GMAT®

DS QUESTIONS

TOP ONE PERCENT

99th PERCENTILE CLUB

DATA SUFFICIENCY QUESTIONS

GMAT

SANDEEP GUPTA

800/800 GMAT,

The Foremost GMAT Trainer in Asia

Founder of Top-One-Percent

Harvard Admit

www.top-one-percent.com

By Sandeep Gupta | GMAT 800/800, Harvard Final Admit

INDEX

Practice Test #1 Data Sufficiency
(218 Questions)

1. 86-!-item-!-187;#058&000002

A garden store purchased a number of shovels and a number of rakes. If the cost of each shovel was \$14 and the cost of each rake was \$9, what was the total cost of the shovels and rakes purchased by the store?

(1) The ratio of the number of shovels to the number of rakes purchased by the store was 2 to 3.

(2) The total number of shovels and rakes purchased by the store was 50.

2. 142-!-item-!-187;#058&000140

Of the students who eat in a certain cafeteria, each student either likes or dislikes lima beans and each student either likes or dislikes brussels sprouts. Of these students, $\frac{2}{3}$ dislike lima beans; and of those who dislike lima beans, $\frac{3}{5}$ also dislike brussels sprouts. How many of the students like brussels sprouts but dislike lima beans?

(1) 120 students eat in the cafeteria.

(2) 40 of the students like lima beans.

3. 196-!-item-!-187;#058&000141

How many different prime numbers are factors of the positive integer n ?

(1) Four different prime numbers are factors of 2n.

(2) Four different prime numbers are factors of n^2.

4. 250-!-item-!-187;#058&000160

Is the product of a certain pair of integers even?

(1) The sum of the integers is odd.

(2) One of the integers is even and the other is odd.

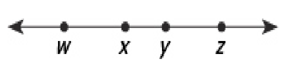
5. 304-!-item-!-187;#058&000163

If k is an integer and 2 < k < 8, what is the value of k ?

(1) k is a factor of 30.

(2) k is a factor of 12.

6. 363-!-item-!-187;#058&000183



On the number line above, is the product of w, x, y, and z negative?

(1) z is positive.

(2) The product of w and x is positive.

7. 509-!-item-!-187;#058&000355

If y and z are integers, is y(z + 1) odd?

(1) y is odd

(2) z is even.

8. 563-!-item-!-187;#058&000364

If n and m are positive integers, what is the remainder when 3^(4n + 2 + m) is divided by 10 ?

(1) n = 2

(2) m = 1

9. 617-!-item-!-187;#058&000483
If x is a positive integer, is x < 16 ?

(1) x is less than the average (arithmetic mean) of the first ten positive integers.

(2) x is the square of an integer.

10. 719-!-item-!-187;#058&000515
Of the 800 students at a certain college, 250 students live on campus and are more than 20 years old. How many of the 800 students live on campus and are 20 years old or less?

(1) 640 students at the college are more than 20 years old.

(2) 60 students at the college are 20 years old or less and live off campus.

11. 959-!-item-!-187;#058&000583
If p is a positive odd integer, what is the remainder when p is divided by 4 ?

(1) When p is divided by 8, the remainder is 5.

(2) p is the sum of the squares of two positive integers.

12. 1013-!-item-!-187;#058&000609
Of the 25 cars sold at a certain dealership yesterday, some had automatic transmission and some had antilock brakes. How many of the cars had automatic transmission but not antilock brakes?

(1) All of the cars that had antilock brakes also had automatic transmission.

(2) 2 of the cars had neither automatic transmission nor antilock brakes.

13. 1067-!-item-!-187;#058&000618
Is x to the right of -5 on the number line?

(1) x is to the right of -7 on the number line.

(2) x is between -4 and -3 on the number line.

14. 1121-!-item-!-187;#058&000619
Is y between -2 and 1 on the number line?

(1) y is to the right of -1 on the number line.

(2) y is to the left of 2 on the number line.

15. 1175-!-item-!-187;#058&000621
Is r to the right of -6 on the number line?

(1) r is between -4 and -1 on the number line.

(2) r is between -3 and 1 on the number line.

16. 1275-!-item-!-187;#058&000656
Lines n and p lie in the xy-plane. Is the slope of line n less than the slope of line p ?

(1) Lines n and p intersect at the point (5,1).

(2) The y-intercept of line n is greater than the y-intercept of line p.

17. 1329-!-item-!-187;#058&000662
Six countries in a certain region sent a total of 75 representatives to an international congress, and no two countries sent the same number of representatives. Of the six countries, if Country A sent the second greatest number of representatives, did Country A send at least 10 representatives?

(1) One of the six countries sent 41 representatives to the congress.

(2) Country A sent fewer than 12 representatives to the congress.

18. 1383-!-item-!-187;#058&000675
What is the hundredths digit of the decimal z ?

(1) The tenths digit of 100z is 2.

(2) The units digit of 1,000z is 2.

19. 1437-!-item-!-187;#058&000677
Is z equal to the median of the three positive integers x, y, and z ?

(1) $x < y + z$

(2) $y = z$

20. 1491-!-item-!-187;#058&000755
A certain one-day seminar consisted of a morning session and an afternoon session. If each of the 128 people attending the seminar attended at least one of the two sessions, how many of the people attended the morning session only?

(1) $\frac{3}{4}$ of the people attended both sessions.

(2) $\frac{7}{8}$ of the people attended the afternoon session.

21. 1545-!-item-!-187;#058&000766
If a certain charity collected a total of 360 books, videos, and board games, how many videos did the charity collect?

(1) The number of books that the charity collected was 40 percent of the total number of books, videos, and board games that the charity collected.

(2) The number of books that charity collected was $66\frac{2}{3}$ percent of the total number of videos and board games that charity collected.

22. 1599-!-item-!-187;#058&000810
Of the 800 sweaters at a certain store, 150 are red. How many of the red sweaters at the store are made of pure wool?

(1) 320 of the sweaters at the store are neither red nor made of pure wool.

(2) 100 of the red sweaters at the store are not made of pure wool.

23. 1653-!-item-!-187;#058&000843
At least 100 students at a certain high school study Japanese. If 4 percent of the students at the school who study French also study Japanese, do more students at the school study French than Japanese?

(1) 16 students at the school study both French and Japanese.

(2) 10 percent of the students at the school who study Japanese also study French.

24. 1952-!-item-!-187;#058&002488
At a certain restaurant, if each hamburger costs the same amount, what is the cost, excluding sales tax, of 1 hamburger?

(1) The total cost, including a 6 percent sales tax, is \$4.77 for 3 hamburgers.

(2) The total cost, including a 6 percent sales tax, is less than \$6.50 for 4 hamburgers.

25. 2055-!-item-!-187;#058&002563
What is the value of n ?

(1) n is between 0 and 1.

(2) $\frac{7}{16}$ is $\frac{3}{8}$ more than n.

26. 2109-!-item-!-187;#058&002567
In a certain conference room each row of chairs has the same number of chairs, and the number of rows is 1 less than the number of chairs in a row. How many chairs are in a row?

(1) There is a total of 72 chairs.

(2) After 1 chair is removed from the last row, there is a total of 17 chairs in the last 2 rows.

27. 2260-!-item-!-187;#058&002626
What is the price for a certain meal listed on a menu?

(1) The total paid for the meal, sales tax, and gratuity is \$10.84.

(2) The sales tax on food is 6 percent.

28. 2365-!-item-!-187;#058&002728
Which of Company X and Company Y earned the greater gross profit last year?

(1) Last year the expenses of Company X were $\frac{5}{6}$ of the expenses of Company Y.

(2) Last year the revenues of Company X were \$6 million less than the revenues of Company Y.

29. 2517-!-item-!-187;#058&002771
What is the value of 6x - 10 ?

(1) $3x - 5 = 16$

(2) $12x - 10 = 74$

30. 2663-!-item-!-187;#058&002855
Is w greater than 1 ?

(1) $w + 2 > 0$

(2) $w^2 > 1$

31. 2764-!-item-!-187;#058&002889
At a refreshment stand, each can of soda sells for the same price and each sandwich sells for the same price. What is the total price for 2 sandwiches and 3 cans of soda at the stand?

(1) At the stand the total price for 1 sandwich and 1 can of soda is \$3.

(2) At the stand the total price for 3 sandwiches and 2 cans of soda is \$8.

32. 2818-!-item-!-187;#058&002974
Al, Pablo, and Marsha shared the driving on a 1,500-mile trip. Which of the three drove the greatest distance on the trip?

(1) Al drove 1 hour longer than Pablo but at an average rate of 5 miles per hour slower than Pablo.

(2) Marsha drove 9 hours and averaged 50 miles per hour.

33. 2873-!-item-!-187;#058&002998

If $x = \frac{1}{2}$, is y equal to 1 ?

(1) $y^2 (x + \frac{1}{2}) = 1$

(2) $y (2x – 1) = 2x - y$

34. 2927-!-item-!-187;#058&003024

During an experiment, some water was removed from each of 6 water tanks. If the standard deviation of the volumes of water in the tanks at the beginning of the experiment was 10 gallons, what was the standard deviation of the volumes of water in the tanks at the end of the experiment?

(1) For each tank, 30 percent of the volume of water that was in the tank at the beginning of the experiment was removed during the experiment.

(2) The average (arithmetic mean) volume of water in the tanks at the end of the experiment was 63 gallons.

35. 3076-!-item-!-187;#058&003114

If p and n are positive integers and p > n, what is the remainder when $p^2 - n^2$ is divided by 15 ?

(1) The remainder when p + n is divided by 5 is 1.

(2) The remainder when p - n is divided by 3 is 1.

36. 3130-!-item-!-187;#058&003116

If x is positive, is x > 3 ?

(1) $(x - 1)^2 > 4$

(2) $(x - 2)^2 > 9$

37. 3184-!-item-!-187;#058&003224

When 1,000 children were inoculated with a certain vaccine, some developed inflammation at the site of the inoculation and some developed fever. How many of the children developed inflammation but not fever?

(1) 880 children developed neither inflammation nor fever.

(2) 20 children developed fever.

38. 3481-!-item-!-187;#058&003324

If r and s are positive integers, is $\frac{r}{s}$ an integer?

(1) Every factor of s is also a factor of r.

(2) Every prime factor of s is also a prime factor of r.

39. 3582-!-item-!-187;#058&003470

For the students in class A, the range of their heights is r centimeters and the greatest height is g centimeters. For the students in class B, the range of their heights is s centimeters and the greatest height is h centimeters. Is the least height of the students in class A greater than the least height of the students in class B ?

(1) r < s

(2) g > h

40. 3636-!-item-!-187;#058&003488

Beth's bank charges a service fee on a regular checking account for each month in which the balance on the account falls below $100 at any time during the month. Did the bank charge a service fee on Beth's regular checking account last month?

(1) During last month, a total of $1,000 was withdrawn from Beth's regular checking account.

(2) At the beginning of last month, Beth's regular checking account balance was $500.

41. 3690-!-item-!-187;#058&003497
Machines X and Y work at their respective constant rates. How many more hours does it take machine Y, working alone, to fill a production order of a certain size than it takes machine X, working alone?

(1) Machines X and Y, working together, fill a production order of this size in two-thirds the time that machine X, working alone, does.

(2) Machine Y, working alone, fills a production order of this size in twice the time that machine X, working alone, does.

42. 3744-!-item-!-187;#058&003565
John and Mary own shares of stock in a certain company. Does John own more shares of the company's stock than Mary?

(1) Mary owns more than 500 shares of the company's stock.

(2) The number of shares of the company's stock that John owns is 400 less than twice the number of shares of the company's stock that Mary owns.

43. 3798-!-item-!-187;#058&003572
Each person in a certain group supports only one of the two candidates R and T. Of the people in the group, 45 percent support Candidate R and the rest support Candidate T. How many people in the group are in favor of a flat tax?

(1) Of the people in the group who support Candidate R, 58 percent are in favor of a flat tax.

(2) Of the people in the group who support Candidate T, 22 are in favor of a flat tax.

44. 3852-!-item-!-187;#058&003578
In the xy-plane, at what two points does the graph of $y = (x + a)(x + b)$ intersect the x-axis?

(1) $a + b = -1$

(2) The graph intersects the y-axis at $(0, -6)$.

45. 3906-!-item-!-187;#058&003579
How many of the 42 people in a group are employed students?

(1) 29 of the 42 people are employed.

(2) 24 of the 42 people are students.

46. 3960-!-item-!-187;#058&003582
How many hours did it take Helen to drive from her house to her parents' house?

(1) Helen's average speed on this trip was 72 kilometers per hour.

(2) If Helen's average speed on this trip had been 8 kilometers per hour greater, it would have taken her 1 hour less.

47. 4068-!-item-!-187;#058&003673
Is $m \neq n$?

(1) $m + n < 0$

(2) $mn < 0$

48. 4122-!-item-!-187;#058&003746
Last Friday each of the pets at a certain veterinary clinic was given either 1 treat or 2 treats. What was the total number of

treats given to pets at the clinic last Friday?

(1) The total number of pets at the clinic last Friday was 90.

(2) $\frac{2}{3}$ of the pets at the clinic last Friday were given 2 treats each.

49. 4176-!-item-!-187;#058&003769
Does x + y = 5 ?

(1) $4x + y = 17$

(2) $x + 4y = 8$

50. 4230-!-item-!-187;#058&003784
A construction company was paid a total of $500,000 for a construction project. The company's only costs for the project were for labor and materials. Was the company's profit for the project greater than $150,000 ?

(1) The company's total cost was three times its cost for materials.

(2) The company's profit was greater than its cost for labor.

51. 4284-!-item-!-187;#058&003822
What is the total value of Company H's stock?

(1) Investor P owns $\frac{1}{4}$ of the shares of Company H's total stock.

(2) The total value of Investor Q's shares of Company H's stock is $16,000.

52. 4338-!-item-!-187;#058&003827
If the average (arithmetic mean) of four different numbers is 30, how many of the numbers are greater than 30 ?

(1) None of the four numbers is greater than 60.

(2) Two of the four numbers are 9 and 10, respectively.

53. 4392-!-item-!-187;#058&003851
If wx = y, what is the value of xy ?

(1) $wx^2 = 16$

(2) $y = 4$

54. 4538-!-item-!-187;#058&004024
Is x - y + 1 greater than x + y - 1 ?

(1) $x > 0$

(2) $y < 0$

55. 4687-!-item-!-187;#058&004202
Malik's recipe for 4 servings of a certain dish requires $1\frac{1}{2}$ cups of pasta. According to this recipe, what is the number of cups of pasta that Malik will use the next time he prepares this dish?

(1) The next time he prepares this dish, Malik will make half as many servings as he did the last time he prepared the dish.

(2) Malik used 6 cups of pasta the last time he prepared this dish.

56. 4741-!-item-!-187;#058&004206
During a sale, a clothing store sold each shirt at a price of $15 and each sweater at a price of $25. Did the store sell more

sweaters than shirts during the sale?

(1) The average (arithmetic mean) of the prices of all of the shirts and sweaters that the store sold during the sale was $21.

(2) The total of the prices of all of the shirts and sweaters that the store sold during the sale was $420.

57. 4795-!-item-!-187;#058&004223
During a sale, for each shirt that Mark purchased at the regular price, he also purchased a shirt at half the regular price. How many shirts did Mark purchase during the sale?

(1) The regular price of each of the shirts that Mark purchased during the sale was $21.50.

(2) The total of the prices for all the shirts that Mark purchased during the sale was $129.00.

58. 4895-!-item-!-187;#058&004290
What is the remainder when the positive integer x is divided by 3 ?

(1) When x is divided by 6, the remainder is 2.

(2) When x is divided by 15, the remainder is 2.

59. 4950-!-item-!-187;#058&004329
Ann deposited money into two new accounts, A and B. Account A earns 5 percent simple annual interest and account B earns 8 percent simple annual interest. If there were no other transactions in the two accounts, then the amount of interest that account B earned in the first year was how many dollars greater than the amount of interest that account A earned in the first year?

(1) Ann deposited $200 more in account B than in account A.

(2) The total amount of interest that the two accounts earned in the first year was $120.

60. 5054-!-item-!-187;#058&004422
What was the percent increase in the population of City K from 1980 to 1990 ?

(1) In 1970 the population of City K was 160,000

(2) In 1980 the population of City K was 20 percent greater than it was in 1970, and in 1990 the population of City K was 30 percent greater than it was in 1970.

61. 5157-!-item-!-187;#058&004472
Of the 60 animals on a certain farm, $\frac{2}{3}$ are either pigs or cows. How many of the animals are cows?

(1) The farm has more than twice as many cows as it has pigs.

(2) The farm has more than 12 pigs.

62. 5212-!-item-!-187;#058&004501
In isosceles ΔRST what is the measure of $\angle R$

(1) The measure of $\angle T$ is 100°.

(2) The measure of $\angle S$ is 40°.

63. 5266-!-item-!-187;#058&004544
The cost of delivery for an order of desk chairs was $10.00 for the first chair, and $1.00 for each additional chair in the order. If an office manager placed an order for n desk chairs, is n > 24 ?

(1) The delivery cost for the order totaled more than $30.00.

(2) The average (arithmetic mean) delivery cost per chair of the n chairs was $1.36.

64. 5320-!-item-!-187;#058&004563
Are at least 10 percent of the people in Country X who are 65 years old or older employed?

(1) In Country X, 11.3 percent of the population is 65 years old or older.

(2) In Country X, of the population 65 years old or older, 20 percent of the men and 10 percent of the women are employed.

65. 5374-!-item-!-187;#058&004565
If x is a positive number less than 10, is z greater than the average (arithmetic mean) of x and 10 ?

(1) On the number line, z is closer to 10 than it is to x.

(2) z = 5x

66. 5428-!-item-!-187;#058&004588
In the finite sequence of positive integers K_1, K_2, K_3, . . . , K_9, each term after the second is the sum of the two terms immediately preceding it. If $K_5 = 18$, what is the value of K_9 ?

(1) $K_4 = 11$

(2) $K_6 = 29$

67. 5482-!-item-!-187;#058&004634
Is x + y negative?

(1) x is negative.

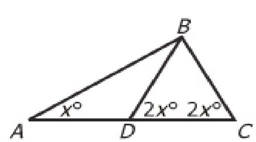
(2) y is positive.

68. 5536-!-item-!-187;#058&004638
What is the tens digit of the positive integer r ?

(1) The tens digit of $\frac{r}{10}$ is 3.

(2) The hundreds digit of 10r is 6.

69. 5825-!-item-!-187;#058&004737



In triangle ABC above, what is the length of side BC ?

(1) Line segment AD has length 6.

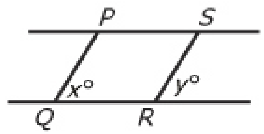
(2) x = 36

70. 6067-!-item-!-187;#058&004849
Is the integer x divisible by 6 ?

(1) x + 3 is divisible by 3.

(2) x + 3 is an odd number.

71. 6125-!-item-!-187;#058&004856



In the figure above, if x and y are each less than 90 and PS || QR is the length of segment PQ less than the length of segment SR ?

(1) $x > y$

(2) $x + y > 90$

72. 6179-!-item-!-187;#058&004900
A bookstore that sells used books sells each of its paperback books for a certain price and each of its hardcover books for a certain price. If Joe, Maria, and Paul bought books in this store, how much did Maria pay for 1 paperback book and 1 hardcover book?

(1) Joe bought 2 paperback books and 3 hardcover books for $12.50.

(2) Paul bought 4 paperback books and 6 hardcover books for $25.00.

73. 6279-!-item-!-187;#058&004943
What is the average (arithmetic mean) of eleven consecutive integers?

(1) The average of the first nine integers is 7.

(2) The average of the last nine integers is 9.

74. 6333-!-item-!-187;#058&004944
If x and y are integers, what is the value of $x + y$?

(1) $690 < x < y < 696$

(2) $692 < x < y < 695$

75. 6387-!-item-!-187;#058&004958
Is x less than 20 ?

(1) The sum of x and y is less than 20.

(2) y is less than 20.

76. 6441-!-item-!-187;#058&005031
Is the integer k divisible by 4 ?

(1) 8k is divisible by 16.

(2) 9k is divisible by 12.

77. 6741-!-item-!-187;#058&005163
If n is an integer between 10 and 99, is $n < 80$?

(1) The sum of the two digits of n is a prime number.

(2) Each of the two digits of n is a prime number.

78. 6841-!-item-!-187;#058&005248
For each customer, a bakery charges p dollars for the first loaf of bread bought by the customer and charges q dollars for each additional loaf bought by the customer. What is the value of p ?

(1) A customer who buys 2 loaves is charged 10 percent less per loaf than a customer who buys a single loaf.

(2) A customer who buys 6 loaves of bread is charged 10 dollars.

79. 6946-!-item-!-187;#058&005390
If the terms of a sequence are t_1, t_2, t_3, . . . , t_n, what is the value of n ?

(1) The sum of the n terms is 3,124.

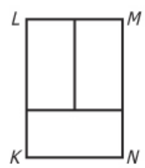
(2) The average (arithmetic mean) of the n terms is 4.

80. 7243-!-item-!-187;#058&005480
If x is a negative number, what is the value of x ?

(1) $x^2 = 1$

(2) $x^2 + 3x + 2 = 0$

81. 7301-!-item-!-187;#058&005482



In the figure above, what is the ratio $\frac{KN}{MN}$

(1) The perimeter of rectangle KLMN is 30 meters.

(2) The three small rectangles have the same dimensions.

82. 7356-!-item-!-187;#058&005489
Is $|x| > |y|$?

(1) $x^2 > y^2$

(2) $x > y$

83. 7463-!-item-!-187;#058&005565
If u, v, and w are integers, is u > 0 ?

(1) $u = v^2 + 1$

(2) $u = w^4 + 1$

84. 7517-!-item-!-187;#058&005572
If p is a prime number greater than 2, what is the value of p ?

(1) There are a total of 100 prime numbers between 1 and p + 1.

(2) There are a total of p prime numbers between 1 and 3,912.

85. 7713-!-item-!-187;#058&005641
Is k positive?

(1) k is between -2 and 3 on the number line.

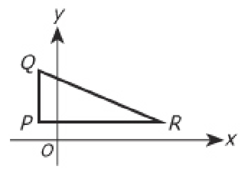
(2) k is between 1 and 2 on the number line.

86. 7767-!-item-!-187;#058&005660
Each of the students in a certain class received a single grade of P, F, or I. What percent of the students in the class were females?

(1) Of those who received a P, 40 percent were females.

(2) Of those who received either an F or I, 80 percent were males.

87. 7824-!-item-!-187;#058&005664



In the figure above, segments PQ and PR are each parallel to one of the rectangular coordinate axes. What is the sum of the coordinates of point P ?

(1) The x-coordinate of point Q is -1.

(2) The y-coordinate of point R is 1.

88. 8066-!-item-!-187;#058&005745
What is the greatest common divisor of positive integers m and n ?

(1) m is a prime number.

(2) $2n = 7m$

89. 8212-!-item-!-187;#058&005846
What is the retail price of a certain calculator?

(1) The retail price of the calculator is $2.00 more than the wholesale price.

(2) The retail price of the calculator is 50 percent more than the $4.00 wholesale price.

90. 8266-!-item-!-187;#058&005947
On Jane's credit card account, the average daily balance for a 30-day billing cycle is the average (arithmetic mean) of the daily balances at the end of each of the 30 days. At the beginning of a certain 30-day billing cycle, Jane's credit card account had a balance of $600. Jane made a payment of $300 on the account during the billing cycle. If no other amounts were added to or subtracted from the account during the billing cycle, what was the average daily balance on Jane's account for the billing cycle?

(1) Jane's payment was credited on the 21st day of the billing cycle.

(2) The average daily balance through the 25th day of the billing cycle was $540.

91. 8417-!-item-!-187;#058&005991
What is the remainder when the positive integer n is divided by 6 ?

(1) n is a multiple of 5.

(2) n is a multiple of 12.

92. 8471-!-item-!-187;#058&005997
Is the integer r divisible by 3 ?

(1) r is the product of 4 consecutive positive integers.

(2) $r < 25$

93. 8525-!-item-!-187;#058&006006

If the integer n is greater than 1, is n equal to 2 ?

(1) n has exactly two positive factors.

(2) The difference of any two distinct positive factors of n is odd.

94. 8579-!-item-!-187;#058&006012

What is the value of y ?

(1) y is an odd integer between 28 and 34.

(2) $31 < y < 36$

95. 8634-!-item-!-187;#058&006039

Is $\frac{1}{a-b} < b - a$?

(1) $a < b$.

(2) $1 < |a-b|$.

96. 8688-!-item-!-187;#058&006049

If x and y are integers greater than 1, is x a multiple of y ?

(1) $3y^2 + 7y = x$.

(2) $x^2 - x$ is a multiple of y.

97. 8745-!-item-!-187;#058&006054

Is $\sqrt{(x-3)^2} = 3 - x$

(1) $x \neq 3$

(2) $-x|x| > 0$

98. 8799-!-item-!-187;#058&006082

What is the value of $5x^2 + 4x - 1$?

(1) $x(x + 2) = 0$

(2) $x = 0$

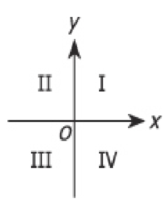
99. 9270-!-item-!-187;#058&006322

If $m > 0$ and $n > 0$, is $\frac{m+x}{n+x} > \frac{m}{n}$?

(1) $m < n$

(2) $x > 0$

100. 9327-!-item-!-187;#058&006480



In the rectangular coordinate system shown above, does the line k (not shown) intersect quadrant II ?

(1) The slope of k is $-\frac{1}{6}$

(2) The y-intercept of k is -6.

101. 9432-!-item-!-187;#058&006634
If the sum of three different numbers is 54, what is the largest number?

(1) The largest number is twice the smallest number.

(2) The sum of the two smaller numbers is 30.

102. 9486-!-item-!-187;#058&006637
If M is a finite set of negative integers, is the total number of integers in M an odd number?

(1) The product of all the integers in M is odd.

(2) The product of all the integers in M is negative.

103. 9540-!-item-!-187;#058&006638
A certain bag contains red, blue, and green marbles. What is the ratio of the number of green marbles to the number of red marbles in the bag?

(1) The number of blue marbles in the bag is 2 times the number of green marbles in the bag.

(2) The number of blue marbles in the bag is 3 times the number of red marbles in the bag.

104. 9643-!-item-!-187;#058&006681
What is the value of x ?

(1) y - x = y - 6

(2) x + 2y = 10

105. 9789-!-item-!-187;#058&006817
What is the number of members of Club X who are at least 35 years of age?

(1) Exactly $\frac{3}{4}$ of the members of Club X are under 35 years of age.

(2) The 64 women in Club X constitute 40 percent of the club's membership.

106. 9843-!-item-!-187;#058&006850
What was Jean's insurance premium in 1995 ?

(1) The ratio of Jean's insurance premium in 1995 to her insurance premium in 1994 was $\frac{6}{5}$.

(2) Jean's insurance premium in 1995 was 20 percent more than her insurance premium in 1994.

107. 9897-!-item-!-187;#058&006904
A combined total of 55 lightbulbs are stored in two boxes; of these, a total of 7 are broken. If there are exactly 2 broken bulbs in the first box, what is the number of bulbs in the second box that are not broken?

(1) In the first box, the number of bulbs that are not broken is 15 times the number of broken bulbs.

(2) The total number of bulbs in the first box is 9 more than the total number of bulbs in the second box.

108. 10385-!-item-!-187;#058&007204
Three friends rented a car for a week and divided the cost equally. What was the total cost of renting the car?

(1) If the three friends had kept the car for a second week, they could have obtained the two-week rate, which was 1.5 times the cost of a one-week rental.

(2) If a fourth friend had joined the three friends and the cost had been divided equally among the four friends, the cost to each of the original three would have been reduced by $15.

109. 10439-!-item-!-187;#058&007237
If $R = 1 + 2xy + x^2y^2$, what is the value of xy ?

(1) $R = 0$

(2) $x > 0$

110. 10493-!-item-!-187;#058&007240
If $z^n = 1$, what is the value of z ?

(1) n is a nonzero integer.

(2) $z > 0$

111. 10884-!-item-!-187;#058&007442
If x, y, and z are positive integers, what is the remainder when $100x + 10y + z$ is divided by 7 ?

(1) $y = 6$

(2) $z = 3$

112. 11176-!-item-!-187;#058&007606
Each person attending a fund-raising party for a certain club was charged the same admission fee. How many people attended the party?

(1) If the admission fee had been $0.75 less and 100 more people had attended, the club would have received the same amount in admission fees.

(2) If the admission fee had been $1.50 more and 100 fewer people had attended, the club would have received the same amount in admission fees.

113. 11760-!-item-!-187;#058&007855
For a certain set of n numbers, where $n > 1$, is the average (arithmetic mean) equal to the median?

(1) If the n numbers in the set are listed in increasing order, then the difference between any pair of successive numbers in the set is 2.

(2) The range of the n numbers in the set is $2(n - 1)$.

114. 11816-!-item-!-187;#058&007868
Henry purchased 3 items during a sale. He received a 20 percent discount off the regular price of the most expensive item and a 10 percent discount off the regular price of each of the other 2 items. Was the total amount of the 3 discounts greater than 15 percent of the sum of the regular prices of the 3 items?

(1) The regular price of the most expensive item was $50, and the regular price of the next most expensive item was $20.

(2) The regular price of the least expensive item was $15.

115. 11870-!-item-!-187;#058&007880
If $xy = -18$, is x less than y ?

(1) $x < 0$

(2) $y < 10$

116. 11924-!-item-!-187;#058&007881
An insurance company has a contract with a medical laboratory to pay a discounted price for a certain medical test performed on patients referred to the laboratory by the insurance company. If the laboratory's original bill for this medical test on a patient referred by the insurance company is $230, what is the percent discount specified by the contract between the laboratory and the insurance company?

(1) The insurance company is required to pay only 20 percent of the original bill for the test.

(2) The insurance company is required to pay $46 for the test.

117. 11978-!-item-!-187;#058&007947
If P, Q, and R are points on the number line, what is the distance between P and R ?

(1) Q is between P and R.

(2) The distance between P and Q is 5.

118. 12032-!-item-!-187;#058&007948
If x is positive, what is the value of y ?

(1) $5x = 15$

(2) $xy + y = 18$

119. 12086-!-item-!-187;#058&008079
A contractor combined x tons of a gravel mixture that contained 10 percent gravel G, by weight, with y tons of a mixture that contained 2 percent gravel G, by weight, to produce z tons of a mixture that was 5 percent gravel G, by weight. What is the value of x ?

(1) $y = 10$

(2) $z = 16$

120. 12140-!-item-!-187;#058&008146
How many of the students in a certain class are taking both a history and a science course?

(1) Of all the students in the class, 50 are taking a history course.

(2) Of all the students in the class, 70 are taking a science course.

121. 12194-!-item-!-187;#058&008148
Pat bought 5 pounds of apples. How many pounds of pears could Pat have bought for the same amount of money?

(1) One pound of pears costs $0.50 more than one pound of apples.

(2) One pound of pears costs $1\frac{1}{2}$ times as much as one pound of apples.

122. 12343-!-item-!-187;#058&008383
During a 40-mile trip, Marla traveled at an average speed of x miles per hour for the first y miles of the trip and at an average speed of 1.25x miles per hour for the last 40 - y miles of the trip. The time that Marla took to travel the 40 miles was what percent of the time it would have taken her if she had traveled at an average speed of x miles per hour for the entire trip?

(1) $x = 48$

(2) $y = 20$

123. 12586-!-item-!-187;#058&008871
If integer p is greater than 1, is p a prime number?

(1) p is odd.

(2) The only positive factors of p are 1 and p.

124. 12829-!-item-!-187;#058&008976
A certain company divides its total advertising budget into television, radio, newspaper, and magazine budgets in the ratio of 8 : 7 : 3 : 2, respectively. How many dollars are in the radio budget?

(1) The television budget is $18,750 more than the newspaper budget.

(2) The magazine budget is $7,500.

125. 12932-!-item-!-187;#058&009020
The sequence a_1, a_2, a_3, . . . , a_n of n integers is such that $a_k = k$ if k is odd and $a_k = -a_{k-1}$ if k is even. Is the sum of the terms in the sequence positive?

(1) n is odd.

(2) a_n is positive.

126. 13035-!-item-!-187;#058&009047
S is a finite set of numbers. Does S contain more negative numbers than positive numbers?

(1) The product of all the numbers in S is -1,200.

(2) There are 6 numbers in S .

127. 13089-!-item-!-187;#058&009187
On the number line, if the number k is to the left of the number t, is the product kt to the right of t ?

(1) $t < 0$

(2) $k < 1$

128. 13143-!-item-!-187;#058&009201
The points A, B, C, and D are on a number line, not necessarily in that order. If the distance between A and B is 18 and the distance between C and D is 8, what is the distance between B and D ?

(1) The distance between C and A is the same as the distance between C and B.

(2) A is to the left of D on the number line.

129. 13198-!-item-!-187;#058&009205
Is $\frac{x+1}{x-3} < 0$?

(1) $-1 < x < 1$

(2) $x^2 - 4 < 0$

130. 13252-!-item-!-187;#058&009207
In the sequence of positive numbers x_1, x_2, x_3, . . . , what is the value of x_1 ?

(1) $x_l = \frac{x_{l-1}}{2}$ for all integers $l > 1$

(2) $x_5 = \frac{x_4}{x_4+1}$

131. 13306-!-item-!-187;#058&009213
The positive integer k has exactly two positive prime factors, 3 and 7. If k has a total of 6 positive factors, including 1 and k,

what is the value of k ?

(1) 3^2 is a factor of k.

(2) 7^2 is not a factor of k.

132. 13360-!-item-!-187;#058&009215
If ℓ and k are lines in the xy-plane, is the product of the slopes of ℓ and k equal to -1 ?

(1) Line ℓ passes through the origin and the point (1, 2).

(2) Line k has x-intercept 4 and y-intercept 2.

133. 13609-!-item-!-187;#058&009567
At a certain company, the average (arithmetic mean) number of years of experience is 9.8 years for the male employees and 9.1 years for the female employees. What is the ratio of the number of the company's male employees to the number of the company's female employees?

(1) There are 52 male employees at the company.

(2) The average number of years of experience for the company's male and female employees combined is 9.3 years.

134. 13755-!-item-!-187;#058&009724
An attorney charged a fee for estate planning services for a certain estate. The attorney's fee was what percent of the assessed value of the estate?

(1) The assessed value of the estate was \$1.2 million.

(2) The attorney charged \$2,400 for the estate planning services.

135. 13860-!-item-!-187;#058&009754
During a one-day sale, a store sold each sweater of a certain type for \$30 more than the store's cost to purchase each sweater. How many of these sweaters were sold during the sale?

(1) During the sale, the total revenue from the sale of these sweaters was \$270.

(2) During the sale, the store sold each of these sweaters at a price that was 50 percent greater than the store's cost to purchase each sweater.

136. 13960-!-item-!-187;#058&009782
An integer greater than 1 that is not prime is called composite. If the two-digit integer n is greater than 20, is n composite?

(1) The tens digit of n is a factor of the units digit of n.

(2) The tens digit of n is 2.

137. 14062-!-item-!-187;#058&009802
If x is an integer, is $(x^2 + 1)(x + 5)$ an even number?

(1) x is an odd number.

(2) Each prime factor of x^2 is greater than 7.

138. 14162-!-item-!-187;#058&009822
A certain theater has a total of 884 seats, of which 500 are orchestra seats and the rest are balcony seats. When tickets for all the seats in the theater are sold, the total revenue from ticket sales is \$34,600. What was the theater's total revenue from ticket sales for last night's performance?

(1) The price of an orchestra seat ticket is twice the price of a balcony seat ticket.

(2) For last night's performance, tickets for all the balcony seats were sold, but only 80 percent of the tickets for the orchestra seats were sold.

139. 14263-!-item-!-187;#058&009908

If it took Carlos $\frac{1}{2}$ hour to cycle from his house to the library yesterday, was the distance that he cycled greater than 6 miles? (Note: 1 mile = 5,280 feet)

(1) The average speed at which Carlos cycled from his house to the library yesterday was greater than 16 feet per second.

(2) The average speed at which Carlos cycled from his house to the library yesterday was less than 18 feet per second.

140. 14319-!-item-!-187;#058&009938

At a certain pet shop, $\frac{1}{3}$ of the pets are dogs and $\frac{1}{5}$ of the pets are birds. How many of the pets are dogs?

(1) There are 30 birds at the pet shop.

(2) There are 20 more dogs than birds at the pet shop.

141. 14373-!-item-!-187;#058&009939

To fill an order on schedule, a manufacturer had to produce 1,000 tools per day for n days. What is the value of n ?

(1) Because of production problems, the manufacturer produced only 600 tools per day during the first 5 days.

(2) Because of production problems, the manufacturer had to produce 1,500 tools per day on each of the last 4 days in order to meet the schedule.

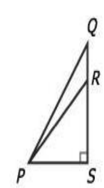
142. 14473-!-item-!-187;#058&010003

If x is a positive integer, what is the least common multiple of x, 6, and 9 ?

(1) The least common multiple of x and 6 is 30.

(2) The least common multiple of x and 9 is 45.

143. 14534-!-item-!-187;#058&010011



In the figure shown, the measure of angle PRS is how many degrees greater than the measure of angle PQR ?

(1) The measure of angle QPR is 30°

(2) The sum of the measures of angles PQR and PRQ is 150°

144. 14635-!-item-!-187;#058&010061

If \$1,000 is deposited in a certain bank account and remains in the account along with any accumulated interest, the dollar amount of interest, I , earned by the deposit in the first n years is given by the formula $I = 1000\left[\left(1 + \frac{r}{100}\right)^n - 1\right]$, where r percent is the annual interest rate paid by the bank. Is the annual interest rate paid by the bank greater than 8 percent?

(1) The deposit earns a total of \$210 in interest in the first two years.

(2) $\left(1 + \frac{r}{100}\right)^2 > 1.15$

145. 14689-!-item-!-187;#058&010088

On her way home from work, Janet drives through several tollbooths. Is there a pair of these tollbooths that are less than 10 miles apart?

(1) The first tollbooth and the last tollbooth are 25 miles apart.

(2) Janet drives through 4 tollbooths on her way home from work.

146. 14746-!-item-!-187;#058&010097
If the symbol $\triangle$ represents either addition or multiplication, which operation does it represent?

(1) $a \triangle b = b \triangle a$ for all numbers a and b.

(2) $a \triangle (b - c) = (a \triangle b) - (a \triangle c)$ for all numbers a, b, and c.

147. 14800-!-item-!-187;#058&010134
Each employee on a certain task force is either a manager or a director. What percent of the employees on the task force are directors?

(1) The average (arithmetic mean) salary of the managers on the task force is $5,000 less than the average salary of all employees on the task force.

(2) The average (arithmetic mean) salary of the directors on the task force is $15,000 greater than the average salary of all employees on the task force.

148. 14854-!-item-!-187;#058&010192
In the xy-plane, does the line with equation $y = 3x + 2$ contain the point (r, s) ?

(1) $(3r + 2 - s)(4r + 9 - s) = 0$

(2) $(4r - 6 - s)(3r + 2 - s) = 0$

149. 14908-!-item-!-187;#058&010196
If m, r, x, and y are positive, is the ratio of m to r equal to the ratio of x to y ?

(1) The ratio of m to y is equal to the ratio of x to r.

(2) The ratio of m + x to r + y is equal to the ratio of x to y.

150. 15103-!-item-!-187;#058&010253
If a, b, k, and m are positive integers, is a^k a factor of b^m ?

(1) a is a factor of b.

(2) $k \leq m$

151. 15157-!-item-!-187;#058&010256
Is $x > 0.05$?

(1) $x > \frac{3}{40}$

(2) x is greater than 3 percent of 50.

152. 15303-!-item-!-187;#058&010299
If $xyz > 0$, is $x > 0$?

(1) $xy > 0$

(2) $xz > 0$

153. 15354-!-item-!-187;#058&010304

A wooden rod is cut into two pieces. What is the length of the longer piece?

(1) One of the pieces is 20 inches longer than the other piece.

(2) The length of the shorter piece is $\frac{1}{3}$ the length of the longer piece.

154. 15408-!-item-!-187;#058&010332
The sum of positive integers x and y is 77. What is the value of xy ?

(1) $x = y + 1$

(2) x and y have the same tens digit.

155. 15462-!-item-!-187;#058&010358
Did it take Pei more than 2 hours to walk a distance of 10 miles along a certain trail? (1 mile = 1.6 kilometers, rounded to the nearest tenth.)

(1) Pei walked this distance at an average rate of less than 6.4 kilometers per hour.

(2) On average, it took Pei more than 9 minutes per kilometer to walk this distance.

156. 15516-!-item-!-187;#058&010359
A store sells milk in cartons of two sizes, one-half gallon and one-quarter gallon. If the store sold a total of 300 cartons of milk yesterday, how many gallons of milk did it sell yesterday?

(1) Yesterday the store sold 120 one-quarter-gallon cartons of milk.

(2) Yesterday the store sold 90 gallons of milk in one-half-gallon cartons.

157. 15663-!-item-!-187;#058&010465
If n is a positive integer and r is the remainder when $4 + 7n$ is divided by 3, what is the value of r ?

(1) $n + 1$ is divisible by 3.

(2) $n > 20$

158. 15810-!-item-!-187;#058&010518
Each of the 25 balls in a certain box is either red, blue, or white and has a number from 1 to 10 painted on it. If one ball is to be selected at random from the box, what is the probability that the ball selected will either be white or have an even number painted on it?

(1) The probability that the ball will both be white and have an even number painted on it is 0.

(2) The probability that the ball will be white minus the probability that the ball will have an even number painted on it is 0.2.

159. 15957-!-item-!-187;#058&010660
If n is a positive integer and r is the remainder when $(n - 1)(n + 1)$ is divided by 24, what is the value of r ?

(1) n is not divisible by 2.

(2) n is not divisible by 3.

160. 16057-!-item-!-187;#058&010664
If Company M ordered a total of 50 computers and printers and Company N ordered a total of 60 computers and printers, how many computers did Company M order?

(1) Company M and Company N ordered the same number of computers.

(2) Company N ordered 10 more printers than Company M.

161. 16203-!-item-!-187;#058&010722
If the average (arithmetic mean) of the five numbers x, 7, 2, 16, and 11 is equal to the median of the five numbers, what is the value of x ?

(1) 7 < x < 11

(2) x is the median of the five numbers.

162. 16257-!-item-!-187;#058&010730
What fraction of this year's graduating students at a certain college are males?

(1) Of this year's graduating students, 33 percent of the males and 20 percent of the females transferred from another college.

(2) Of this year's graduating students, 25 percent transferred from another college.

163. 16312-!-item-!-187;#058&010731
Linda put an amount of money into each of two new investments, A and B, that pay simple annual interest. If the annual interest rate of investment B is 1.5 times that of investment A, what amount did Linda put into investment A ?

(1) The interest for 1 year is $50 for investment A and $150 for investment B.

(2) The amount that Linda put into investment B is twice the amount that she put into investment A.

164. 16412-!-item-!-187;#058&010774
At a two-day seminar, 90 percent of those registered attended the seminar on the first day. What percent of those registered did not attend the seminar on either day?

(1) A total of 1,000 people registered for the two-day seminar.

(2) Of those registered, 80 percent attended the seminar on the second day.

165. 16466-!-item-!-187;#058&010795
Of the 1,400 college teachers surveyed, 42 percent said that they considered engaging in research an essential goal. How many of the college teachers surveyed were women?

(1) In the survey, 36 percent of the men and 50 percent of the women said that they considered engaging in research an essential goal.

(2) In the survey, 288 men said that they considered engaging in research an essential goal.

166. 16522-!-item-!-187;#058&010838
In the xy-coordinate plane, the slope of line l is $\frac{3}{4}$. Does line l pass through the point $(-\frac{2}{3}, \frac{1}{2})$?

(1) Line l passes through the point (4,4).

(2) Line l passes through the point (-4,-2).

167. 16626-!-item-!-187;#058&010859
If x, y, and z are integers and xy + z is an odd integer, is x an even integer?

(1) xy + xz is an even integer.

(2) y + xz is an odd integer.

168. 16680-!-item-!-187;#058&010861
On the number line, the distance between x and y is greater than the distance between x and z. Does z lie between x and y on the number line?

(1) xyz < 0

(2) $xy < 0$

169. 16735-!-item-!-187;#058&010875
If the integers a and n are greater than 1 and the product of the first 8 positive integers is a multiple of a^n, what is the value of a ?

(1) $a^n = 64$

(2) $n = 6$

170. 16927-!-item-!-187;#058&010946
If n and t are positive integers, what is the greatest prime factor of the product nt ?

(1) The greatest common factor of n and t is 5.

(2) The least common multiple of n and t is 105.

171. 16981-!-item-!-187;#058&010960
Is $|x - y| > |x| - |y|$?

(1) $y < x$

(2) $xy < 0$

172. 17130-!-item-!-187;#058&011022
If m, k, x, and y are positive numbers, is $mx + ky > kx + my$?

(1) $m > k$

(2) $x > y$

173. 17281-!-item-!-187;#058&011070
If N is a positive integer, is the units digit of N equal to zero?

(1) 14 and 35 are factors of N.

(2) $N = (2^5)(3^2)(5^7)(7^6)$

174. 17336-!-item-!-187;#058&011114
In the xy-plane, what is the y-intercept of line l

(1) The slope of line l is 3 times its y-intercept.

(2) The x-intercept of line l is $-\frac{1}{3}$.

175. 17390-!-item-!-187;#058&011123
The sum of the integers in list S is the same as the sum of the integers in list T. Does S contain more integers than T ?

(1) The average (arithmetic mean) of the integers in S is less than the average of the integers in T.

(2) The median of the integers in S is greater than the median of the integers in T.

176. 17491-!-item-!-187;#058&011140
If x and y are positive integers, is the product xy even?

(1) $5x - 4y$ is even.

(2) $6x + 7y$ is even.

177. 17595-!-item-!-187;#058&011159
If x and y are positive integers, what is the value of xy ?

(1) The greatest common factor of x and y is 10.

(2) The least common multiple of x and y is 180.

178. 17649-!-item-!-187;#058&011192
If there are more than two numbers in a certain list, is each of the numbers in the list equal to 0 ?

(1) The product of any two numbers in the list is equal to 0.

(2) The sum of any two numbers in the list is equal to 0.

179. 17750-!-item-!-187;#058&011285
A manufacturer conducted a survey to determine how many people buy products P and Q. What fraction of the people surveyed said that they buy neither product P nor product Q ?

(1) $\frac{1}{3}$ of the people surveyed said that they buy product P but not product Q.

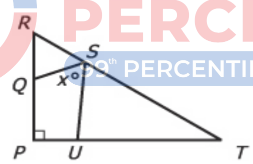
(2) $\frac{1}{2}$ of the people surveyed said that they buy product Q.

180. 17851-!-item-!-187;#058&011342
Are x and y both positive?

(1) $2x - 2y = 1$

(2) $\frac{x}{y} > 1$

181. 17908-!-item-!-187;#058&011358



In the figure shown, what is the value of x ?

(1) The length of line segment QR is equal to the length of line segment RS.

(2) The length of line segment ST is equal to the length of line segment TU.

182. 17963-!-item-!-187;#058&011379
In a certain year, the difference between Mary's and Jim's annual salaries was twice the difference between Mary's and Kate's annual salaries. If Mary's annual salary was the highest of the 3 people, what was the average (arithmetic mean) annual salary of the 3 people that year?

(1) Jim's annual salary was $30,000 that year.

(2) Kate's annual salary was $40,000 that year.

183. 18017-!-item-!-187;#058&011390
The positive integers x, y, and z are such that x is a factor of y and y is a factor of z. Is z even?

(1) xz is even.

(2) y is even.

184. 18071-!-item-!-187;#058&011405
Jack and Mark both received hourly wage increases of 6 percent. After the wage increases, Jack's hourly wage was how many dollars per hour more than Mark's?

(1) Before the wage increases, Jack's hourly wage was $5.00 per hour more than Mark's.

(2) Before the wage increases, the ratio of Jack's hourly wage to Mark's hourly wage was 4 to 3.

185. 18511-!-item-!-187;#058&011604
Is x between 0 and 1 ?

(1) x is between $-\frac{1}{2}$ and $\frac{3}{2}$

(2) $\frac{3}{4}$ is $\frac{1}{4}$ more than x.

186. 18566-!-item-!-187;#058&011610

If $0 < x < y$, what is the value of $\frac{(x+y)^2}{(x-y)^2}$?

(1) $x^2 + y^2 = 3xy$

(2) $xy = 3$

187. 18620-!-item-!-187;#058&011611
If x, y, and z are integers greater than 1, what is the value of x + y + z ?

(1) $xyz = 70$

(2) $\frac{x}{yz} = \frac{7}{10}$

188. 18674-!-item-!-187;#058&011626
Is p + pz = p ?

(1) p = 0

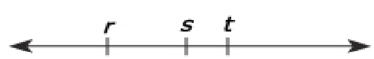
(2) z = 0

189. 18728-!-item-!-187;#058&011689
If the operation $\triangle$ is one of the four arithmetic operations addition, subtraction, multiplication, and division, is $(6 \triangle 2) \triangle 4 = 6 \triangle (2 \triangle 4)$?

(1) $3 \triangle 2 > 3$

(2) $3 \triangle 1 = 3$

190. 18785-!-item-!-187;#058&011838



On the number line shown, is zero halfway between r and s ?

(1) s is to the right of zero.

(2) The distance between t and r is the same as the distance between t and -s.

191. 18839-!-item-!-187;#058&011851
If the product of the three digits of the positive integer k is 14, what is the value of k ?

(1) k is an odd integer.

(2) $k < 700$

192. 18939-!-item-!-187;#058&011984
Of the 75 houses in a certain community, 48 have a patio. How many of the houses in the community have a swimming pool?

(1) 38 of the houses in the community have a patio but do not have a swimming pool.

(2) The number of houses in the community that have a patio and a swimming pool is equal to the number of houses in the community that have neither a swimming pool nor a patio.

193. 18993-!-item-!-187;#058&012050
The attendees at a certain convention purchased a total of 15,000 books. How many of these attendees were female?

(1) There was a total of 4,000 attendees at the convention.

(2) The male attendees purchased an average (arithmetic mean) of 3 books each, and the female attendees purchased an average of 5 books each.

194. 19047-!-item-!-187;#058&012065
If x and y are positive integers, what is the value of x + y ?

(1) $2^x3^y = 72$

(2) $2^x2^y = 32$

195. 19101-!-item-!-187;#058&012103
What is the value of h ?

(1) $h^2 = 36$

(2) $h^2 + 12h = -36$

196. 19155-!-item-!-187;#058&012165
How many odd integers are greater than the integer x and less than the integer y ?

(1) There are 12 even integers greater than x and less than y.

(2) There are 24 integers greater than x and less than y.

197. 19209-!-item-!-187;#058&012193
Jason's salary and Karen's salary were each p percent greater in 1998 than in 1995. What is the value of p ?

(1) In 1995 Karen's salary was $2,000 greater than Jason's.

(2) In 1998 Karen's salary was $2,440 greater than Jason's.

198. 19263-!-item-!-187;#058&012213
Did one of the 3 members of a certain team sell at least 2 raffle tickets yesterday?

(1) The 3 members sold a total of 6 raffle tickets yesterday.

(2) No 2 of the members sold the same number of raffle tickets yesterday.

199. 19366-!-item-!-187;#058&012225
If s and t are two different numbers on the number line, is s + t equal to 0 ?

(1) The distance between s and 0 is the same as the distance between t and 0.

(2) 0 is between s and t.

200. 19420-!-item-!-187;#058&012241
Of the 1,000 companies responding to a certain survey, what percent indicated that they had a business recovery plan?

(1) 200 of the companies did not indicate that they had a business recovery plan.

(2) The number of companies that indicated that they had a business recovery plan was 4 times the number that did not indicate that they had a business recovery plan.

201. 19474-!-item-!-187;#058&012274
Martha bought an armchair and a coffee table at an auction and sold both items at her store. Her gross profit from the purchase and sale of the armchair was what percent greater than her gross profit from the purchase and sale of the coffee table?

(1) Martha paid 10 percent more for the armchair than for the coffee table.

(2) Martha sold the armchair for 20 percent more than she sold the coffee table.

202. 19528-!-item-!-187;#058&012279
Each employee of Company Z is an employee of either Division X or Division Y, but not both. If each division has some part-time employees, is the ratio of the number of full-time employees to the number of part-time employees greater for Division X than for Company Z ?

(1) The ratio of the number of full-time employees to the number of part-time employees is less for Division Y than for Company Z.

(2) More than half of the full-time employees of Company Z are employees of Division X, and more than half of the part-time employees of Company Z are employees of Division Y.

203. 19582-!-item-!-187;#058&012370
What is the remainder when the positive integer x is divided by 6?

(1) When x is divided by 2, the remainder is 1; and when x is divided by 3, the remainder is 0.

(2) When x is divided by 12, the remainder is 3.

204. 19682-!-item-!-187;#058&012407
On a certain sight-seeing tour, the ratio of the number of women to the number of children was 5 to 2. What was the number of men on the sight-seeing tour?

(1) On the sight-seeing tour, the ratio of the number of children to the number of men was 5 to 11.

(2) The number of women on the sight-seeing tour was less than 30.

205. 19736-!-item-!-187;#058&012415
Ellen can purchase a certain computer at a local store at the price of p dollars and pay a 6 percent sales tax. Alternatively, Ellen can purchase the same computer from a catalog for a total of q dollars, including all taxes and shipping costs. Will it cost more for Ellen to purchase the computer from the local store than from the catalog?

(1) $q - p < 50$

(2) $q = 1,150$

206. 19977-!-item-!-187;#058&012599
If p is a positive integer, what is the value of p ?

(1) $\frac{p}{4}$ is a prime number.

(2) p is divisible by 3.

207. 20123-!-item-!-187;#058&012633
Is $y < 2x$?

(1) $\frac{y}{4} < \frac{x}{2}$

(2) $\frac{y-2x}{3} < 0$

208. 20177-!-item-!-187;#058&012683
Is x > y ?

(1) x + y < 0

(2) x - y > 0

209. 20231-!-item-!-187;#058&012732
For each month of next year, Company R's monthly revenue target is x dollars greater than its monthly revenue target for the preceding month. What is Company R's revenue target for March of next year?

(1) Company R's revenue target for December of next year is $310,000.

(2) Company R's revenue target for September of next year is $30,000 greater than its revenue target for June of next year.

210. 20285-!-item-!-187;#058&012741
Is m + z > 0 ?

(1) m - 3z > 0

(2) 4z - m > 0

211. 20437-!-item-!-187;#058&012817
If k is a positive integer, then 20k is divisible by how many different positive integers?

(1) k is prime.

(2) k = 7

212. 20491-!-item-!-187;#058&012823
This morning, a certain sugar container was full. Since then some of the sugar from this container was used to make cookies. If no other sugar was removed from or added to the container, by what percent did the amount of sugar in the container decrease?

(1) The amount of sugar in the container after making the cookies would need to be increased by 30 percent to fill the container.

(2) Six cups of sugar from the container were used to make the cookies.

213. 20735-!-item-!-187;#058&013187
If a and b are positive numbers, what are the coordinates of the midpoint of line segment CD in the xy-plane?

(1) The coordinates of C are (a, 1 - b).

(2) The coordinates of D are (1 - a, b).

214. 20789-!-item-!-187;#058&013258
The cost of a square slab is proportional to its thickness and also proportional to the square of its length. What is the cost of a square slab that is 3 meters long and 0.1 meter thick?

(1) The cost of a square slab that is 2 meters long and 0.2 meter thick is $160 more than the cost of a square slab that is 2 meters long and 0.1 meter thick.

(2) The cost of a square slab that is 3 meters long and 0.1 meter thick is $200 more than the cost of a square slab that is 2

meters long and 0.1 meter thick.

215. 20843-!-item-!-187;#058&013306
If Bob produces 36 or fewer items in a week, he is paid x dollars per item. If Bob produces more than 36 items in a week, he is paid x dollars per item for the first 36 items and 1.5 times that amount for each additional item. How many items did Bob produce last week?

(1) Last week Bob was paid a total of $480 for the items that he produced that week.

(2) This week Bob produced 2 items more than last week and was paid a total of $510 for the items that he produced this week.

216. 20897-!-item-!-187;#058&013307
Is $x < y$?

(1) $2x < 3y$

(2) $xy > 0$

217. 21093-!-item-!-187;#058&013542

$$a_1 , a_2 , a_3 , . . . , a_{15}$$

In the sequence shown, $a_n = a_{n-1} + k$, where $2 \leq n \leq 15$ and k is a nonzero constant. How many of the terms in the sequence are greater than 10 ?

(1) $a_1 = 24$

(2) $a_8 = 10$

218. 21147-!-item-!-187;#058&013552
Is $4z > -6$?

(1) $z < 7$

(2) $z > -1$

Practice Test 1 Data Sufficiency Keys:

1. C 2. D 3. B 4. D 5. E 6. E 7. C 8. B 9. A 10. C 11. D 12. E 13. B 14. E 15. D 16. C 17. E 18. E 19. B 20. B
21. E 22. B 23. B 24. A 25. B 26. D 27. E 28. E 29. D 30. E 31. C 32. E 33. B 34. A 35. E 36. D 37. C 38. A 39. C 40. E
41. E 42. C 43. E 44. C 45. E 46. C 47. B 48. C 49. C 50. C 51. E 52. C 53. A 54. B 55. C 56. A 57. C 58. D 59. C 60. B
61. C 62. A 63. B 64. B 65. A 66. D 67. E 68. B 69. A 70. C 71. A 72. E 73. D 74. B 75. E 76. B 77. B 78. C 79. C 80. A
81. B 82. A 83. D 84. D 85. B 86. E 87. C 88. C 89. B 90. D 91. B 92. A 93. B 94. C 95. A 96. A 97. B 98. B 99. C100. A
101. B 102. B 103. C 104. A 105. C 106. E 107. D 108. B 109. A 110. C 111. E 112. C 113. A 114. A 115. A
116. D 117. E 118. C 119. D 120. E 121. B 122. B 123. B 124. D 125. D 126. E 127. A 128. E 129. A 130. C
131. D 132. C 133. B 134. C 135. C 136. A 137. D 138. C 139. E 140. D 141. E 142. D 143. D 144. A 145. C
146. B 147. C 148. C 149. B 150. C 151. D 152. C 153. C 154. D 155. D 156. D 157. A 158. E 159. C 160. E
161. D 162. C 163. E 164. E 165. A 166. D 167. A 168. E 169. B 170. B 171. B 172. C 173. D 174. E 175. A
176. D 177. C 178. B 179. C 180. C 181. C 182. B 183. D 184. A 185. B 186. A 187. A 188. D189. A 190. C
191. E 192. B 193. C 194. D 195. B 196. B 197. C 198. D 199. A 200. D 201. E 202. D 203. D 204. C 205. C
206. C 207. D 208. B 209. C 210. C 211. B 212. A 213. C 214. D 215. E 216. E 217. B 218. B

Practice Test #2 Data Sufficiency
(218 Questions)

1. 86-!-item-!-187;#058&000060

Is $m > k$?

(1) $3m > 3k$

(2) $2m > 2k$

2. 140-!-item-!-187;#058&000076

If k is a positive integer, is k the square of an integer?

(1) k is divisible by 4.

(2) k is divisible by exactly four different prime numbers.

3. 195-!-item-!-187;#058&000100

If w and z are positive, is $\frac{w}{z} < 1$?

(1) $w < z$

(2) $z < 4$

4. 300-!-item-!-187;#058&000133

The sale price of a certain jacket was 15 percent less than its original price, and the sale price of a certain shirt was 10 percent less than its original price. How much greater was the original price of the jacket than the original price of the shirt?

(1) The sale price of the jacket was $83 greater than the sale price of the shirt.

(2) The original price of the jacket was $140.

5. 354-!-item-!-187;#058&000214

If x, y, and z are integers, is $x + y + 2z$ even?

(1) $x + z$ is even.

(2) $y + z$ is even.

6. 408-!-item-!-187;#058&000218

The operation @ represents either addition, subtraction, or multiplication of integers. What is the value of 1 @ 0 ?

(1) 0 @ 2 = 2

(2) 2 @ 0 = 2

7. 462-!-item-!-187;#058&000279

One kilogram of a certain coffee blend consists of x kilogram of type I coffee and y kilogram of type II coffee. The cost of the blend is C dollars per kilogram, where $C = 6.5x + 8.5y$. Is $x < 0.8$?

(1) $y > 0.15$

(2) $C \geq 7.30$

8. 563-!-item-!-187;#058&000288

If n and p are integers, is $p > 0$?

(1) $n + 1 > 0$

(2) $np > 0$

9. 617-!-item-!-187;#058&000317
Each of the 105 students in a certain club is either a freshman, a sophomore, or a junior. How many of the students in the club are sophomores?

(1) The ratio of the number of freshmen to the number of sophomores is 1 to 2.

(2) The ratio of the number of freshmen to the number of juniors is 1 to 4.

10. 672-!-item-!-187;#058&000324
Juan bought some paperback books that cost \$8 each and some hardcover books that cost \$25 each. If Juan bought more than 10 paperback books, how many hardcover books did he buy?

(1) The total cost of the hardcover books that Juan bought was at least \$150.

(2) The total cost of all the books that Juan bought was less than \$260.

11. 726-!-item-!-187;#058&000339
What is the value of the positive integer m ?

(1) When m is divided by 6, the remainder is 3.

(2) When 15 is divided by m, the remainder is 6.

12. 781-!-item-!-187;#058&000341
Sets A, B, and C have some elements in common. If 16 elements are in both A and B, 17 elements are in both A and C, and 18 elements are in both B and C, how many elements do all three of the sets A, B, and C have in common?

(1) Of the 16 elements that are in both A and B, 9 elements are also in C.

(2) A has 25 elements, B has 30 elements, and C has 35 elements.

13. 881-!-item-!-187;#058&000429
Of the people who attended a workshop, 60 percent were teachers and some of the teachers were teachers of language arts. What percent of the people who attended the workshop were teachers of language arts?

(1) 200 people attended the workshop.

(2) 72 of the teachers who attended the workshop were not teachers of language arts.

14. 935-!-item-!-187;#058&000511
Jane walked for 4 miles. What was her average speed for the first 2 miles?

(1) Jane's average speed for the 4 miles was 3.2 miles per hour.

(2) It took Jane 15 minutes longer to walk the second 2 miles than it took her to walk the first 2 miles.

15. 989-!-item-!-187;#058&000579
Is xy + xz = 0 ?

(1) x = 0

(2) y + z = 0

16. 1043-!-item-!-187;#058&000590
Is |k | = 2 ?

(1) $k^2 = 4$

(2) k = $|-2|$

17. 1097-!-item-!-187;#058&000661

Store S sold a total of 90 copies of a certain book during the seven days of last week, and it sold different numbers of copies on any two of the days. If for the seven days Store S sold the greatest number of copies on Saturday and the second greatest number of copies on Friday, did Store S sell more than 11 copies on Friday?

(1) Last week Store S sold 8 copies of the book on Thursday.

(2) Last week Store S sold 38 copies of the book on Saturday.

18. 1151-!-item-!-187;#058&000679
Are the two nonzero integers x and y on opposite sides of 0 on the number line?

(1) The sum of x and y is 0.

(2) The product of x and y is less than 0.

19. 1251-!-item-!-187;#058&000852
Set S consists of five consecutive integers, and set T consists of seven consecutive integers. Is the median of the numbers in set S equal to the median of the numbers in set T ?

(1) The median of the numbers in set S is 0.

(2) The sum of the numbers in set S is equal to the sum of the numbers in set T.

20. 1305-!-item-!-187;#058&000855
If $-2x > 3y$, is x negative?

(1) $y > 0$

(2) $2x + 5y - 20 = 0$

21. 1407-!-item-!-187;#058&000929
Is the integer n odd?

(1) n is divisible by 3.

(2) 2n is divisible by twice as many positive integers as n.

22. 1557-!-item-!-187;#058&001222

Is $\frac{1}{p} > \frac{r}{r^2+2}$

(1) $p = r$

(2) $r > 0$

23. 1765-!-item-!-187;#058&002433

q	***q***	***q***	***q***
q	***r***	***s***	***t***
q	***u***	***v***	***w***
q	***x***	***y***	***z***

In the table above, is $z = 20q$?

(1) $q = 3$

(2) Each value in the table other than q is equal to the sum of the value immediately above it in the table and the value immediately to its left in the table.

24. 1819-!-item-!-187;#058&002455
One member of a committee of 5 men and 8 women resigned and was not replaced. What fraction of the remaining members were men?

(1) $\frac{7}{12}$ of the remaining members were women.

(2) The member who resigned was a woman.

25. 1873-!-item-!-187;#058&002459
If x and y are greater than 0, is x = 1 ?

(1) $\frac{x}{y} = 1$

(2) xy = 1

26. 1925-!-item-!-187;#058&002479
If x and y are integers, is the value of x(y + 1) even?

(1) x and y are prime numbers.

(2) y > 7

27. 2023-!-item-!-187;#058&002572
Does set S contain any even numbers?

(1) There are no prime numbers in S.

(2) There are no multiples of 4 in S.

28. 2077-!-item-!-187;#058&002573
A certain movie depicted product A in 21 scenes, product B in 7 scenes, product C in 4 scenes, and product D in 3 scenes. The four product manufacturers paid amounts proportional to the number of scenes in which their product was depicted in the movie. If each manufacturer paid x dollars per scene, how much did the manufacturer of product D pay for this advertising?

(1) The manufacturers of products A and B together paid a total of $560,000 for this advertising.

(2) The manufacturer of product B paid $60,000 more for this advertising than the manufacturer of product C paid.

29. 2131-!-item-!-187;#058&002580
Is the positive integer n odd?

(1) n = 2k + 1, where k is a positive integer.

(2) 2n + 1 is an odd integer.

30. 2186-!-item-!-187;#058&002582

If n is an integer, is $\frac{n}{7}$ an integer?

(1) $\frac{3n}{7}$ is an integer.

(2) $\frac{5n}{7}$ is an integer.

31. 2292-!-item-!-187;#058&002682
If a wire 27 meters long is cut into three pieces of three different lengths, what is the length of the longest piece?

(1) The length of the longest piece is twice the length of the shortest piece.

(2) The sum of the lengths of the two shorter pieces is 15 meters.

32. 2346-!-item-!-187;#058&002760

Is positive integer n divisible by 3 ?

(1) $\frac{n^2}{36}$ is an integer.

(2) $\frac{144}{n^2}$ is an integer.

33. 2446-!-item-!-187;#058&002780
If a > 0, b > 0, and c > 0, is a(b - c) = 0 ?

(1) b – c = c - b

(2) $\frac{b}{c} = \frac{c}{b}$

34. 2500-!-item-!-187;#058&002904
Are positive integers p and q both greater than n ?

(1) p - q is greater than n .

(2) q > p

35. 2600-!-item-!-187;#058&002931
What is the value of xy ?

(1) y = x + 1

(2) $y = x^2 + 1$

36. 2847-!-item-!-187;#058&003085
If ax + b = 0, is x > 0 ?

(1) a + b > 0

(2) a - b > 0

37. 3042-!-item-!-187;#058&003156
Are the integers z and f to the right of 0 on the number line?

(1) The product of z and f is positive.

(2) The sum of z and f is positive.

38. 3096-!-item-!-187;#058&003188
Some of the students enrolled at College T are part-time students and the rest are full-time students. By what percent did the number of full-time students enrolled at College T increase from the fall of 1999 to the fall of 2000 ?

(1) There were 50 more full-time students enrolled at College T in the fall of 2000 than in the fall of 1999.

(2) The total number of students enrolled at College T increased by 5 percent from the fall of 1999 to the fall of 2000.

39. 3150-!-item-!-187;#058&003215
If c and d are integers, is c even?

(1) c(d + 1) is even.

(2) (c + 2)(d + 4) is even.

40. 3204-!-item-!-187;#058&003218
If set S consists of the numbers 1, 5, -2, 8, and n, is 0 < n < 7 ?

(1) The median of the numbers in S is less than 5.

(2) The median of the numbers in S is greater than 1.

41. 3308-!-item-!-187;#058&003278
Last Thursday, John assembled chairs at a rate of 3 chairs per hour for part of the day and Larry assembled no chairs. Last Friday, Larry assembled chairs at a rate of 4 chairs per hour for part of the day and John assembled no chairs. If John and Larry assembled chairs for a total of 7 hours during these two days, how many chairs did John assemble last Thursday?

(1) During these two days, John and Larry assembled a total of 25 chairs.

(2) During these two days, Larry assembled more chairs than John did.

42. 3362-!-item-!-187;#058&003280
What is the value of 3n - 4 ?

(1) $6n - 10 = 30$

(2) $\frac{n}{3} = \frac{20}{9}$

43. 3416-!-item-!-187;#058&003281
Circle C and line k lie in the xy-plane. If circle C is centered at the origin and has radius 1, does line k intersect circle C ?

(1) The x-intercept of line k is greater than 1.

(2) The slope of line k is $-\frac{1}{10}$.

44. 3524-!-item-!-187;#058&003319
How many people received a certain survey?

(1) Six-tenths of those who received the survey responded.

(2) Of those who received the survey, 42 responded.

45. 3824-!-item-!-187;#058&003586
If x and z are integers, is at least one of them even?

(1) x + z is odd.

(2) x - z is odd.

46. 3927-!-item-!-187;#058&003647
Three thousand families live in a certain town. How many families who live in the town own neither a car nor a television set?

(1) Of the families who live in the town, 2,980 own a car.

(2) Of the families who live in the town, 2,970 own both a car and a television set.

47. 3982-!-item-!-187;#058&003679

In the fraction $\frac{x}{y}$, where x and y are positive integers, what is the value of y ?

(1) The least common denominator of $\frac{x}{y}$ and $\frac{1}{3}$ is 6.

(2) x = 1.

48. 4036-!-item-!-187;#058&003710
There are two types of rolls on a counter, plain rolls and seeded rolls. What is the total number of rolls on the counter?

(1) The ratio of the number of seeded rolls on the counter to the number of plain rolls on the counter is 1 to 5.

(2) There are 16 more plain rolls than seeded rolls on the counter.

49. 4090-!-item-!-187;#058&003782
Is the hundredths digit of the decimal d greater than 5 ?

(1) The tenths digit of 10d is 7.

(2) The thousandths digit of $\frac{d}{10}$ is 7.

50. 4144-!-item-!-187;#058&003797
What is the value of 2x + 2y ?

(1) 3x + 5y = 60

(2) 5x + 3y = 68

51. 4198-!-item-!-187;#058&003817
Whenever Martin has a restaurant bill with an amount between $10 and $99, he calculates the dollar amount of the tip as 2 times the tens digit of the amount of his bill. If the amount of Martin's most recent restaurant bill was between $10 and $99, was the tip calculated by Martin on this bill greater than 15 percent of the amount of the bill?

(1) The amount of the bill was between $15 and $50.

(2) The tip calculated by Martin was $8.

52. 4349-!-item-!-187;#058&003856
For Manufacturer M, the cost C of producing x units of its product per month is given by C = kx + t, where C is in dollars and k and t are constants. Last month, if Manufacturer M produced 1,000 units of its product and sold all the units for k + 60 dollars each, what was Manufacturer M's gross profit on the 1,000 units?

(1) Last month, Manufacturer M's revenue from the sale of the 1,000 units was $150,000.

(2) Manufacturer M's cost of producing 500 units in a month is $45,000 less than its cost of producing 1,000 units in a month.

53. 4404-!-item-!-187;#058&003880
The symbol @ represents one of the four arithmetic operations: addition, subtraction, multiplication, and division.

Is (5 @ 6) @ 2 = 5 @ (6 @ 2) ?

(1) 5 @ 6 = 6 @ 5

(2) 2 @ 0 = 2

54. 4458-!-item-!-187;#058&003882
If y is an integer and y = |x | + x, is y = 0 ?

(1) x < 0

(2) y < 1

55. 4604-!-item-!-187;#058&003931
Is the positive integer n an odd integer?

(1) n + 4 is a prime number.

(2) n + 3 is <u>not</u> a prime number.

56. 4658-!-item-!-187;#058&003940

What is the total surface area of rectangular solid R ?

(1) The surface area of one of the faces of R is 48.

(2) The length of one of the edges of R is 3.

57. 4761-!-item-!-187;#058&003968
A certain list consists of several different integers. Is the product of all the integers in the list positive?

(1) The product of the greatest and smallest of the integers in the list is positive.

(2) There is an even number of integers in the list.

58. 4863-!-item-!-187;#058&004007
A certain store sells chairs individually or in sets of 6. The store charges less for purchasing a set of 6 chairs than for purchasing 6 chairs individually. How much does the store charge for purchasing a set of 6 chairs?

(1) The charge for purchasing a set of 6 chairs is 10 percent less than the charge for purchasing the 6 chairs individually.

(2) The charge for purchasing a set of 6 chairs is $20 more than the charge for purchasing 5 chairs individually.

59. 4918-!-item-!-187;#058&004054

If $k \neq 0, 1,$ or -1, is $\frac{1}{k} > 0$?

(1) $\frac{1}{k-1} > 0$

(2) $\frac{1}{k+1} > 0$

60. 4972-!-item-!-187;#058&004074
Does the integer k have a factor p such that $1 < p < k$?

(1) $k > 4!$

(2) $13! + 2 \leq k \leq 13! + 13$

61. 5072-!-item-!-187;#058&004127
When the positive integer n is divided by 25, the remainder is 13. What is the value of n ?

(1) $n < 100$

(2) When n is divided by 20, the remainder is 3.

62. 5126-!-item-!-187;#058&004141
If $y \geq 0$, what is the value of x ?

(1) $|x - 3| \geq y$

(2) $|x - 3| \leq -y$

63. 5228-!-item-!-187;#058&004178
If m is a positive odd integer, what is the average (arithmetic mean) of a certain set of m integers?

(1) The integers in the set are consecutive multiples of 3.

(2) The median of the set of integers is 33.

64. 5329-!-item-!-187;#058&004211
If $a < y < z < b$, is $|y - a| < |y - b|$?

(1) $|z - a| < |z - b|$

(2) |y - a | < |z - b |

65. 5432-!-item-!-187;#058&004252
If ab $\neq$ 0 and points (-a, b) and (-b, a) are in the same quadrant of the xy-plane, is point (-x, y) in this same quadrant?

(1) xy > 0

(2) ax > 0

66. 5486-!-item-!-187;#058&004317
If q is a positive integer less than 17 and r is the remainder when 17 is divided by q, what is the value of r ?

(1) q > 10

(2) q = 2^k, where k is a positive integer.

67. 5586-!-item-!-187;#058&004324
What is the ratio of the number of cups of flour to the number of cups of sugar required in a certain cake recipe?

(1) The number of cups of flour required in the recipe is 250 percent of the number of cups of sugar required in the recipe.

(2) $1\frac{1}{2}$ more cups of flour than cups of sugar are required in the recipe.

68. 5640-!-item-!-187;#058&004354
In 1999 Company X's gross profit was what percent of its revenue?

(1) In 1999 Company X's gross profit was $\frac{1}{3}$ of its expenses.

(2) In 1999 Company X's expenses were $\frac{3}{4}$ of its revenue.

69. 5791-!-item-!-187;#058&004570
At the bakery, Lew spent a total of $6.00 for one kind of cupcake and one kind of doughnut. How many doughnuts did he buy?

(1) The price of 2 doughnuts was $0.10 less than the price of 3 cupcakes.

(2) The average (arithmetic mean) price of 1 doughnut and 1 cupcake was $0.35.

70. 6564-!-item-!-187;#058&004850
If eleven consecutive integers are listed from least to greatest, what is the average (arithmetic mean) of the eleven integers?

(1) The average of the first nine integers is 7.

(2) The average of the last nine integers is 9.

71. 6765-!-item-!-187;#058&004947
What is the greatest integer that is less than t ?

(1) t = $\frac{9}{4}$

(2) t = $\left(\frac{-3}{2}\right)^2$

72. 6868-!-item-!-187;#058&005029
Of the 4,800 voters who voted for or against Resolution K, 1800 were Democrats and 3,000 were Republicans. What was the total number of female voters who voted for Resolution K ?

(1) $\frac{3}{4}$ of the Democrats and $\frac{2}{3}$ of the Republicans voted for Resolution K.

(2) $\frac{1}{3}$ of the Democrats who voted for Resolution K and $\frac{1}{2}$ of the Republicans who voted for Resolution K were females.

73. 6922-!-item-!-187;#058&005032
If n is a positive integer, is n^3 - n divisible by 4 ?

(1) n = 2k + 1, where k is an integer.

(2) n^2 + n is divisible by 6.

74. 6977-!-item-!-187;#058&005035

If x $\neq$ -y, is $\frac{x-y}{x+y}$ > 1 ?

(1) x > 0

(2) y < 0

75. 7031-!-item-!-187;#058&005040
A certain group of car dealerships agreed to donate x dollars to a Red Cross chapter for each car sold during a 30-day period. What was the total amount that was expected to be donated?

(1) A total of 500 cars were expected to be sold.

(2) 60 more cars were sold than expected, so that the total amount actually donated was $28,000.

76. 7085-!-item-!-187;#058&005061
Over a certain time period, did the number of shares of stock in Ruth's portfolio increase?

(1) Over the time period, the ratio of the number of shares of stock to the total number of shares of stocks and bonds in Ruth's portfolio increased.

(2) Over the time period, the total number of shares of stocks and bonds in Ruth's portfolio increased.

77. 7139-!-item-!-187;#058&005072
Is |x | = y - z ?

(1) x + y = z

(2) x < 0

78. 7339-!-item-!-187;#058&005310
If n is an integer, is $-3x^n$ positive?

(1) x is negative.

(2) n is odd.

79. 7535-!-item-!-187;#058&005487
If n is an integer between 2 and 100 and if n is also the square of an integer, what is the value of n ?

(1) n is even.

(2) The cube root of n is an integer.

80. 7589-!-item-!-187;#058&005492
If x and y are positive integers such that x = 8y + 12, what is the greatest common divisor of x and y ?

(1) x = 12u, where u is an integer.

(2) y = 12z, where z is an integer.

81. 7692-!-item-!-187;#058&005524
At a certain bakery, each roll costs r cents and each doughnut costs d cents. If Alfredo bought rolls and doughnuts at the bakery, how many cents did he pay for each roll?

(1) Alfredo paid $5.00 for 8 rolls and 6 doughnuts.

(2) Alfredo would have paid $10.00 if he had bought 16 rolls and 12 doughnuts.

82. 7746-!-item-!-187;#058&005794
Is x > 0 ?

(1) xy > 0

(2) x + y > 0

83. 7800-!-item-!-187;#058&005796
How much time did it take a certain car to travel 400 kilometers?

(1) The car traveled the first 200 kilometers in 2.5 hours.

(2) If the car's average speed had been 20 kilometers per hour greater than it was, it would have traveled the 400 kilometers in 1 hour less time than it did.

84. 7854-!-item-!-187;#058&005813
Each of the offices in a certain building has a floor area of 200, 300, or 350 square feet. How many offices are on the first floor of the building?

(1) There is a total of 9,500 square feet of office floor space on the first floor of the building.

(2) Ten of the offices on the first floor have floor areas of 350 square feet each.

85. 7908-!-item-!-187;#058&005852
Is n divisible by 12 ?

(1) $\frac{n}{6}$ is an integer.

(2) $\frac{n}{4}$ is an integer.

86. 7962-!-item-!-187;#058&005867
Do more than 50 percent of the children in a certain group have brown hair?

(1) 70 percent of the boys in the group have brown hair.

(2) 30 percent of the children in the group are girls with brown hair.

87. 8062-!-item-!-187;#058&006016
Is the integer n a multiple of 15 ?

(1) n is a multiple of 20.

(2) n + 6 is a multiple of 3.

88. 8117-!-item-!-187;#058&006040

If x + y $\neq$ 0, what is the value of $\frac{ax+ay}{x+y}$?

(1) x = 4 and y = 5.

(2) $a = 6$

89. 8171-!-item-!-187;#058&006095
What is the ratio of p to r ?

(1) The ratio of p to 3r is 5 to 9.

(2) The sum of p and r is 16.

90. 8271-!-item-!-187;#058&006138
What is the value of $a^4 - b^4$?

(1) $a^2 - b^2 = 16$

(2) $a + b = 8$

91. 8325-!-item-!-187;#058&006143
In the rectangular coordinate system, are the points (r, s) and (u, v) equidistant from the origin?

(1) $r + s = 1$

(2) $u = 1 - r$ and $v = 1 - s$.

92. 8570-!-item-!-187;#058&006483
X and Y are sets of positive integers. Is the greatest integer in X greater than the greatest integer in Y ?

(1) X is a set of 5 consecutive odd integers, each less than 20.

(2) Y is a set of 3 consecutive even integers, each less than 15.

93. 8624-!-item-!-187;#058&006485
The lifetimes of all the batteries produced by a certain company in a year have a distribution that is symmetric about the mean m. If the distribution has a standard deviation of d, what percent of the distribution is greater than m + d ?

(1) 68 percent of the distribution lies in the interval from m - d to m + d, inclusive.

(2) 16 percent of the distribution is less than m - d.

94. 8775-!-item-!-187;#058&006653
If $|x + 2| = 4$, what is the value of x ?

(1) $x^2 \neq 4$

(2) $x^2 = 36$

95. 8829-!-item-!-187;#058&006700
If v and w are different integers, does $v = 0$?

(1) $vw = v^2$

(2) $w = 2$

96. 8932-!-item-!-187;#058&006783
Is $\sqrt{(x-5)^2} = 5 - x$

(1) $-x|x| > 0$

(2) $5 - x > 0$

97. 8986-!-item-!-187;#058&006790
What is the median of a certain set of 7 numbers?

(1) 3 of the numbers are less than 10.

(2) 4 of the numbers are greater than 10.

98. 9040-!-item-!-187;#058&006792
Is $x + y < 1$?

(1) $x < \frac{8}{9}$

(2) $y < \frac{1}{8}$

99. 9094-!-item-!-187;#058&006821
For each home sold in County X, the buyer and the seller each must pay to County X a tax of 0.5 percent of the sale price of the home. Colleen recently sold her old home and bought a new home, both in County X. What was the total tax that Colleen paid to County X on these home sales?

(1) Colleen's old home had a sale price of $169,500.

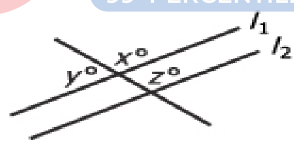
(2) Colleen's new home had a sale price 20% greater than that of her old home.

100. 9148-!-item-!-187;#058&006857
A certain bank charges a maintenance fee on a standard checking account each month that the balance falls below $1,000 at any time during the month. Did the bank charge a maintenance fee on Sue's standard checking account last month?

(1) At the beginning of last month, Sue's account balance was $1,500.

(2) During last month, a total of $2,000 was withdrawn from Sue's checking account.

101. 9205-!-item-!-187;#058&006882

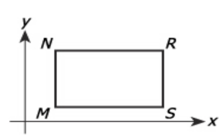


In the figure above, lines l_1 and l_2 are parallel. What is the value of x ?

(1) $y = 87$

(2) $z = 93$

102. 9262-!-item-!-187;#058&006890



In the coordinate plane above, what is the area of rectangular region MNRS ?

(1) M has coordinates (2, 1).

(2) N has coordinates (2, 5).

103. 9889-!-item-!-187;#058&007222
How much did the taxi driver charge George for the trip to the airport?

(1) George paid the taxi driver a tip equal to 15 percent of the amount the driver charged.

(2) George paid the taxi driver a tip of $6.00.

104. 9943-!-item-!-187;#058&007224
A child selected a three-digit number, XYZ, where X, Y, and Z denote the digits of the number. If no two of the three digits were equal, what was the three-digit number?

(1) The sum of the digits was 10.

(2) $X < Y < Z$

105. 9997-!-item-!-187;#058&007246
If b is positive, is ab positive?

(1) $a^2b > 0$

(2) $a^2 + b = 13$

106. 10051-!-item-!-187;#058&007251
Robin split a total of $24,000 between two investments, X and Y. If investment Y earns 7 percent simple annual interest, how much of the total did Robin put into investment Y ?

(1) Each investment earns the same dollar amount of interest annually.

(2) Investment X earns 5 percent simple annual interest.

107. 10578-!-item-!-187;#058&007600
Is $2x - 3y < x^2$?

(1) $2x - 3y = -2$

(2) $x > 2$ and $y > 0$.

108. 10635-!-item-!-187;#058&007601
If $\frac{x}{2} = \frac{3}{y}$, is x less than y ?

(1) $y \geq 3$

(2) $y \leq 4$

109. 11067-!-item-!-187;#058&007824
Marta bought several pencils. If each pencil was either a 23-cent pencil or a 21-cent pencil, how many 23-cent pencils did Marta buy?

(1) Marta bought a total of 6 pencils.

(2) The total value of the pencils Marta bought was 130 cents.

110. 11121-!-item-!-187;#058&007826
If x and y are integers and $x > 0$, is $y > 0$?

(1) $7x - 2y > 0$

(2) $-y < x$

111. 11229-!-item-!-187;#058&007982
A state legislature had a total of 96 members. The members who did not vote on a certain bill consisted of 25 who were absent and 3 who abstained. How many of those voting voted for the bill?

(1) Exactly $\frac{1}{3}$ of the total membership of the legislature voted against the bill.

(2) The number of Legislators who voted for the bill was 8 more than the total number who were absent or abstained.

112. 11432-!-item-!-187;#058&008149
If m and n are positive integers and mn = k, is m + n = k + 1 ?

(1) m = 1

(2) k is a prime number.

113. 11488-!-item-!-187;#058&008235
In a certain year the United Nations' total expenditures were $1.6 billion. Of this amount, 67.8 percent was paid by the 6 highest-contributing countries, and the balance was paid by the remaining 153 countries. Was Country X among the 6 highest-contributing countries?

(1) 56 percent of the total expenditures was paid by the 4 highest-contributing countries, each of which paid more than Country X.

(2) Country X paid 4.8 percent of the total expenditures.

114. 11543-!-item-!-187;#058&008310
If $\frac{x+y}{z}$ = -2, is x positive?

(1) z is negative.

(2) y is positive.

115. 11595-!-item-!-187;#058&008332
List S and list T each contain 5 positive integers, and for each list the average (arithmetic mean) of the integers in the list is 40. If the integers 30, 40, and 50 are in both lists, is the standard deviation of the integers in list S greater than the standard deviation of the integers in list T ?

(1) The integer 25 is in list S.

(2) The integer 45 is in list T.

116. 11649-!-item-!-187;#058&008377
On the number line, what is the distance between the point 2x and the point 3x ?

(1) On the number line, the distance between the point -x and the point x is 16.

(2) On the number line, the distance between the point x and the point 3x is 16.

117. 11703-!-item-!-187;#058&008423
What is the remainder when the positive integer n is divided by the positive integer k, where k > 1 ?

(1) n = (k + 1)^3

(2) k = 5

118. 11804-!-item-!-187;#058&008456
Is x $\geq$ 3 ?

(1) $x^2 - 9 = 0$

(2) x < 10

119. 11954-!-item-!-187;#058&008495
At a two-candidate election for mayor, $\frac{3}{4}$ of the registered voters cast ballots. How many registered voters cast ballots for the winning candidate?

(1) 25,000 registered voters did not cast ballots in the election.

(2) Of the registered voters who cast ballots, 55 percent cast ballots for the winning candidate.

120. 12295-!-item-!-187;#058&008940
If n is the product of the least and the greatest of 6 consecutive integers, what is the value of n ?

(1) The greatest of the 6 consecutive integers is 20.

(2) The average (arithmetic mean) of the 6 consecutive integers is 17.5.

121. 12397-!-item-!-187;#058&009033
If n and s are each 2-digit positive integers, is n greater than s ?

(1) The units digit of n is greater than the units digit of s.

(2) The tens digit of n is greater than the tens digit of s.

122. 12685-!-item-!-187;#058&009461
If n is a positive integer and r is the remainder when (n - 1)(n + 1) is divided by 24, what is the value of r ?

(1) 2 is not a factor of n.

(2) 3 is not a factor of n.

123. 12975-!-item-!-187;#058&009772
When positive integer n is divided by 3, the remainder is 2; and when positive integer t is divided by 5, the remainder is 3. What is the remainder when the product nt is divided by 15 ?

(1) n - 2 is divisible by 5.

(2) t is divisible by 3.

124. 13029-!-item-!-187;#058&009789
A certain motel has a total of 540 units, each of which has a 1-person, 2-person, or 4-person capacity. How many people stayed in the motel's 4-person units yesterday?

(1) At this motel, $\frac{1}{3}$ of the units are 4-person units.

(2) Yesterday, 80 percent of the 4-person units in the motel were filled to capacity, and the rest of the 4-person units were empty.

125. 13274-!-item-!-187;#058&009989
If @ denotes one of two arithmetic operations, addition or multiplication, and if k is an integer, what is the value of 3 @ k ?

(1) 2 @ k = 3

(2) 1 @ 0 = k

126. 13661-!-item-!-187;#058&010116
If r and t are positive integers, is rt even?

(1) r + t is odd.

(2) r^t is odd.

127. 13762-!-item-!-187;#058&010132

If $\frac{2}{5}$ of the students at College C are business majors, what is the number of female students at College C ?

(1) $\frac{2}{5}$ of the male students at College C are business majors.

(2) 200 of the female students at College C are business majors.

128. 13817-!-item-!-187;#058&010140

Is $y < \frac{x+z}{2}$?

(1) y - x < z - y

(2) $z - y < \frac{z-x}{2}$

129. 13872-!-item-!-187;#058&010142

If t is a positive integer and r is the remainder when $t^2 + 5t + 6$ is divided by 7, what is the value of r ?

(1) When t is divided by 7, the remainder is 6.

(2) When t^2 is divided by 7, the remainder is 1.

130. 14021-!-item-!-187;#058&010265

Set S consists of 20 different positive integers. How many of the integers in S are odd?

(1) 10 of the integers in S are even.

(2) 10 of the integers in S are multiples of 4.

131. 14121-!-item-!-187;#058&010319

If w + x < 0, is w - y > 0 ?

(1) x + y < 0

(2) y < x < w

132. 14175-!-item-!-187;#058&010326

If the drama club and music club are combined, what percent of the combined membership will be male?

(1) Of the 16 members of the drama club, 15 are male.

(2) Of the 20 members of the music club, 10 are male.

133. 14229-!-item-!-187;#058&010329

What is the average (arithmetic mean) height of the n people in a certain group?

(1) The average height of the $\frac{n}{3}$ tallest people n the group is 6 feet $2\frac{1}{2}$ inches, and the average height of the rest of the people n the group is f feet 10 inches.

(2) The sum of the heights of the n people is 178 feet 9 inches.

134. 14283-!-item-!-187;#058&010330

If m and n are integers, is m odd?

(1) n + m is odd.

(2) $n + m = n^2 + 5$.

135. 14337-!-item-!-187;#058&010335

How many more first-time jobless claims were filed in week P than in week T ?

(1) For weeks P, Q, R, and S, the average (arithmetic mean) number of first-time jobless claims filed was 388,250.

(2) For weeks Q, R, S, and T, the average (arithmetic mean) number of first-time jobless claims filed was 383,000.

136. 14393-!-item-!-187;#058&010357

$$x, 3, 1, 12, 8$$

If x is an integer, is the median of the 5 numbers shown greater than the average (arithmetic mean) of the 5 numbers?

(1) $x > 6$

(2) x is greater than the median of the 5 numbers.

137. 14447-!-item-!-187;#058&010361
If x and y are positive integers, is xy a multiple of 8 ?

(1) The greatest common divisor of x and y is 10.

(2) The least common multiple of x and y is 100.

138. 14501-!-item-!-187;#058&010393
If $zy < xy < 0$, is $|x - z| + |x| = |z|$?

(1) $z < x$

(2) $y > 0$

139. 14556-!-item-!-187;#058&010396
If machine J, working alone at its constant rate, takes 2 minutes to wrap 60 pieces of candy, how many minutes does it take machine K, working alone at its constant rate, to wrap 120 pieces of candy?

(1) Machine K, working alone at its constant rate, takes more than 5 minutes to wrap 60 pieces of candy.

(2) Machines J and K, working together at their respective constant rates, take 1 minute and 30 seconds to wrap 60 pieces of candy.

140. 14610-!-item-!-187;#058&010398
A manufacturer produced x percent more video cameras in 1994 than in 1993 and y percent more video cameras in 1995 than in 1994. If the manufacturer produced 1,000 video cameras in 1993, how many video cameras did the manufacturer produce in 1995 ?

(1) $xy = 20$

(2) $x + y + \frac{xy}{100} = 9.2$

141. 14664-!-item-!-187;#058&010407
Of the 20 people who each purchased 2 tickets to a concert, some used both tickets, some used only 1 ticket, and some used neither ticket. What percent of the tickets that were purchased by the 20 people were used by those people?

(1) Of the 20 people, 10 used only 1 ticket.

(2) Of the 20 people, 4 used neither ticket.

142. 14718-!-item-!-187;#058&010409
At a certain stand, all soft drinks cost the same and all sandwiches cost the same. How much does 1 sandwich cost at the stand?

(1) At the stand, 1 sandwich and 2 soft drinks cost a total of \$3.15.

(2) At the stand, 3 sandwiches and 1 soft drink cost a total of \$5.70.

143. 14772-!-item-!-187;#058&010415
If K is a positive three-digit integer, what is the hundreds digit of K ?

(1) The hundreds digit of K + 150 is 4.

(2) The tens digit of K + 25 is 7.

144. 14826-!-item-!-187;#058&010416
In the xy-plane, point P has coordinates (a, b) and point Q has coordinates (c, d). What is the distance between P and Q ?

(1) b - d = 4

(2) a - c = 3

145. 14880-!-item-!-187;#058&010418
If a, b, and c are positive integers, is b between a and c ?

(1) b is 3 greater than a, and b is 5 less than c.

(2) c is 5 greater than b, and c is 8 greater than a.

146. 14980-!-item-!-187;#058&010478
At a certain refreshment stand, all hot dogs have the same price and all sodas have the same price. What is the total price of 3 hot dogs and 2 sodas at the refreshment stand?

(1) The total price of 5 sodas at the stand is less than the total price of 2 hot dogs.

(2) The total price of 9 hot dogs and 6 sodas at the stand is $21.

147. 15034-!-item-!-187;#058&010480
If a certain company purchased computers at $2,000 each and printers at $300 each, how many computers did it purchase?

(1) More than three printers were purchased.

(2) The total amount for the purchase of the computers and the printers was $15,000.

148. 15274-!-item-!-187;#058&010713
If x = 3 and y = 6, is y > nx + k ?

(1) n = 5

(2) k = -10

149. 15328-!-item-!-187;#058&010715
Does x + c = y + c ?

(1) x = y

(2) x = c

150. 15382-!-item-!-187;#058&010719
If n is an integer between 3 and 9, what is the value of n ?

(1) On the number line, the distance from 3 to n is $\frac{2}{3}$ of the distance from 3 to 9.

(2) On the number line, n is 10 units to the right of -3

151. 15486-!-item-!-187;#058&010743
Is the average (arithmetic mean) of 5 different positive integers at least 30 ?

(1) Each of the integers is a multiple of 10.

(2) The sum of the 5 integers is 160.

152. 15540-!-item-!-187;#058&010751

A certain jar contains only b black marbles, w white marbles, and r red marbles. If one marble is to be chosen at random from the jar, is the probability that the marble chosen will be red greater than the probability that the marble chosen will be white?

(1) $\frac{r}{b+w} > \frac{w}{b+r}$

(2) b – w > r

153. 15687-!-item-!-187;#058&010776
On his trip from Alba to Benton, Julio drove the first x miles at an average rate of 50 miles per hour and the remaining distance at an average rate of 60 miles per hour. How long did it take Julio to drive the first x miles?

(1) On this trip, Julio drove for a total of 10 hours and drove a total of 530 miles.

(2) On this trip, it took Julio 4 more hours to drive the first x miles than to drive the remaining distance.

154. 15741-!-item-!-187;#058&010784
To install cable television in a home, a certain cable company charges a basic fee of $30 plus a fee of $20 for each cable outlet installed in the home. How much did the cable company charge the Horace family for installing cable television in their home?

(1) The cable company installed three cable outlets in the Horace family home.

(2) The amount that the cable company charged the Horace family for installing cable television in their home was equivalent to an average (arithmetic mean) charge of $30 per cable outlet installed.

155. 15795-!-item-!-187;#058&010817
If 500 is the multiple of 100 that is closest to x and 400 is the multiple of 100 that is closest to y, which multiple of 100 is closest to x + y ?

(1) x < 500

(2) y < 400

156. 15849-!-item-!-187;#058&010825
Each of the numbers w, x, y, and z is equal to either 0 or 1. What is the value of w + x + y + z ?

(1) $\frac{w}{2} + \frac{x}{4} + \frac{y}{8} + \frac{z}{16} = \frac{11}{16}$

(2) $\frac{w}{3} + \frac{x}{9} + \frac{y}{27} + \frac{z}{81} = \frac{31}{81}$

157. 15904-!-item-!-187;#058&010840
A certain list consists of five <u>different</u> integers. Is the average (arithmetic mean) of the two greatest integers in the list greater than 70 ?

(1) The median of the integers in the list is 70.

(2) The average of the integers in the list is 70.

158. 15958-!-item-!-187;#058&010868
A store purchased 20 coats that each cost an equal amount and then sold each of the 20 coats at an equal price. What was the store's gross profit on the 20 coats?

(1) If the selling price per coat had been twice as much, the store's gross profit on the 20 coats would have been $2,400.

(2) If the selling price per coat had been $2 more, the store's gross profit on the 20 coats would have been $440.

159. 16012-!-item-!-187;#058&010902
Beth and Jim each received a salary increase. If Jim's salary was increased by the same percent as Beth's salary, did Beth receive a greater dollar increase in salary than Jim?

(1) Before the increases, Jim's salary was greater than $25,000.

(2) Before the increases, Jim's salary was $\frac{4}{5}$ of Beth's salary.

160. 16066-!-item-!-187;#058&010935
All the clients that Company X had at the beginning of last year remained with the company for the whole year. If Company X acquired new clients during the year, what was the ratio of the number of clients that Company X had at the end of last year to the number of clients that it had at the beginning of last year?

(1) The ratio of the number of clients that Company X had at the beginning of last year to the number of new clients that it acquired during the year was 12 to 1.

(2) Company X had 144 clients at the beginning of last year.

161. 16120-!-item-!-187;#058&010949
In the xy-coordinate plane, line m and line k intersect at the point (4, 3). Is the product of their slopes negative?

(1) The product of the x-intercepts of lines m and k is positive.

(2) The product of the y-intercepts of lines m and k is negative.

162. 16220-!-item-!-187;#058&011014
If n is a positive integer and r is the remainder when $n^2 - 1$ is divided by 8, what is the value of r ?

(1) n is odd.

(2) n is not divisible by 8.

163. 16419-!-item-!-187;#058&011075
In a certain election, 240 men and 280 women voted for the winning candidate. What was the total number of men and women who voted in the election?

(1) The number of women who voted was $\frac{7}{8}$ the number of men who voted.

(2) Of the men and women who voted, 30 percent of the men and 40 percent of the women voted for the winning candidate.

164. 16473-!-item-!-187;#058&011078
If $mv < pv < 0$, is $v > 0$?

(1) $m < p$

(2) $m < 0$

165. 16527-!-item-!-187;#058&011081
If x and y are points on the number line, what is the value of $x + y$?

(1) 6 is halfway between x and y.

(2) $y = 2x$

166. 16673-!-item-!-187;#058&011115
If the prime numbers p and t are the only prime factors of the integer m, is m a multiple of p^2t ?

(1) m has more than 9 positive factors.

(2) m is a multiple of p^3.

167. 16727-!-item-!-187;#058&011198
A certain circular area has its center at point P and has radius 4, and points X and Y lie in the same plane as the circular area.

Does point Y lie outside the circular area?

(1) The distance between point P and point X is 4.5.

(2) The distance between point X and point Y is 9.

168. 16781-!-item-!-187;#058&011242
In a certain senior class, 72 percent of the male students and 80 percent of the female students have applied to college. What fraction of the students in the senior class are male?

(1) There are 840 students in the senior class.

(2) 75 percent of the students in the senior class have applied to college.

169. 16835-!-item-!-187;#058&011243
Greta and Randy collected bottles to be recycled. How many bottles did Randy collect?

(1) Greta and Randy collected a total of 85 bottles.

(2) Greta collected 15 more bottles than Randy did.

170. 16889-!-item-!-187;#058&011265
If $zt < -3$, is $z < 4$?

(1) $z < 9$

(2) $t < -4$

171. 16943-!-item-!-187;#058&011304
If k is a positive integer and the tens digit of k + 5 is 4, what is the tens digit of k ?

(1) $k > 35$

(2) The units digit of k is greater than 5.

172. 17043-!-item-!-187;#058&011315
If a and b are nonzero numbers on the number line, is 0 between a and b ?

(1) The distance between 0 and a is greater than the distance between 0 and b.

(2) The sum of the distances between 0 and a and between 0 and b is greater than the distance between 0 and the sum a + b .

173. 17097-!-item-!-187;#058&011316
In the xy-plane, line k passes through the point (1,1) and line m passes through the point (1,-1). Are lines k and m perpendicular to each other?

(1) Lines k and m intersect at the point (1,-1).

(2) Line k intersects the x-axis at the point (1,0).

174. 17151-!-item-!-187;#058&011360
Each week Connie receives a base salary of $500, plus a 20 percent commission on the total amount of her sales that week in excess of $1,500. What was the total amount of Connie's sales last week?

(1) Last week Connie's base salary and commission totaled $1,200.

(2) Last week Connie's commission was $700.

175. 17205-!-item-!-187;#058&011383
Ann bought five different kinds of fruit: apples, oranges, pears, mangoes, and bananas. If the number of apples that Ann bought was twice the number of oranges and if the number of pears that Ann bought was the same as the number of apples

and oranges combined, what fraction of the total number of pieces of fruit that Ann bought were pears?

(1) Ann bought a total of 18 pieces of fruit.

(2) Ann bought 5 bananas.

176. 17259-!-item-!-187;#058&011402
In 1995 Division A of Company X had 4,850 customers. If there were 86 service errors in Division A that year, what was the service-error rate, in number of service errors per 100 customers, for Division B of Company X in 1995 ?

(1) In 1995 the overall service-error rate for Divisions A and B combined was 1.5 service errors per 100 customers.

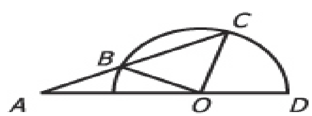
(2) In 1995 Division B had 9,350 customers, none of whom were customers of Division A.

177. 17313-!-item-!-187;#058&011410
If x and y are positive integers, is x an even integer?

(1) x (y + 5) is an even integer.

(2) $6y^2 + 41y + 25$ is an even integer.

178. 17370-!-item-!-187;#058&011434



In the figure shown, point O is the center of the semicircle and points B, C, and D lie on the semicircle. If the length of line segment AB is equal to the length of line segment OC, what is the degree measure of angle BAO ?

(1) The degree measure of angle COD is 60.

(2) The degree measure of angle BCO is 40.

179. 17563-!-item-!-187;#058&011544
Working independently at their respective constant rates, pumps X and Y took 48 minutes to fill an empty tank with water. What fraction of the water in the full tank came from pump X ?

(1) Working alone at its constant rate, pump X would have taken 80 minutes to fill the tank with water.

(2) Working alone at its constant rate, pump Y would have taken 120 minutes to fill the tank with water.

180. 17617-!-item-!-187;#058&011567
What is the value of $v^3 - k^3$?

(1) vk > 0

(2) v - k = 6

181. 17723-!-item-!-187;#058&011591
Rasheed bought two kinds of candy bars, chocolate and toffee, that came in packages of 2 bars each. He handed out $\frac{2}{3}$ of the chocolate bars and $\frac{3}{5}$ of the toffee bars. How many packages of chocolate bars did Rasheed buy?

(1) Rasheed bought 1 fewer package of chocolate bars than toffee bars.

(2) Rasheed handed out the same number of each kind of candy bar.

182. 17777-!-item-!-187;#058&011599
If m and r are two numbers on a number line, what is the value of r ?

(1) The distance between r and 0 is 3 times the distance between m and 0 .

(2) 12 is halfway between m and r.

183. 17831-!-item-!-187;#058&011633
If m is a positive odd integer between 2 and 30, then m is divisible by how many different positive prime numbers?

(1) m is not divisible by 3.

(2) m is not divisible by 5.

184. 17933-!-item-!-187;#058&011666
If k is an integer greater than 1, is k equal to 2^r for some positive integer r ?

(1) k is divisible by 2^6.

(2) k is not divisible by any odd integer greater than 1.

185. 17987-!-item-!-187;#058&011677
Of the 200 members of a certain association, each member who speaks German also speaks English, and 70 of the members speak only Spanish. If no member speaks all three languages, how many of the members speak two of the three languages?

(1) 60 of the members speak only English.

(2) 20 of the members do not speak any of the three languages.

186. 18041-!-item-!-187;#058&011685
If a, b, and c are integers, what is the value of a ?

(1) $(a - 7)(b - 7)(c - 7) = 0$

(2) $bc = 18$

187. 18095-!-item-!-187;#058&011720
An antique dealer bought a coffee table that was then sold for a profit. What was the selling price of the coffee table?

(1) The dealer's cost for the coffee table was $340.

(2) The dealer's gross profit on the coffee table was 15% of the selling price.

188. 18293-!-item-!-187;#058&011863
Is $x^4 + y^4 > z^4$?

(1) $x^2 + y^2 > z^2$

(2) $x + y > z$

189. 18439-!-item-!-187;#058&011934
In the xy-plane, the line k passes through the origin and through the point (a,b), where $ab \neq 0$. Is b positive?

(1) The slope of line k is negative.

(2) $a < b$

190. 18493-!-item-!-187;#058&011993
The numbers of books read by 7 students last year were 10, 5, p, q, r, 29, and 20. What was the range of the numbers of books read by the 7 students last year?

(1) $5 < p < q$

(2) $p < r < 15$

191. 18547-!-item-!-187;#058&011999
Is the positive integer j divisible by a greater number of different prime numbers than the positive integer k ?

(1) j is divisible by 30.

(2) k = 1,000

192. 18601-!-item-!-187;#058&012081
Is $xy > 0$?

(1) $x - y > -2$

(2) $x - 2y < -6$

193. 18701-!-item-!-187;#058&012184
If $x - y > 10$, is $x - y > x + y$?

(1) $x = 8$

(2) $y = -20$

194. 18755-!-item-!-187;#058&012205
If r is the remainder when the positive integer n is divided by 7, what is the value of r ?

(1) When n is divided by 21, the remainder is an odd number.

(2) When n is divided by 28, the remainder is 3.

195. 18858-!-item-!-187;#058&012264
If w, x, y, and z are integers such that $\frac{w}{x}$ and $\frac{y}{z}$ are integers, is $\frac{w}{x} + \frac{y}{z}$ odd?

(1) $wx + yz$ is odd.

(2) $wz + xy$ is odd.

196. 18962-!-item-!-187;#058&012363
A recent lunch meeting at a certain club was attended by members and guests. Each member paid \$4 for the lunch, and each guest paid \$8 for the lunch. How many of the people attending the meeting were members?

(1) A total of 20 people attended the meeting.

(2) A total of \$92 was paid for the lunch.

197. 19016-!-item-!-187;#058&012397
The integers m and p are such that $2 < m < p$ and m is <u>not</u> a factor of p. If r is the remainder when p is divided by m, is $r > 1$?

(1) The greatest common factor of m and p is 2.

(2) The least common multiple of m and p is 30.

198. 19116-!-item-!-187;#058&012496
If @ denotes one of the four arithmetic operations addition, subtraction, multiplication and division, what is the value of 1 @ 2 ?

(1) n @ 0 = n for all integers n.

(2) n @ n = 0 for all integers n.

199. 19170-!-item-!-187;#058&012498

Warehouse W's revenue from the sale of sofas was what percent greater this year than it was last year?

(1) Warehouse W sold 10 percent more sofas this year than it did last year.

(2) Warehouse W's selling price per sofa was $30 greater this year than it was last year.

200. 19224-!-item-!-187;#058&012506
If d is a positive integer and f is the product of the first 30 positive integers, what is the value of d ?

(1) 10^d is a factor of f.

(2) $d > 6$

201. 19278-!-item-!-187;#058&012507
If k is a line in the xy-plane, what is the slope of k ?

(1) The x-intercept of k is 2.

(2) The y-intercept of k is 3.

202. 19378-!-item-!-187;#058&012570
The numbers x and y are <u>not</u> integers. The value of x is closest to which integer?

(1) 4 is the integer that is closest to x + y.

(2) 1 is the integer that is closest to x - y.

203. 19527-!-item-!-187;#058&012646
What is the result when x is rounded to the nearest hundredth?

(1) When x is rounded to the nearest thousandth the result is 0.455.

(2) The thousandths digit of x is 5.

204. 19581-!-item-!-187;#058&012650
If Mary always takes the same route to work, how long did it take Mary to get to work on Friday?

(1) It took Mary 20 minutes to get to work on Thursday.

(2) Mary's average speed on her trip to work was 25 percent greater on Thursday than it was on Friday.

205. 19960-!-item-!-187;#058&012914
What was a certain company's revenue last year?

(1) Last year the company's gross profit was $4,100.

(2) Last year the company's revenue was 50 percent greater than its expenses.

206. 20297-!-item-!-187;#058&013111
In 1984 a certain union had a total of 15,600 members. Was the percent increase in the total number of members in the union from 1984 to 1985 greater than that from 1985 to 1986 ?

(1) From 1984 to 1985 the total number of members in the union increased by 781, and from 1985 to 1986 the total number of members in the union again increased by 781.

(2) In 1985 the union had a total of 16,381 members, and in 1986 the union had a total of 17,162 members.

207. 20351-!-item-!-187;#058&013123
At a certain theater, the cost of each adult's ticket is $5 and the cost of each child's ticket is $2. What was the average (arithmetic mean) cost of all the adults' and children's tickets sold at the theater yesterday?

(1) Yesterday the ratio of the number of children's tickets sold at the theater to the number of adults' tickets sold at the

theater was 3 to 2.

(2) Yesterday 80 adults' tickets were sold at the theater.

208. 20405-!-item-!-187;#058&013127
At a certain store, each notepad costs x dollars and each marker costs y dollars. If $10 is enough to buy 5 notepads and 3 markers, is $10 enough to buy 4 notepads and 4 markers instead?

(1) Each notepad costs less than $1.

(2) $10 is enough to buy 11 notepads.

209. 20459-!-item-!-187;#058&013172
The cost of each adult's ticket for a certain concert was $30, and the cost of each child's ticket for the concert was $24. If Hannah purchased tickets for this concert, what was the average (arithmetic mean) cost per ticket?

(1) Hannah purchased twice as many children's tickets as adults' tickets.

(2) Hannah purchased 4 children's tickets.

210. 20513-!-item-!-187;#058&013256
For each order, a mail-order bookseller charges a fixed processing fee and an additional shipping fee for each book in the order. Rajeev placed five different orders with this bookseller--an order for 1 book in January, an order for 2 books in February, an order for 3 books in March, an order for 4 books in April, and an order for 5 books in May. What was the total of Rajeev's processing and shipping fees for these five orders?

(1) Rajeev's processing and shipping fees were $1.00 more for his order in March than for his order in January.

(2) The total of Rajeev's shipping fees for the five orders was $7.50.

211. 20614-!-item-!-187;#058&013294
A certain economics class consists of 50 women and 30 men. How many of the men in the class are business majors?

(1) 40 percent of the women in the class are business majors.

(2) 50 percent of all the people in the class are business majors.

212. 20668-!-item-!-187;#058&013295
For a certain play performance, adults' tickets were sold for $12 each and children's tickets were sold for $8 each. How many children's tickets were sold for the performance?

(1) The total revenue from the sale of adults’ and children’s tickets for the performance was $5,040.

(2) The number of adults’ tickets sold for the performance was $\frac{1}{3}$ the total number of adults’ and children’s tickets sold for the performance.

213. 20722-!-item-!-187;#058&013303
Linda, Robert, and Pat packed a certain number of boxes with books. What is the ratio of the number of boxes of books that Robert packed to the number of boxes of books that Pat packed?

(1) Linda packed 30 percent of the total number of boxes of books.

(2) Robert packed 10 more boxes of books than Pat did.

214. 20776-!-item-!-187;#058&013419
Is the measure of one of the interior angles of quadrilateral ABCD equal to 60 degrees?

(1) Two of the interior angles of ABCD are right angles.

(2) The degree measure of angle ABC is twice the degree measure of angle BCD.

215. 20830-!-item-!-187;#058&013425
On the number line, the distance between point A and point C is 5 and the distance between point B and point C is 20. Does point C lie between point A and point B ?

(1) The distance between point A and point B is 25.

(2) Point A lies to the left of point B.

216. 20930-!-item-!-187;#058&013466
Is the three-digit number n less than 550 ?

(1) The product of the digits in n is 30.

(2) The sum of the digits in n is 10.

217. 20984-!-item-!-187;#058&013473
If n is a three-digit positive integer, what is the sum of the digits of n ?

(1) The hundreds digit of n is 3 times the units digit.

(2) The hundreds digit of n is 3 more than the tens digit.

218. 21130-!-item-!-187;#058&013592
The retail price of a certain refrigerator is 1.6 times its wholesale price. What is the difference between the retail price and the wholesale price of the refrigerator?

(1) The wholesale price of the refrigerator is $200.

(2) The retail price of the refrigerator is $320.

Practice Test 2 Data Sufficiency Keys:

1. D 2. E 3. A 4. C 5. C 6. D 7. B 8. C 9. C 10. C 11. B 12. A 13. C 14. C 15. D 16. D 17. B 18. D 19. C 20. D
21. B 22. C 23. B 24. D 25. C 26. C 27. E 28. D 29. A 30. D 31. B 32. A 33. D 34. C 35. E 36. E 37. C 38. E 39. C 40. C
41. A 42. D 43. E 44. C 45. D 46. E 47. E 48. C 49. D 50. C 51. B 52. E 53. A 54. D 55. A 56. E 57. C 58. C 59. A 60. B
61. C 62. B 63. C 64. D 65. C 66. B 67. A 68. D 69. E 70. D 71. D 72. C 73. A 74. E 75. C 76. C 77. C 78. C 79. B 80. B
81. E 82. C 83. B 84. E 85. C 86. E 87. C 88. B 89. A 90. C 91. C 92. E 93. D 94. D 95. A 96. D 97. E 98. E 99. C 100. E
101. D 102. E 103. C 104. E 105. E 106. C 107. D 108. A 109. B 110. E 111. D 112. D 113. E 114. E 115. C
116. D 117. A 118. E 119. C 120. D 121. B 122. C 123. C 124. C 125. A 126. A 127. C 128. D 129. A 130. A
131. B 132. E 133. A 134. B 135. C 136. E 137. C 138. D 139. B 140. B 141. C 142. C 143. E 144. C 145. D
146. B 147. E 148. C 149. A 150. D 151. D 152. A 153. A 154. D 155. E 156. D 157. D 158. B 159. B 160. A
161. C 162. A 163. B 164. D 165. A 166. B 167. C 168. B 169. C 170. E 171. B 172. B 173. E 174. D 175. E
176. C 177. E 178. D 179. D 180. E 181. C 182. E 183. A 184. B 185. C 186. C 187. C 188. E 189. C 190. E
191. C 192. C 193. D 194. B 195. B 196. C 197. A 198. B 199. E 200. C 201. C 202. E 203. C 204. C 205. C
206. D 207. A 208. E 209. A 210. E 211. C 212. C 213. E 214. E 215. A 216. C 217. E 218. D

TOP-ONE-PERCENT

SOLUTIONS TO DS COLLECTION 1 – 218Q

RECENT DS COLLECTION 1 – 218Q

BY

SANDEEP GUPTA

DIRECTOR – TOP ONE PERCENT

THE BEST GMAT TRAINER IN ASIA

GMAT: 800 ... minimum score ever: 770

Q.1

Let there be *S* Shovels and *R* rakes.
The wordy question language may then be simplified to reiterate the question as saying:

What is the value of **(14S + 9R)** ?

<u>STATEMENT (1) alone</u>: A 2 : 3 ratio does not give us a fix on the total number of shovels and rakes purchased. It merely states the proportion of items that constitutes shovels and rakes. For instance there can 2 Shovels and 3 Rakes **or** 4 Shovels and 6 Rakes **or** 8 Shovels and 12 Rakes (and so on) in his purchase. Each possibility yields a different value for **(14S + 9R).** Which is why,
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement says S + R = 50. Although this statement gives us a fix on the total number purchased. It gives no clue as to the individual number of each contained in the sum total of 50. Like the above explanation, we can have multiple sets of (S,R) *(say (10,40)* ***or*** *(25,25) for instance)* values that add up to 50. All those values again yield different value for **(14S + 9R).**
STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Together we have a fix on both the total number and the distribution (ratio) of the two items within the total. This is enough to yield a unique value for both *S* & *R*. Alternatively, mathematically this may be seen as being given two equations: (1) $S = (2/3)*R$ & (2) $S + R = 50$ to solve for two variables: *S* & *R* uniquely. The unique set *(S,R)* further yields a unique value of **(14S + 9R).** hence,
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.2

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table as follows:

	SET **A**	$\overline{\text{SET A}}$	TOTAL
SET **B**	No. of elements common to both	No. of elements in B but not in A	Total of SET B **(SUM of left 2)**
$\overline{\text{SET B}}$	No. of elements in A but not in B	No. of elements in neither A nor B	Total of everything not of B **(SUM of left 2)**
TOTAL	Total of SET A **(SUM of above 2)**	Total of everything not of A **(SUM of above 2)**	ENTIRE TOTAL

ADDITION (down the rows)

ADDITION (across the columns)

$\overline{\text{SET A}}$ & $\overline{\text{SET B}}$ represent the complements of SET A and SET B which is nothing but the set of elements not belonging to SET A and SET B respectively.

<u>Note that:</u> No. of elements(SET **A)** + No. of elements(SET $\overline{\textbf{A}}$**)** = **Entire Total. ;** same for B.

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find. Let us say the Total number of students we're dealing with is X.

	Likes Lima Beans	Dislikes Lima Beans	TOTAL
Likes Sprouts		**?**	
Dislikes Sprouts		(3/5)*(2/3)*X	
TOTAL	(1/3)*X	(2/3)*X	X

Filling in the above info allows us to calculate for the required box:

The required box has a value = (2/3)*X – (3/5)*(2/3)*X = **(4/15)*X**
However, the above isn't a fixed unique value but a variable in X.
Let us consider the statements now.

<u>STATEMENT (1) alone</u>: Statement clearly gives out the value of X which in turn gives us the *(unique)* value of what is asked.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: Statement fills in the value for the box (1/3)*X. Or in other words says (1/3)*X = 40, giving us a *(unique)* value of X and hence of what is asked.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.3

Question statement asks for number of distinct prime **factors**. We should bear in mind the possibility that integer *n* can still be a multiple of different prime numbers raised to powers. Remember that the whole idea of the question is to arrive at a unique value of the number of distinct prime factors of the integer.

<u>STATEMENT (1) alone</u>: Unaware of whether n is even or odd, paves way for two possibilities:

1. *n* is odd, in which case considering that 2 itself is prime and the fact that 2**n* has four different prime factors, gives us **3 prime factors of *n*.**
2. *n* is even, in which case considering that 2 itself is prime and the fact that 2**n* has four different prime factors, gives us **4 prime factors of *n*.**

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: The squaring operation (performed on any integer) only raises all existing prime factors to a power twice the original (*if* $n = 2*3^2*5^3$ *then* $n^2 = 2^2*3^4*5^6$). Or,

squaring can never add another prime factor to an already existing integer. Thus if n^2 has **4** distinct prime factors then so does the integer *n*.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.4

Always try to gauge the conditions laid out by the question carefully. Here the mentioned product is of integers (ie, 0, ±1, ±2, ±3…..). The habit although seems of less value, goes a long way. Let *X* & *Y* be the integers.

STATEMENT (1) alone: (X + Y) is odd → **Either** X is odd and Y even **or** X even and Y odd. Either way one of the integers out of *X* & *Y* is even and regardless of which one the product will always be even. CONFIRMED YES!
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This is a simplified version stating the direct result derived from statement (1). It just says it directly. Hence, again a CONFIRMED YES!
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).
Note: even considering catch points (as I like to call them) such as the integer 0 brings about no change in the answer as 0 itself is even.

Q.5

Given K = {3, 4, 5, 6, 7}, we're to find a unique value of K.

STATEMENT (1) alone: 30 can be written as 2 x 3 x 5, hence factors of 30 falling in the set of possible values of K are – 3, 5 & 6. *No unique value.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: 12 can be written as 2 x 2 x 3, hence factors of 12 falling in the set of possible values of K are – 3, 4 & 6. *No unique value.*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (1) gives the possible set of values of K as {3, 5, 6} **and** Statement (2) gives the possible set of values of K as {3, 4, 6}. Considering the two statements together means taking the common values *(ones appearing in both sets)*. This gives K = {3, 6}. Another way to look at this is we're looking for integers from the original set that are factors of both 12 and 30 and those are again {3, 6}. *Still no unique value.*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.6

The diagram conveys two messages – 1. The numbers *(not necessarily Integers)* are distinct and 2. Their increasing/decreasing order. That is it!

STATEMENT (1) alone: The greatest of the integers is given +ve. Now remember all we need is a YES/NO situation and we can move on. This can be done easily by moving the position of zero on the number line. For Instance – Let z be the only +ve number → the product is *negative*. However, if y also turns out to be +ve with the remaining two negative → the product is *positive*. A YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This says w*x > 0. Two cases arise obviously – **a)** w and x are both +ve, or **b)** w and x are both –ve.
Now, if w & x are both +ve that leaves only one option that all the numbers are +ve and hence the product +ve.
However, if w & x are both –ve, then either **a)** y & z are both –ve in which case the product is again +ve or, **b)** y & z are both +ve in which case the product is again +ve or, **c)** y is –ve and z is +ve in which case the product is –ve. A YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: We can pick up from our analysis in statement (2) alone, all we need to do is include the condition that z is +ve. Now, the second part of the analysis beginning with however presents three cases. Out of these three cases, cases **b)** & **c)** are such that they conform to both the conditions laid out by statements (1) & (2) and yet give conflicting answers. Again a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.7

Figuring out whether Y*(Z + 1) is a CONFIRMED EVEN or a CONFIRMED ODD.

STATEMENT (1) alone: The information supplied is of only Y being odd. Depending on what integer Z is, the product above can either be odd or be even. A YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Again, the information supplied is of only Z being even *(and hence, Z + 1 being odd)*. Depending on what integer Y is, the product above can either be odd or be even. A YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Substantiates that both the integers being multiplied are odd and hence yield an CONFIRMED odd product.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.8

Given *n* and *m* are positive integers → both *n* & *m* can take on Integer values beginning with 1 and upwards (ie, 1, 2, 3, 4…….)

A General Note: *To find the remainder when divided by 10 is the exact same thing as to say – find the units digit of the Integer. In other words, any integer divided by 10 leaves a remainder that is the units digit of that integer.*

The question is hence all about finding the units digit of the $3^{(4n + 2 + m)}$. Raising 3 to successive powers gives a repetitive pattern of units digits*(the pattern repeating itself in sets of four)*:
So, really all we need to do is divide 'the power to which 3 is raised' by 4 and figure out the units digit based on the remainder we get.
$3^1 = 3$ *(remainder when power divided by 4 → 1)*
$3^2 = 9$ *(remainder when power divided by 4 → 2)*
$3^3 = 27$ *(remainder when power divided by 4 → 3)*
$3^4 = 81$ *(remainder when power divided by 4 → 0)*
$3^5 = 243$ *(remainder when power divided by 4 → 1)*
$3^6 = 729$ *(remainder when power divided by 4 → 2)*
The red coloured numerals are all we're interested in!

STATEMENT (1) alone: we're given n in the expression (4n + 2 + m), but 4n is already divisible by 4 regardless of the value of integer n. Not knowing the value of Integer m puts us in a fix. We can have multiple remainders depending on the value of m. *(m=1 remainder's 3, m=2 remainder's 0 and so on). No unique units digit.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Here we're given m = 1 so that the power expression (4n + 2 + m) reduces to (4n + 3). This expression regardless of the value of n will always yield a remainder 3 when divided by 4 and hence a units digit of **7**. *A unique value obtained.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.9

x is given to be a positive Integer (ie, 1, 2, 3, 4…….).

STATEMENT (1) alone: The mean of consecutive integers can most easily be evaluated by taking the mean of the 1st and last integers. So effectively the statement says that $x < 5.5$, or x can take on the following values {1, 2, 3, 4, 5} all of which are less than 16. CONFIRMED YES!
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: x can either be $= 3^2 = 9$ which is less than 16. Or, x can be $= 5^2 = 25$ which is greater than 16. YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.10

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a ‘**?**’ sign at the place that we’re required to find.

	Live on Campus	Live off Campus	TOTAL
20 yrs old or less	**?**		
More than 20 yrs old	250		
TOTAL			800

STATEMENT (1) alone: The information further fills in the table as follows:

	Live on Campus	Live off Campus	TOTAL
20 yrs old or less	**?**		160
More than 20 yrs old	250	390	640
TOTAL			800

Although we can infer that 160 students are 20 yrs or less, this still leaves no clue as to how they’re distributed between living on campus and outside campus. In other words, the highlighted cells can be filled with infinite pairs adding up to 160. *No unique value.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Live on Campus	Live off Campus	TOTAL
20 yrs old or less	**?**	**60**	
More than 20 yrs old	250		
TOTAL			800

This is too less information to even remotely arrive at anything. *No unique value.*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Live on Campus	Live off Campus	TOTAL
20 yrs old or less	**100**	**60**	160
More than 20 yrs old	250	390	640
TOTAL	350	450	800

Unique solution obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.11

P is a positive odd integer → p can thus take on values {1, 3, 5, 7……..}

STATEMENT (1) alone: p may thus be written as p = 8*k + 5 where k is a non-negative integer. This means (p – 5) = 8*k. Or, (p – 5) is divisible by 4 *(since (p – 5) is a multiple of 8)*. Hence, {(p – 5) + 4} = (p – 1) is also divisible by 4. Thus, p divided by 4 will always yield a remainder 1. *Unique solution.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Since p is odd, if it is to be expressed as a sum of two +ve integers then one of them must be even and the other odd. Hence, the integers whose squares sum up to p are a pair of even and odd integers. Mathematically this may be expressed as:

p = $(2k)^2 + (2m + 1)^2$; where k & m are non negative integers.

Or, p = $4k^2 + 4m^2 + 4m + 1$

Or, p = $4(k^2 + m^2 + m) + 1$

Or, p = $4j + 1$

The above divided by 4 will always yield a remainder 1. *Unique solution.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.12

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Anti-lock brakes	No Anti-lock brakes	TOTAL
Automatic transmission		**?**	
No Automatic transmission			
TOTAL			25

<u>STATEMENT (1) alone</u>: The additional information fills in the original table as follows:

	Anti-lock brakes	No Anti-lock brakes	TOTAL
Automatic transmission		**?**	
No Automatic transmission	0		
TOTAL			25

This is too less information to even remotely arrive at anything. *No unique value.*
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: The additional information fills in the original table as follows:

	Anti-lock brakes	No Anti-lock brakes	TOTAL
Automatic transmission		**?**	
No Automatic transmission		2	
TOTAL			25

Again, this is too less information to even remotely arrive at anything. *No unique value.*
STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Both the statements together fill in the table completely as follows:

	Anti-lock brakes	No Anti-lock brakes	TOTAL
Automatic transmission		**?**	23

No Automatic transmission	0	2	2
TOTAL			25

Even clubbing the information in the 2 statements, the highlighted cells can still be filled with infinite pairs adding up to 23. *No unique value.*

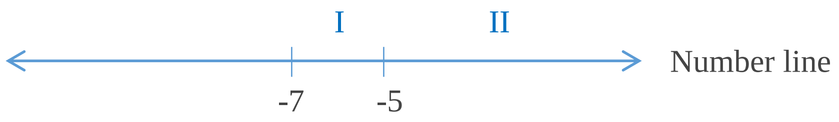
STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.13

The number line approach:

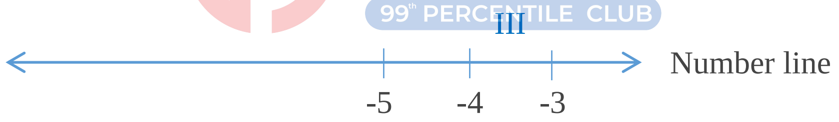
STATEMENT (1) alone: the information is presented below:



The information says that *x* can lie in either region I or II. This gives us a YES/NO situation about *x* lying in region II definitively.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: the information is presented below:



Here, however, the value of *x* is said to lie in region III, which is entirely to the right of -5. CONFIRMED YES.

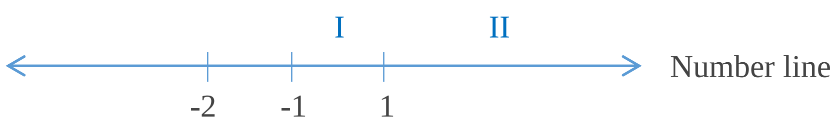
STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.14

The number line approach:

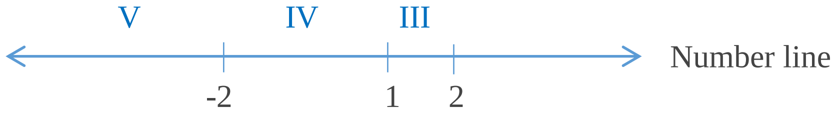
STATEMENT (1) alone: the information is presented below:



The information says that *y* can lie in either region I or II. This gives us a YES/NO situation about *y* lying between -2 & 1 definitively.

STATEMENT (1) alone - INSUFFICIENT

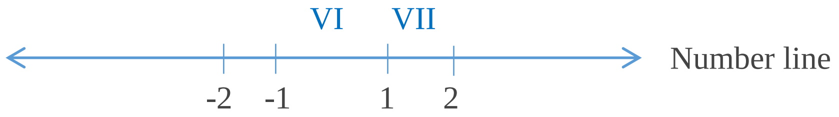
STATEMENT (2) alone: the information is presented below:



The information says that *y* can lie in either region III, IV or V. This again gives us a YES/NO situation about *y* lying between -2 & 1 definitively.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: the clubbed information is presented below:



The information says that *y* can lie in either region VI or VII. This again gives us a YES/NO situation about *y* lying between -2 & 1 definitively.

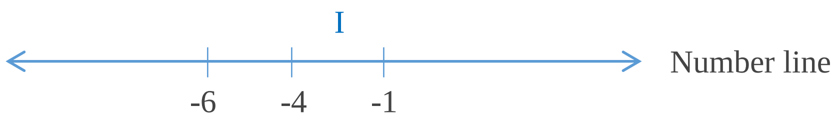
STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.15

The number line approach:

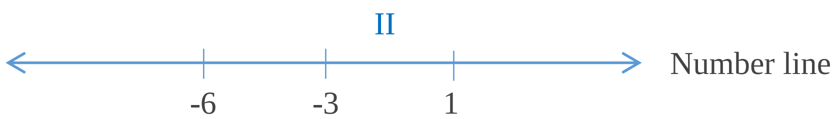
STATEMENT (1) alone: the information is presented below:



The information says that *r* can lie only in region I. This gives us a CONFIRMED YES about *r* lying to the right of -6 definitively.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: the information is presented below:



The information says that *r* can lie only in region II. This gives us a CONFIRMED YES about *r* lying to the right of -6 definitively.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.16

Reading the entire question stem tells us that we're going to be dealing with slope and Y – Intercept of a line. It may thus be useful to represent the line as Y = m*X + c; m & c are the slope and Y – Intercept of the line. Let's see the what the question's asking!

If say line ***n*** be Y = m_1*X + c_1 & line ***p*** be Y = m_2*X + c_2
Then is $m_1 > m_2$?

STATEMENT (1) alone: point (5,1) satisfies both equations, and so we may write: $m_1 = (1 - c_1) / 5$ & similarly $m_2 = (1 - c_2) / 5$. Since the values of c_1 & c_2 are unknown the inequality between m_1 & m_2 cannot be definitively established.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: $c_1 > c_2$ but no relationship between the lines is given. The lines may be parallel ($m_1 = m_2$) for all we know and not have any point in common or have some point in common such that m_1 indeed is > m_2. Since considering this statement alone also does not definitively establish a relationship between the slopes,
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the information together:
If $c_1 > c_2$ then it mathematically follows that $(1 - c_1) < (1 - c_2)$. Dividing both sides by 5, we get $\{(1 - c_1) / 5\} < \{(1 - c_2) / 5\}$, or $m_1 < m_2$. A CONFIRMED NO answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.17

The question may be simplified as to asking that – *out of six countries sending **distinct** number of representatives and a total of 75 did the country sending the 2nd largest representatives send representatives ≥ 10?*

A YES/NO situation simulation should be our target!

STATEMENT (1) alone: Under the conditions laid out by the question stem, a country sending in 41 representatives can only be the country with the largest number of representatives *(If you decide to dedicate it as the 2nd largest in representatives share, then the next largest has to have at most 42 representatives which would exceed the overall total of 75 representatives).* Now with 41 as the largest number of representatives belonging to a single country leaves us with allotting 75 – 41 = 34 representatives to the remaining 5 countries with the second largest representative country maybe having atleast 10 in its share.

Creating a **YES** situation is relatively simple in that we allot 10 representatives to country A and split the remaining 34 – 10 = 24 representatives among the remaining 4 countries as say 3, 6, 7, 8 representatives *(all distinct and below 10).*

A **NO** situation means distributing the remaining 75 – 41 = 34 representatives among 5 countries such that all are distinct and below 10. We start with the largest number below 10 ie 9. (**9** + 8 + 7 + 6 + 4) is one such distribution.

This confirms a YES/NO situation.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: In other words country A *(sending the 2nd largest number of representatives)* could have sent {11, 10, 9, 8…..so on} representatives.

Creating a **YES** situation we begin by designating 10 representatives to country A. Next we can have any number of representatives from the four lower countries in terms of representatives *(as the only restriction is that the numbers should all be less than 10 and distinct).* The remaining can be balanced by allotting any number greater than 10 to the largest country in terms of representatives to add everything up to 75.

An example is (40 + **10** + 8 + 7 + 6 + 4).

Similarly a **NO** situation can be created by designating 9 representatives to country A. Next we can have any number of representatives from the four lower countries in terms of representatives *(as the only restriction is that the numbers should all be less than 9 and distinct).* The remaining can be balanced by allotting any number greater than 9 to the largest country in terms of representatives to add everything up to 75.

An example is (41 + **9** + 8 + 7 + 6 + 4).

This confirms a YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the restrictions laid out by both the statements, we try for yet another YES/NO situation. We have to distribute 75 – 41 = 34 representatives with country A *(second largest in terms of number of representatives)* containing fewer than 12 or {11, 10, 9, 8…..so on} representatives.

A **NO** situation, to begin with, can simply be reiterated from the analysis of statement (1). (**9** + 8 + 7 + 6 + 4) is one possible solution.

A **YES** situation can easily be created by manipulating the above distribution *(say by subtracting 1 from 4 to take the number of representatives by country A up to 10).*

(**10** + 8 + 7 + 6 + 3) is one possible solution.

This yet again confirms a YES/NO situation.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.18

The question deals with accurately tracking the decimal marked out by the question stem.

A quick recap of decimal representation may come in handy here.

A decimal may be represented as:

0.THTT... and so on, where:

T → the tenths digit of the decimal.

H → the hundredths digit of the decimal.

T → the thousandths digit of the decimal.

T → the ten thousandths digit of the decimal.

STATEMENT (1) alone: Multiplying z by 100, **the hundredths digit** becomes the **units** digit (ie the first one to the right of 0). However, we are given **the tenths digit of the**

decimal as 2. This tells us nothing about what the units digit of 100z or the hundredths digit of z is.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Multiplying z by 1000, **the hundredths digit** becomes the **tens** digit (ie the second one to the right of 0). However, we are given the units digit as 2. This tells us nothing about what the tens digit of 1000z or the hundredths digit of z is.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements are saying the same irrelevant thing and there is nothing new that may be achieved by combining them in any way possible.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.19

x, y & z are integers and are positive integers. For z to be the median of the three z must **either** be between *x & y* in case all three are distinct **or** be equal to atleast one of the two *x & y*. Anything that substantiates any of the above yields a definitive answer.

STATEMENT (1) alone: $x < y + z$ gives us all three possibilities of *z* being the least, greatest or in the middle. An example of all three are – *(x,y,z)* = (15,30,2), (15,2,30) and (15,20,30).
A YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: $y = z$ then regardless of what *x* is the median (middle value) shall always be the value of *y* or *z*.
A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.20

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Morning present	Morning absent	TOTAL
Afternoon present			

Afternoon absent	**?**	0	
TOTAL			128

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Morning present	Morning absent	TOTAL
Afternoon present	96		
Afternoon absent	**?**	0	
TOTAL			128

This information provides numerous possibilities of filling out box asked which can all then be compensated by an appropriate value filling out the highlighted box to add up the total to 128. *No unique value.*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Morning present	Morning absent	TOTAL
Afternoon present			112
Afternoon absent	**? = 16**	0	16
TOTAL			128

Since no one was absent for both sessions, we can conclude that the 1/8th people that were absent for the afternoon session were all those who were present for the morning one which is what is asked. A *unique value obtained.*

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.21

We're given Books**(B)** + Videos**(V)** + Board Games**(G)** = 360.
We need to find a *unique value* for **V**.

STATEMENT (1) alone: statement says **B** = (2/5)*360 = 144. Or, in other words,
V + **G** = 216. But *No Unique value of* **V**.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: statement says **B** = (2/3)***(V** + **G),** Or **(V** + **G)** = (3/2)***B**;
Substituting back into the original equation at the top → **B** + (3/2)***B** = 360,

Or **B** = (2/5)*360 = 144, which is the exact same scenario that we arrived at from statement (1). Hence *No Unique value of* **V**.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same relationship and there is nothing new that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.22

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Red coloured	NOT Red Coloured	TOTAL
Made of pure wool	**?**		
NOT made of pure wool			
TOTAL	150	650	800

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Red coloured	NOT Red Coloured	TOTAL
Made of pure wool	**?**	330	
NOT made of pure wool		320	
TOTAL	150	650	800

The information does fill out the 2^{nd} column in our table but does little to give us any clue as to how the 150 red coloured sweaters are distributed between **pure wool** and **not made of pure wool** ones. *No unique value.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Red coloured	NOT Red Coloured	TOTAL
Made of pure wool	**? = 50**		

NOT made of pure wool	100		
TOTAL	150	650	800

The information fills out one of the two cells that add up to 150 and hence gives a unique value of **50** for what is asked. *Unique value obtained.*

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.23

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information that we know of.

Let the students studying French be **F** & Let the students studying Japanese be **J**
The question asks: is **F > J**?

	Study Japanese	Do Not Study Japanese	TOTAL
Study French	(4/100)***F**		**F**
Do Not Study French			
TOTAL	**J** ≥ 100		

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Study Japanese	Do Not Study Japanese	TOTAL
Study French	(4/100)***F**		**F**
Do Not Study French			
TOTAL	**J** ≥ 100		

The information says that (4/100)***F** = 16. Or, that **F** = 400. However, we only know that **J** ≥ 100. **F** may or may not be greater than **J***(all dependent on the actual value of **J**)*. A YES/NO situation.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Study Japanese	Do Not Study Japanese	TOTAL
Study French	(4/100)***F**		**F**
Do Not Study French			
TOTAL	**J** $\geq$ 100		

The information says that (4/100)***F** = (10/100)***J**. Or, that **F** = (5/2)***J**. This sufficiently substantiates that **F** > **J**. A CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.24

Let the cost, excluding sales tax, of 1 hamburger be **P**.
Now cost to a customer for buying x hamburgers at r % sales tax should be:
Cost = x***P***(1 + r/100).
The question requires us to find **P**.

STATEMENT (1) alone: The statement results in a linear equation with a single variable **P** and hence is sufficient to solve for a unique value of **P**. *Solving is unnecessary and a waste of time!*

4.77 = 3***P***(1.06) → solve for **P** = $1.50
Unique value of ***P*** *obtained.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement results in a linear inequality with a single variable **P**. Inequalities always give a range of values for a particular variable but almost never a unique value. *Solving is unnecessary and a waste of time!*

6.50 > 4***P***(1.06) → **P** < $1.533
No unique value.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.25

STATEMENT (1) alone: 0 < n < 1 gives a range rather than a unique value of n.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: gives a linear equation in one variable n. This is enough to substantiate a unique value of n. *Solving is unnecessary and a waste of time!*
n + (3/8) = (7/16) or n = (1/16).
Unique value of ***n*** *obtained.*

STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.26

The statement 'each row of chairs has the same number of chairs' means we're dealing with a rectangular grid of elements with say ***n*** rows and ***m*** columns.
We're given ***n*** = ***m*** – 1 & asked to find ***m.***

STATEMENT (1) alone: Tells us the total number of elements/chairs in the grid. Thus, ***n* m*** = 72 or ***m**** (***m*** – 1) = 72. *(Note that rows and columns can only be **positive Integers**).* This gives a quadratic equation in one variable and hence may be solved for a *unique positive* value of ***m.*** Alternatively, the above equation is a multiplication of consecutive integers to yield a given definitive product. Such a scenario will always have only one unique pair of consecutive integers that satisfies the equation*(in this case (9,8))*. Hence, ***m*** = 9. Again *Solving is unnecessary and a waste of time! The purpose here is only to offer an explanation. Unique value of* ***m*** *obtained.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Tells us the total in the last two rows after removing one element. Or, 2***m*** – 1 = 17, which is a linear equation in one variable.
Again a unique value of ***m*** *obtained.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.27

Assuming its price as **P**, we need a *unique value* of **P**.

STATEMENT (1) alone: If the sales tax be *r* % and the gratuity paid be **G**. Then,

P*(1 + *r*/100) + **G** = $10.84, an equation with three unknowns. Insufficient information.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Alone this information does not bear even the most remote connection to what is asked!
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the information together forms the equation:
P*(1 + 6/100) + **G** = $10.84, an equation with still two unknowns. Insufficient information.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.28

For profit questions it is always useful to keep the below inherent equation at the back of your mind.

Gross Profit = Revenue – Expenses.

Let the revenues and expenses of company **X** be $\mathbf{R_X}$ & $\mathbf{E_X}$ respectively and let the revenues and expenses of company **Y** be $\mathbf{R_Y}$ & $\mathbf{E_Y}$ respectively.

The question asks to establish a definitive inequality between ($\mathbf{R_X - E_X}$) & ($\mathbf{R_Y - E_Y}$).

STATEMENT (1) alone: The statement does mention the relationship ($\mathbf{E_X} = (5/6)^* \mathbf{E_Y}$) between the expenses, however mentions nothing in regard to revenues. The information is insufficient to establish an accurate inequality.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement on the other hand does mention the relationship ($\mathbf{R_Y - R_X} = \$6mn$) between the revenues, however mentions nothing in regard to expenses. The information is insufficient to establish an accurate inequality.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the information together we'll try to write ($\mathbf{R_Y - E_Y}$) in terms of $\mathbf{R_X}$ & $\mathbf{E_X}$.
($\mathbf{R_Y - E_Y}$) = (\$6mn + $\mathbf{R_X}$) – (6/5)*$\mathbf{E_X}$ = ($\mathbf{R_X - E_X}$) + (\$6mn – (1/5)*$\mathbf{E_X}$)
Now depending on the absolute value of $\mathbf{E_X}$ the value of (\$6mn – (1/5)*$\mathbf{E_X}$) will either be negative or positive. And hence, the value of ($\mathbf{R_Y - E_Y}$) might either be greater than ($\mathbf{R_X - E_X}$) *(considering that the value of (\$6mn – (1/5)*$\mathbf{E_X}$) is positive)* or less than ($\mathbf{R_X - E_X}$) *(considering that the value of (\$6mn – (1/5)*$\mathbf{E_X}$) is negative)*. Hence together the information is insufficient to establish an accurate inequality.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.29

All we need is the value of the variable *x* to get the answer to what is asked!

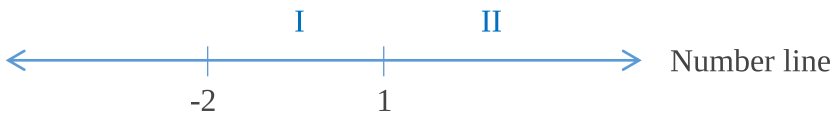
STATEMENT (1) alone: Not only is this a linear equation in one variable that may be definitively solved for that variable *(in this case x)*, but multiplying both sides by 2 alone sufficiently yields the answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This again is a linear equation in one variable that may be definitively solved for that variable *(in this case x)*.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.30

The number line approach:

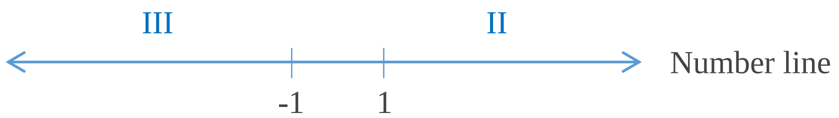
<u>STATEMENT (1) alone</u>: the information is presented below:



The information says that *w* can lie in either region I or II. This gives us a YES/NO situation about *w* lying in region II definitively.

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: the information is presented below:



The information says that *w* can lie in either region II or III. This again gives us a YES/NO situation about *w* lying in region II definitively.

STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: the clubbed information is presented below:

The information says that *w* can lie in either region IV or II. This again gives us a YES/NO situation about *w* lying in region II definitively.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.31

Let the price of one sandwich be $\$S$ & let the price of one can be $\$C$.

Note: prices need not be integers…

We're asked the value of $(2*S + 3*C)$

<u>STATEMENT (1) alone</u>: Given $S + C = \$3$ leaves us clueless about what the individual prices are. The information is thus of limited help.

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: Given $3*S + 2*C = \$8$ still leaves us clueless about what the individual prices are. The information is thus of limited help.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Given the two equations $S + C = \$3$ & $3*S + 2*C = \$8$ in two variables S & C unique values of both S & C can be evaluated to yield a *unique* numerical value of what is asked.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.32

Let **A, P** & **M** be the miles driven by Al, Pablo & Marsha. Then, **A + P + M =** 1500
Figuring out the Max of these three:

Let $\mathbf{V_A}$ & $\mathbf{T_A}$ be the average rate at which Al drove and the duration of Al's driving respectively. Similarly let $\mathbf{V_p}$ & $\mathbf{T_p}$ be the average rate at which Pablo drove and the duration of Pablo's driving respectively.

STATEMENT (1) alone: The statement says $\mathbf{T_A} = \mathbf{T_p} + 1$ and $\mathbf{V_A} = \mathbf{V_p} - 5$. Using *distance = velocity* x *time.*

$\mathbf{A} = \mathbf{V_A} * \mathbf{T_A} = (\mathbf{T_p} + 1)*(\mathbf{V_p} - 5)$

$\mathbf{P} = \mathbf{V_p} * \mathbf{T_p}$

In analysing the product $(\mathbf{T_p} + 1)*(\mathbf{V_p} - 5)$ against $\mathbf{V_p} * \mathbf{T_p}$ for which one is greater, it may be noted that if $\mathbf{V_p}$ *(say 250)* is considerably greater than $\mathbf{T_p}$ *(say 1)* then the former becomes greater than the latter. However, if $\mathbf{V_p}$ *(say 10)* is considerably smaller than $\mathbf{T_p}$ *(say 100)* then the latter becomes greater than the former. Since nothing in the question or the statement tells us anything about the ranges of $\mathbf{V_p}$ or $\mathbf{T_p}$, it is hard to accurately point to which one is greater than the other. *Moreover*, nothing is shared about **M**. The information is insufficient.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This says **M =** 450. Or, **A + P =** 1050. At most we can infer that **M** is definitely not the greatest, as either **A** or **P** is at least equal to (1050/2 = 525). However, we still don't know which one of **A** or **P** is the greater of the two, and hence the greatest.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the information together we have:

$(\mathbf{T_p} + 1)*(\mathbf{V_p} - 5) + \mathbf{V_p} * \mathbf{T_p} = 1050.$

But again picking up from the analysis in statement (1) if $\mathbf{V_p}$ *(say 350)* is considerably greater than $\mathbf{T_p}$ *(say 1)* then **A** becomes greater than **P**. However, if $\mathbf{V_p}$ *(say 8)* is considerably smaller than $\mathbf{T_p}$ *(say 100)* then **P** becomes greater than **A**. Since nothing in the question or the statements together tells us anything about the ranges of $\mathbf{V_p}$ or $\mathbf{T_p}$, it is still hard to accurately point to which one is greater than the other.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.33

The language of the question is typical to directing us towards a YES/NO proving mode approach.

<u>STATEMENT (1) alone</u>: The equation reduces to $y^2 = 1$, or $y = \pm 1$. A YES/NO situation since two values of y are obtained.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: The equation reduces to $y - 1 = 0$, or $y = 1$. A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.34

Let's mathematically formulate the problem at hand:
If X_1, X_2, X_3, X_4, X_5 & X_6 be the individual amounts of water in the six tanks initially, then we're given:

$$SD = \sqrt{\frac{(D_1^2 + D_2^2 + D_3^2 + D_4^2 + D_5^2 + D_6^2)}{6}} = 10$$

Where $D_K = (X_K - Mean)$; K = {1, 2, 3, 4, 5, 6}

And $Mean = \dfrac{X_1 + X_2 + X_3 + X_4 + X_5 + X_6}{6}$

Keeping in mind the above tools we'll attempt the statements one by one.

<u>STATEMENT (1) alone</u>: This statement indirectly implies that all tanks are now left with (7/10)th of the volume they initially started out with. Thus in the new scenario each of X_1, X_2, X_3, X_4, X_5 & X_6 get multiplied by a factor = 0.7. Using the mean formula we see that then new *Mean* also is 0.7 times the original *Mean*. Hence, $D_K = (X_K - Mean)$ for the new scenario is also 0.7 times the original and substituting this in the SD formula we can see that the new SD is nothing but 0.7 times the original (ie, 0.7*10 = 7). Thus we arrive at a *unique* value for the new SD.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: We're only given the mean at the end of the experiment. Although a *Mean* is representative of a set of observations, a *Mean* can never give any idea what so ever of how the observations are dispersed about the mean which is the whole idea of a Standard Deviation measurement. Even mathematically in the new D_K *(the one at the end of the experiment)* we know just the *Mean* but no the individual amounts of water in the tanks.
Please be advised that it is incorrect to assume while considering Statement (2) alone that an equal proportion was taken out of each tank. That info is statement (1) and should be forgotten the moment we turn our attention to statement (2).
Thus the information given is far from establishing a *unique* value for the new SD.
STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.35

p and **n** are given to be positive integers such that **p** > **n**.
We're to find a *definitive/unique* value of the **remainder**
$\mathbf{p^2 - n^2 = (p + n)}*(\mathbf{p - n})$ & 15 = 5*3

STATEMENT (1) alone: the statement allows us to write **p + n** = 5**K* + 1; *K* = 1, 2, 3, 4 and so on. Here we're given information about **p + n** but none about **p – n**. **p – n** could be 3 in which case the **remainder** is 1. **p – n** could also be 6 in which case the **remainder** is 2. This is enough to substantiate that we can't get a fixed value of the **remainder**.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: this statement allows us to write **p – n** = 3**M* + 1; *M* = 0, 1, 2, 3, 4 and so on. Here we're given information about **p – n** but none about **p + n**. **p + n** could be 5 in which case the **remainder** is 1. **p + n** could also be 10 in which case the **remainder** is 2. This is similarly enough to substantiate that we can't get a fixed value of the **remainder**.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: clubbing the information in the two together we can write: $\mathbf{p^2 - n^2 = (p + n)}*(\mathbf{p - n}) = (5*K + 1)*(3*M + 1) = 15*K*M + 5*K + 3*M + 1$. Now dividing the reduced expression by 15 yields a **remainder** that is dependent on the value of $(5*K + 3*M + 1)$. For instance if $K = 1$ & $M = 0$, the **remainder** is 6. If $K = 1$ & $M = 1$, the **remainder** is 9. Again this is enough to substantiate that we can't get a fixed value of the **remainder**.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.36

Given is that x is **positive** but *not necessarily an Integer*.
A YES/NO target approach works well here.

STATEMENT (1) alone: This statement says that either $(x – 1) > 2$ or $(x – 1) < –2$.
Simplifying further: Either $x > 3$ or $x < –1$
However remember that x is given to be a positive number. Hence the only viable result from the above is that $x > 3$. A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that either $(x – 2) > 3$ or $(x – 2) < –3$.
Simplifying further: Either $x > 5$ or $x < –1$
However remember that x is given to be a positive number. Hence the only viable result from
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).
Note: Not considering x is positive yields the wrong answer E.

Q.37

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Developed Fever	NO Fever	TOTAL
Developed Inflammation		**?**	
NO Inflammation			
TOTAL			1000

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Developed Fever	NO Fever	TOTAL
Developed Inflammation		**?**	
NO Inflammation		880	
TOTAL			1000

This is too less information to arrive at a fixed value. *No unique value.*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Developed Fever	NO Fever	TOTAL
Developed Inflammation		**?**	
NO Inflammation			
TOTAL	20	980	1000

Again this is too less information to arrive at a fixed value. *No unique value.*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Developed Fever	NO Fever	TOTAL
Developed Inflammation		**? = 100**	
NO Inflammation		880	
TOTAL	20	980	1000

The clubbed information fills out two of the three cells in the 'NO Fever' column and hence gives a unique value of **100** for what is asked. *Unique value obtained.*

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.38

For (*r*/*s*) to be an integer, *s* should completely divide *r*. In other words the question asks that for positive integers *r* & *s* is *s* a factor of *r*?

STATEMENT (1) alone: Now *s* is definitely a factor of *s (ie itself).* And since every factor of *s* is also a factor of *r*, *s* is a factor of *r*. A CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement talks only of prime factors. We can make cases to try to arrive at a YES/NO situation.

Making *r*/*s* an integer is easy. We can say each of *r* & *s* = 2*3*5 *(say)*. *r*/*s* in that case is an integer = 1. A **YES** answer.

Now we'll try the opposite. Let *r* = 2*3*5 but *s* = $2*3*5^2$. Both *r* & *s* have the same prime factors but of different degrees of power when they're multiplied to form *r* & *s* respectively *(r has 5 whereas s – the denominator – has* 5^2*)*. *r*/*s* in that case is not an integer = (1/5) . A **NO** answer.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.39

We know, Range = MaxValue – MinValue

Formulating the information mathematically:

The least height of the students in class A is (*g* – *r*).

Similarly, the least height of the students in class B is (*h* – *s*).

The question stem then is: Is (*g* – *r*) > (*h* – *s*)?

STATEMENT (1) alone: This statement says (*r* – *s*) < 0. But since any information about *g* & *h* is absent therefore the inequality asked in the question stem cannot be accurately stated.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says (*g* – *h*) > 0. But since any information about *r* & *s* is absent therefore the inequality asked in the question stem cannot be accurately stated.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: From the two statements we have:
$(r - s) < 0$ or $(r - s)$ is negative &
$(g - h) > 0$ or $(g - h)$ is positive. Since a positive value is always greater than a negative value, it follows:
$(g - h) > (r - s)$ or rearranging terms we arrive at $\mathbf{(g - r) > (h - s)}$**.** Which is what is asked in the question stem. A CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.40

The question stem only lays out the conditions that allow it to impose a penalty on a customer account.

STATEMENT (1) alone: Although a total of $1000 was withdrawn, it is unclear what the initial amount in the bank was and in what portions were the withdrawals made that add up to $1000. Moreover no information about deposits if any is given. Assuming our own values about the above mentioned absent quantities we can easily create a YES/NO situation. *(In fact when such less info is revealed we shouldn't even try creating an actual YES/NO but know that such a situation can and does exist).*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Here too only the initial amount is given but no transactions are mentioned. This is too little information to substantiate anything.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Even together the statements mention the initial amount and withdrawal with absolutely nothing on deposits. This again can easily create a YES/NO situation depending on how much money was deposited during the month. *(Note that there has to some deposit made – and this can't be ignored – otherwise how can you withdraw $1000 from an account that has only $500 to begin with.*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.41

Let x & y be the hours it takes machines X and Y (each working alone) respectively to fill an order of a certain size.

Working together X & Y will do the job in $x*y/(x + y)$ hours.

We're required to find a numerical value for $(y - x)$.

STATEMENT (1) alone: Simulating the worded information in the statement mathematically:
$x*y/(x + y) = (2/3)*x$; or, simplifying we get → $y = 2*x$ or, $y – x = x$
Here we get a relationship between x & y but no numerical value for $(y – x)$ since x is unknown.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This says the result derived in statement (1) directly → $y = 2*x$ or, $y – x = x$. But we arrive at the same juncture where we don't have a numerical value for the difference because x is unknown.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same relationship and there is nothing new that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.42

Let John & Mary own J & M number of stock in the company respectively.
We're to find if $J > M$?

STATEMENT (1) alone: The statement says: $\boldsymbol{M > 500}$. This does little to substantiate the comparison intended in the question stem. We know nothing of J.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically this information translates into the following:
$J = 2*M – 400$. Now since we require a comparison between J & M, we'll rewrite the equation as $\boldsymbol{J – M = (M – 400)}$. And thus the value of $(J – M)$ all depends on the actual value of M. In other words, if $M = 300$ (ie less than 400), $(J – M) < 0$ or $J < M$ and if $M = 600$ (ie greater than 400), $(J – M) > 0$ or $J > M$. But since the absolute value of M is unknown we get a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: From statement (1) $M > 500$ → $(M – 400) > 100$.
From statement (2) $J – M = (M – 400) > 100$. Or, $J – M > 100$ → $J – M > 0$. Or, $\boldsymbol{J > M}$. A CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.43

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Here note that the supporters of candidate R & candidate T are complementary to each other and thus we can tabulate this info.

Also note that we require a numerical value as an answer not a percentage!

	Supporting **R**	Supporting **T**	TOTAL
Favour flat tax			**?**
Against flat tax			
TOTAL	45%	55%	100%

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Supporting **R**	Supporting **T**	TOTAL
Favour flat tax	(58/100)*45 = 26.1%		**?**
Against flat tax	18.9%		
TOTAL	45%	55%	100%

Since the highlighted cell lacks a definitive/fixed value. The answer has *No unique value.* Moreover, we're still dealing with percentages whereas we're asked the number of people not the percentage.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Supporting **R**	Supporting **T**	TOTAL
Favour flat tax		**22**	**?**
Against flat tax			
TOTAL	45%	55%	100%

The highlighted cell lacks a definitive/fixed value. Thus this information is insufficient to arrive at an answer.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Supporting **R**	Supporting **T**	TOTAL
Favour flat tax	(58/100)*45 = 26.1%	**22**	**?**
Against flat tax	18.9%		
TOTAL	45%	55%	100%

Although the two cells have values but these values cannot be added together on account of being of different order *(one is a percentage the other a numeral)*. Since the total number of people remain unknown 26.1% cannot be converted into a numeral to add to **22.** *No unique value.*

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.44

The graph of y = (x + a)(x + b) intersects the X-axis at points – (–a, 0) & (–b, 0). *(ie values of x that when substituted back into the equation give y = 0).*

Here in this question we are required to find the numerical *unique* values of a & b.

STATEMENT (1) alone: This gives on equation in a & b: **a + b = -1**.

One equation with two variables will never yield a unique set of values for (a,b). *(eg (-7,6) and (-5,4) both satisfy the equation in statement (1)).*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: If (0, –6) lies on the graph then it must also satisfy the equation of the graph y = (x + a)(x + b). By substituting x = 0 and y = –6 in the equation of the graph we get **a*b = –6** (another equation in a & b). But again as demonstrated above one equation with two variables will never yield a unique set of values for (a,b).

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together means acquiring two equations in two variables: **a + b = -1** & **a*b = –6.** Which can be solved to get a unique set of values for a & b. *(In this case (-3,2)).* Thus, a *unique* numeral answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.45

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Employed	Unemployed	TOTAL
Students	**?**		
Non-students			
TOTAL			42

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Employed	Unemployed	TOTAL
Students	**?**		
Non-students			
TOTAL	29	13	42

Although we know the sum total of employed people, we cannot infer based on the information how many of these are students. Numerous solutions are possible.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Employed	Unemployed	TOTAL
Students	**?**		24
Non-students			18
TOTAL			42

Again, although we know the sum total of students among the people, we cannot infer based on the information how many of these are employed. Numerous solutions are possible.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Employed	Unemployed	TOTAL
Students	**?**		24
Non-students			18
TOTAL	29	13	42

We have values for all the summation cells, but know nothing about the inner four cells. Numerous values/solutions are almost always possible under such a scenario. We can choose values for the required cell and the remaining three cells will adjust accordingly. *(12 and 13 are possible solutions for the number of employed students).*

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.46

The only applicable tool here is **Distance** = **speed(avg)** x **time**

Let the distance travelled be **D,** speed(avg) be **V** & the time taken be **T**.

We need to find **T**.

STATEMENT (1) alone: We're told the **speed(avg)** = 72 KM/HR, but unless we know the distance of her trip, we cannot get a fix on the time she took.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically put this statement says:

(D/V) – (D/(V + 8)) = 1 this can be simplified to say (**D/V**) = (**V** + 8)/8. Now (**D/V**) is nothing but the time taken **T** *(using the distance = speed x time formula).* Thus the entire discussion may be simplified to saying: **T** = (**V**/8) + 1. Since **V** is unknown **T** does not have a *unique* value.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (2) derives **T** = (**V**/8) + 1 & statement (1) gives the value of **V** = 72. Using both the information a *unique* value of T can be found.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.47

Given is that *m* & *n* can be anything

A YES/NO target approach works well here.

STATEMENT (1) alone: Given $m + n < 0$ creating a **YES** answer is relatively easy as we can pick (*m*, *n*) as (5, -7). Creating a **NO** answer we can pick two negative equal numbers – (-5,-5). A YES/NO scenario.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Given $m*n < 0$ we note that either m is **+ve** and n is **–ve,** or m is **–ve** and n is **+ve.** In other words m & n can never be of the same sign, which means they will always lie on opposite sides of the numeral 0. Thus, since a negative number can never be equal to a positive number. We get a CONFIRMED YES for the question asked.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.48

Let **X** be the number of pets given a single treat and **Y** be the number of pets given two treats. The question then simply asks the numerical value of: (**X** + 2***Y**)

STATEMENT (1) alone: We know from this statement that **X** + **Y** = 90, but not knowing the individual values of **X** & **Y** renders the expression (**X** + 2***Y**) inaccurate in terms of a numerical value. In other words we can have different sets of (**X,Y**) that add up to 90 but yield different values of the asked expression. Simply put it is essential to know how many pets got 2 treats and how many got just 1 to get a fix on the total number of treats distributed.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says: **Y** = (2/3)*(**X** + **Y**), or **Y** = 2***X.** Substituting in the expression (**X** + 2***Y**) we get that the total number of treats distributed are 5***X.** Since the value of either **X** or **Y** is unknown we cannot get a numerical answer.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Knowing that **Y** = (2/3)*(**X** + **Y**) from statement (2) and **X** + **Y** = 90 from statement (1). We can calculate *unique* of **X** & **Y** and hence of the expression (**X** + 2***Y**) which represents the total number of treats.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.49

A YES/NO target approach should work well here.

STATEMENT (1) alone: Theoretically X + Y = 5 & 4*X + Y = 17 are lines on the XY plane containing infinite set of points conforming to the respective conditions laid out by the equation of the line.

Now solving the 2 equations will definitely yield a set of values of (X, Y) that having satisfied 4*X + Y = 17 will also satisfy X + Y = 5 *(It is unnecessary to know what this point is and is enough to know that such a point on the line* 4*X + Y = 17 *will exist).* This point will give a **YES** answer to the question asked.

All other points on the line 4*X + Y = 17 will only satisfy this line equation and not the other (X + Y = 5) to give a **NO** answer.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: An exactly similar approach to statement (1) will yield a YES/NO situation in this case too. There will be exactly one point on the line X + 4*Y = 8 that will also satisfy X + Y = 5 *(the point of intersection of the two lines)* giving a **YES** answer. All the other points on the line X + 4*Y = 8 will give a **NO** answer.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Solving the two equations from statements (1) & (2) – 4*X + Y = 17 & X + 4*Y = 8 will result in *unique* values for both X & Y and for the expression X + Y. It can then be definitively said whether they sum up to 5 or not. A CONFIRMED answer will result. *(any solving anywhere in this question is a complete waste of time)*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.50

For profit questions it is always useful to keep the below inherent equation at the back of your mind.

Gross Profit = Revenue – Expenses.

We're given **revenues** = $500,000
If **L** be the Labour costs and **M** be the materials costs, then **Expenses = L + M.**
We're asked if **Gross Profit** > 150,000

STATEMENT (1) alone: statement says that **Expenses = 3*M,** since **Expenses = L + M**, we may also infer from the two that **L** = 2***M**. The statement thus only gives a distribution of the costs among Labour and Materials and says nothing about its actual value so that a fix on the range of profit may be evaluated.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: the statement says that **Gross Profit** > **L**. We only know that **L** is one of the only two components of **Expenses.** But we neither know the **Expenses** nor **L.** Since the value of **L** is unknown and since any sort of relationship of **L** with any other variable is also unknown, we cannot definitively say with any certainty if **Gross Profit** > 150,000.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Now statement (2) says that **Gross Profit** > **L** and statement (1) links the **L** with **M** and hence with **Expenses.** From statement (1) we know that **L** = 2***M** & **Expenses** = 3***M.** Thus **L** = (2/3)* **Expenses.** But **Gross Profit = Revenue – Expenses** or rearranging → **Expenses = Revenue – Gross Profit.** Substituting this in **L** = (2/3)* **Expenses** we get **L** = (2/3)*(**Revenue – Gross Profit**). Also since we're given **revenues** = $500,000, we can rewrite the previous equations as **L** = (2/3)*(500,000 – **Gross Profit**). Now substituting this all the way back into **Gross Profit** > **L,** we get:

Gross Profit > (2/3)*(500,000 – **Gross Profit**)
Or, **Gross Profit** > (2/5)*500,000

Or, **Gross Profit** > 200,000
A CONFIRMED YES for the question asked.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.51

This is a question where we're after the specific yet *unique* total value of Company H's stock. Nothing need be solved anywhere in this question.

STATEMENT (1) alone: This statement gives us the shareholding of some Investor P, i.e. a proportion of the total value of Company H's stock. But unless we know the absolute value of Investor P's holding, we cannot arrive at an accurate *unique* value for the total value amount of Company H's stock. *(It's like saying I have 25% of the total chips at a poker table, but unless I mention the exact number of chips I have – 2, 3 or maybe 4 – I cannot arrive at how many total chips are at the table).*
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement on the contrary mentions the absolute value of some other Investor Q's holding, but fails to say anything about how much (i.e. proportion) of the total amount does this constitute. Again Insufficient data.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Since both statements talk of two completely different Investors whose inter-relationship in terms of their shareholding in the Company is completely unknown, even clubbing the two info together doesn't improve our situation by any degree. The Equation will still be:
(¼)*(**total number of shares**)*(**value of each share**) + $16,000 + **possibly some other shares** = Total value Company H's stock. All the **bold** portions are still unknown.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.52

Such questions are best tackled by making quick cases with the aim to prove that a *unique* solution does NOT exist.
*Do take note of the fact the question is dealing with four **different** numbers (so not necessarily integers).*
Also, since the mean is always greater than the least and less than largest number (in case of a set containing at least two distinct numbers), not all four can be greater than 30 nor can they all be less than 30.
Since, we know that the mean is 30, we also know that the sum of the 4 ***different*** numbers will also always be 4*30 = 120.

STATEMENT (1) alone: We will try making cases by balancing the elements about the mean = 30. **Case (1):** Let's say **exactly one** is greater than 30 and less than or equal to 60, then we can surely find three numbers on the other (left) side of 30 that make up the mean of all four 30 (or their sum = 120) *(One such set of numbers are 50, 30, 25 & 15).* **Case (1I):** Let's say **exactly two** are greater than 30 and less than or equal to 60, then too we can find the remaining two numbers on the other (left) side of 30 that make up the mean of all four 30 (or their sum = 120) *(One such set of numbers are 50, 45, 15 & 10).* We need not go any further as these two cases are enough to substantiate that **multiple** answers to the asked question exist.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: If we know two of the numbers (9 & 10) we can find the sum of the remaining 2 numbers: 120 – (9 + 10) = 101. Now let's try making cases of numbers that add up to 101. *(forget not greater than 60 condition here – that was statement (1)).* **Case (1):** Let's say **exactly one** of the two is greater than 30, then we can surely find it's counterpart that sums it up to 101 *(One such set of numbers are 100 & 1).* **Case (1I):** Let's say **both** are greater than 30, then too we can find such a pair that adds up to 101 *(One such set of numbers are 50 & 51).* Here too, we need not go any further as these two cases are enough to substantiate that **multiple** answers to the asked question exist.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Combining the two statements together means we're required to find pairs of numbers adding up to 101 – statement (2), and both of them being less than or equal to 60 – statement (1). We yet again begin making cases. **Case (1):** Let's say **exactly one** of the two is greater than 30 then the maximum value this number can have is 60 *(as it can't go beyond 60)* and the maximum value the other number (the one we want to not be greater than 30) can have a maximum value of 30. Now these two add up to a sum total of only 90, which falls short of the required 101. Since we've considered the maximum extreme values we could in this case there are no other options left that might validate this case, and so such an arrangement **is not possible** where only one of the two numbers is greater than 30. This leaves us with only one case – **Case (2):** Being the only case left this one has to hold and it does *(One such set of numbers are 42 & 59).* Thus combining the two equation we can narrow down to a ***unique*** answer saying that **exactly 2** are greater than 30.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.53

An algebraic approach seems to work better for us here:

We're given W*X = Y, and are asked for a *unique* value of X*Y.

STATEMENT (1) alone: Take the info this statement gives us $W*X^2 = 16$ and keep it aside but only for a moment. Now take up the relationship given in the question stem – W*X = Y and multiply with X on both sides of the 'equal to' sign to yield $W*X^2 = X*Y$. But remember the equation we kept aside says $W*X^2 = 16$ which ultimately means X*Y = 16. A definitive answer for the product.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Y = 4 gives us by substitution in the equation given in the question that W*X = 4. Now we can have a range of combinations for the pair (W, X) that multiply to give 4 *(W=2 & X=2 or W=1 & X=4)* are two of many available options. Both the options give different values for the product X*Y *(X=2 gives X*Y=8 & X=4 gives X*Y=16)*. The simple short analysis is enough to give us an idea that no *unique* value of X*Y exists.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.54

It's always a good idea to mathematically simplify what is asked in the question stem.
The question asks if X – Y + 1 > X + Y – 1,
We can rearrange the terms to say that the question asks if **Y < 1**?
In other words only if **Y < 1** will the original inequality hold.
*Also note that this question has **absolutely nothing** to do with **X**. The presence of **X** is irrelevant as it gets cancelled for **whatever** value it may hold. The variable **X** here is used as a decoy or a scarecrow!*

STATEMENT (1) alone: The question stem has absolutely nothing to do with **X.** The question only asks if **Y < 1**? Any information about X is irrelevant.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: statement says **Y < 0** which means that **Y is definitely < 1.** A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.55

This question is all about accurately tracking the relevant information and nothing else.
All we know from the question stem is that Malik requires (3/8) cups of Pasta per serving.

STATEMENT (1) alone: We have absolutely no clue as to how many servings Malik made the last time he prepared the dish. This info is not even a start!
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: His cups used last time is irrelevant to the cups he will use next time unless some contextual relation is given about his behaviour of using the cups *(say something like every time he makes pasta he uses two more cups than he did the previous time he made pasta.)*
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Statement (2) says he made 6 cups of pasta or **16 servings**. And statement (1) says that his number of servings he will wish to make will be half of what he made the last time (**16 servings**). Thus he will make **8 servings** the next time and will accordingly need **3 cups** of pasta.

STATEMENT (1) & (2) together - SUFFICIENT

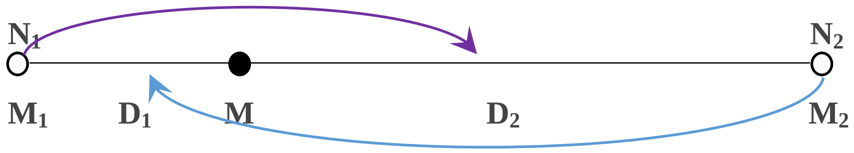
ANSWER – (C).

Q.56

This is a perfect case scenario to view things via the *Combined mean* interpretation result:

$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,

$\mathbf{N_1}$ = Sample size of SET 1

$\mathbf{N_2}$ = Sample size of SET 2

$\mathbf{M_1}$ = Mean of elements of SET 1

$\mathbf{M_2}$ = Mean of elements of SET 2

M = Combined Mean of the two SETS

$\mathbf{D_1}$ = ($\mathbf{M - M_1}$) = Deviation distance of $\mathbf{M_1}$ from the combined Mean of the two SETS

$\mathbf{D_2}$ = ($\mathbf{M_2 - M}$) = Deviation distance of $\mathbf{M_2}$ from the combined Mean of the two SETS

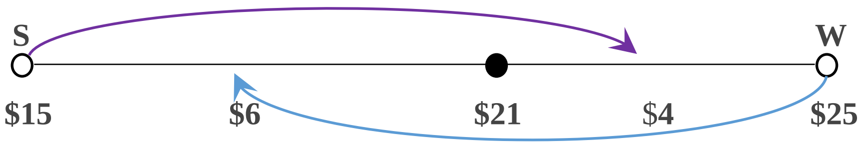
Now returning back to the question:

Let the number of shirts sold be **S** & let the number of sweaters sold be **W**.

We're asked if **W** > **S?**

STATEMENT (1) alone: We're given the *Mean* of the combined SET = $21.

Diagrammatically put:



From the above diagram a ratio of the sample sizes of the two SETS *(i.e. Sweaters(W) & Shirts(S))* can be easily inferred.

In fact: (**W/S**) = ($6/$4) = (3/2). Or, **W** = (3/2)***S** = (1.5)***S**

In other words, **W is definitely** > **S.** A CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Total revenue from the sale = $420. Or, 15***S** + 25***W** = 420 or, 3***S** + 5***W** = 84 *(**S** & **W** remember are integer solutions)*. Now as per the usual norm we see a single equation in two variables, we stop and say *insufficient* information because we're sure not to get a *unique* solution. However, bear in mind that the question stem here is different. It isn't about finding *unique* values of **S** & **W** but about substantiating the inequality between **S** & **W.** Moreover, there is a further restraint on the values of **S** & **W** that says that they must be non-negative integer values.

If we get say only two solutions for the equation 3***S** + 5***W** = 84 and both are such that **W** > **S**. Then this is sufficient rather than insufficient info because the scenario gives a confirmed yes answer to the question asked in the question stem.

Hence we'll have to try out a few values that fit the 3***S** + 5***W** = 84 with the aim of obtaining a YES/NO situation. One possible solution **S** = 8 & **W** = 12; **W** > **S**, another is **S** = 18 & **W** = 6; **W** < **S.** We now have a confirmed YES/NO situation.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.57

Assuming the variables:
Let the regular price of each shirt be **P** units and let **X** be the number of shirts Mark purchased at *FULL PRICE*. Mark then has purchased a total of 2***X**.
The question asks for the numerical value of (2***X**).

STATEMENT (1) alone: This statement just gives us a value of the regular price **P**. **P = $21.50**. This alone is far from getting any sort of fix on the value of (2***X**).

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This gives us the total value of Mark's purchase. We'll try to put this mathematically as:
X*P + **X***(**P**/2) = $129, or **X*P** = **$86**. This is a single equation in two variables and hence does not allow us to get a fix on a *unique* numerical value of **X**.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statement together we get two equations **X*P** = **$86** & **P** = **$21.50** for two variables **X** & **P**. It's quite easy to see that the info clubbed gives us a definitive/unique value of **X** and hence of (2***X**).

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.58

For the *positive integer* **X** divided by **3**, we're supposed to find a *unique* **remainder.**

STATEMENT (1) alone: The statement says that we can write a general term for **X** as follows:

X = 6**k* + 2, where *k* = {0, 1, 2, 3, and so on…}
Dividing the expression **X** = 6**k* + 2 by **3** *(which is a factor of 6)* we see that for any value of *k*, **X** divided by **3** will also always yield the same remainder 2. Or, **remainder** = 2. *Unique value.*

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says that we can write a general term for **X** as follows:

X = 15**k* + 2, where *k* = {0, 1, 2, 3, and so on…}
Dividing the expression **X** = 15**k* + 2 by **3** *(which is a factor of 15)* we see that for any value of *k*, **X** divided by **3** will also always yield the same remainder 2. Or, **remainder** = 2. *Unique value.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.59

Let **A** & **B** be the amounts that Ann deposited into the two new accounts.
Then the interest earned on the two amounts **A** & **B** for the first year is:
((5/100)***A**) & ((8/100)***B**)
We're required to find the absolute value of the expression: ((8/100)***B**) – ((5/100)***A**).
Or, (8***B** – 5***A**)/100.

STATEMENT (1) alone: The statement mathematically put says: **B – A** = $200. But this difference alone *(one equation in two variables)* is insufficient to find a *unique* value of the expression (8***B** – 5***A**)/100 – which requires both variables to be known.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says: (8***B** + 5***A**)/100 = $120. But this equation alone *(one equation in two variables)* is insufficient to find a *unique* value of the expression (8***B** – 5***A**)/100 – which requires both variables to be known.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statement together we get two equations **B – A** = $200 & (8***B** + 5***A**)/100 = $120 for two variables **A** & **B**. It is a waste of time to solve for both **A** & **B**, and should be enough to know that the two equations yield a *unique* set of values of **A** & **B** & hence of the expression (8***B** – 5***A**)/100 – which is what is asked in the question stem.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.60

We're required to only find the percent increase in the population of City K from **1980** to **1990**.
Let P_{1990}, P_{1980} & P_{1970} be the populations of City K in 1990, 1980 & 1970 respectively.
Then what is asked in the question may be mathematically put as:
$\{(P_{1990} - P_{1980}) / P_{1980}\}*100$.

STATEMENT (1) alone: This statement simply says P_{1970} = 160,000 and gives out no clue about what the populations might have been in 1980 and 1990.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out two bits of information which may be mathematically put as:

a) $\mathbf{P_{1980}} = (1 + (20/100))^* \mathbf{P_{1970}}$ &
b) $\mathbf{P_{1990}} = (1 + (30/100))^* \mathbf{P_{1970}}$

The above two equations if divided eliminates the variable $\mathbf{P_{1970}}$ and thus yields a relationship between $\mathbf{P_{1990}}$ & $\mathbf{P_{1980}}$ as follows:
$\mathbf{P_{1990}} / \mathbf{P_{1980}} = (1.30/1.20) = (13/12)$
Or, $\{(\mathbf{P_{1990}} - \mathbf{P_{1980}}) / \mathbf{P_{1980}}\} = \{(13 - 12)/12\} = (1/12)$
Or, $\{(\mathbf{P_{1990}} - \mathbf{P_{1980}}) / \mathbf{P_{1980}}\}*100. = (1/12)*100 \sim$ **8.34%**
Thus the entire working *(which again is a complete waste of time on the exam. It is only for demonstration purposes that the exact value is calculated here)* shows a *unique* value for the percent increase in the population of City K from **1980** to **1990**.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.61

If **P** be the number of Pigs & **C** be the number of Cows.
Then we're given that **P + C =** 40
The question asks for the exact number of Cows or the value of **C**.
*Remember **P** & **C** are non-negative integers here.*

STATEMENT (1) alone: The statement establishes the following relationship between the variables: **C** > 2***P**. Now we can use the equation given in the question stem **P + C =** 40 to substitute **P** in the inequality as **P** = (40 – **C**) and arrive at **C** > 2*(40 – **C**), or **C** > (80/3).
Thus **C** can take on the following set of values **{27, 28, 29,…, 40}**. But using the info in statement (1) we arrive at a range of values for **C** rather than a *unique* value.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement simply says **P** > 12. Using the equation given in the question stem **P + C =** 40 to substitute **P** in the inequality as **P** = (40 – **C**), we arrive at (40 – **C**) > 12 or **C** < 28. Thus **C** can take on the following set of values **{27, 26, 25,…, 0}**.
But using the info in statement (2) we again arrive at a range of values for **C** rather than a *unique* value.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Having sorted out the range of values of the variable **C** in both the statements makes interpreting the combined scenario much easier.
Statement (1) says **C** can take on the following set of values: **{27, 28, 29,…, 40}**
Statement (2) says **C** can take on the following set of values: **{27, 26, 25,…, 0}**
Combining means picking out those values of the variable that conform to conditions laid out by both Statement (1) and (2). This means picking out the common value(s) in both the sets.
However, there is only one such value for the variable **C** = 27. A *unique* answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.62

Let angA denote ANGLE A
Given an Isosceles Δ RST *(A Δ with any two sides and hence angles equal).* We're asked the measure of angR.

STATEMENT (1) alone: Statement says that one of the angles angT of the Isosceles Δ RST is 100^o. Now we know that since all the three angles of a Δ always add up to 180^o, there can be at most one obtuse *(> 90^o)* angle in any triangle. In other words if angT = 100^o is one of the two equal angles of the triangle then the sum of all three angles of Δ RST exceeds 200^o which by any means is impossible. Hence angT = 100^o has to be the *apex* angle *(the non - equal angle)* with the other two angles each equal to 40^o to make up the sum as 180^o. Thus we get that angS = angR = 40^o. A *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This is slightly different information from statement (1) in that an acute angle measure is given. This gives rise to two possible Δs and hence perhaps two possible values of angR. **Possibility 1:** the given angS = 40^o is one of the equal angles → this means one of the two angles (angR & angT) is also 40^o. Hence even in this possibility we're not sure of the value of angR. angR could be = 40^o *(if angT = 80^o)* or angR could be = 80^o *(if angT = 40^o).* We can stop at this point to say that statement (2) is inconclusive yielding two possible values. Still for demonstration sake we'll consider **Possibility 2:** the given angS = 40^o is the apex angle *(the non-equal angle)* → this means the remaining two angles (angR & angT) are both = (140/2) = 70^o. As can be seen from the analysis above angR can be either 40^o, 80^o or 70^o. Not a *unique* answer.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.63

According to the question stem if **N** is the number of desk chairs for which an order was placed, then:
The total cost of delivery for the order = \$10 + (**N** – 1)*1 = \$(**N** + 9)
The question asks if **N** > 24
A YES/NO target approach can come in handy in such a situation.

STATEMENT (1) alone: The statement says that the total cost > \$30, or \$(**N** + 9) > \$30, or **N** > 21. → **N** can have values {22, 23, 24, 25, 26,…and so on}. A YES/NO answer.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The average delivery cost per chair = (Total cost/Number of chairs) = ((**N** + 9)/**N**) = 1 + (9/**N**) = 1.36 → **N** = (9/0.36) = 25; a definitive value of **N** which thus yields a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.64

Although the question stem does trigger our mind to the use of tabular approach, however reading the statements that follow will render the tabular approach less appropriate. The question's motive is directed elsewhere.
It is best to consider each statement as it comes in regard to the question asked.

<u>STATEMENT (1) alone</u>: The question stem is very specific in its language targeting the section of the people that are 65 years old or older. Of these we're required to establish how many are employed. The statement, however, simply tells us the portion (percentage) these people constitute of the overall population. This is irrelevant information.
STATEMENT (1) alone – INSUFFICIENT

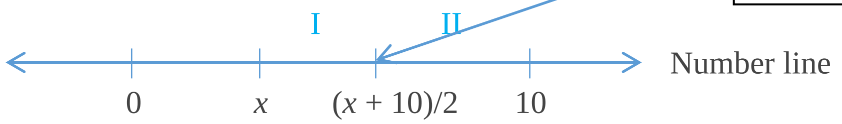
<u>STATEMENT (2) alone</u>: Now this statement talks about the relevant targeted section of people only. This is a start. Let **P** be the population of people who are 65 years old or older.
Since the population comprises of *Men* & *Women*,
P = M(men – 65 years old or older) + W(women – 65 years old or older).
Further from statement (2) we can formulate that {(20/100)*M + (10/100)*W} are employed and 65 years old or older. The expression {(20/100)*M + (10/100)*W} can be rewritten as (10/100)*(M + W) + (10/100)*M or <u>(10/100)***P** + (10/100)*M</u>
Thus *the employed population who are 65 years old or older* = (10/100)***P** + (10/100)*M
Considering M $\geq$ 0
Therefore, *the employed population who are 65 years old or older* will always be $\geq$ (10/100)***P.** This just gave us a CONFIRMED YES answer to the question stem.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).
Top 1% expert replies to student queries (can skip) (Link)

Q.65

Given that 0 < *x* < 10, the question asks if *z* > (*x* + 10)/2?

Chalking this out on a number line:

Note that (x + 10)/2 lies exactly midway between x and 10



<u>STATEMENT (1) alone</u>: Since (*x* + 10)/2 lies exactly midway between *x* and 10, this implies that according to the information in statement (1) alone *z* lies in region II and hence is definitively > (*x* + 10)/2. A CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: Given *z* = 5**x*, we can either plug in values and create a YES/NO situation or approach it algebraically. → The question asks if *z* > (*x* + 10)/2 or substituting *z* → if 5**x* > (*x* + 10)/2 or, if *x* > (10/9)? But since we're given that 0 < *x* < 10 the reduced question *(by substituting z = 5*x in z > (x + 10)/2)* is *x* > (10/9)? cannot be conclusively answered.
STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.66

Given a finite sequence of positive integers $\mathbf{K_1, K_2, K_3, \ldots, K_9}$, with the following relationship $\mathbf{K_3} = \mathbf{K_1} + \mathbf{K_2}$ and in general $\mathbf{K_n} = \mathbf{K_{n-1}} + \mathbf{K_{n-2}}$.

We're given the value of $\mathbf{K_5} = 18$, and asked the value of $\mathbf{K_9}$.

STATEMENT (1) alone: Given the additional value of just $\mathbf{K_4} = 11$, however, the given term $\mathbf{K_4}$ is a preceding consecutive term in this case to the already given $\mathbf{K_5} = 18$. These two together form the immediately preceding terms for the term $\mathbf{K_6}$ – which can hence be found by the general rule by which all terms following the first two terms are bound by: $\mathbf{K_6} = \mathbf{K_5} + \mathbf{K_4}$. This sparks off a chain reaction wherein $\mathbf{K_6}$ (now known) and $\mathbf{K_5}$ together now form the immediately preceding terms for the term $\mathbf{K_7}$. Such a chain reaction/calculation leads us ultimately to the *unique* value of the asked $\mathbf{K_9}$. *Note that it is an absolute futile effort trying to find out the actual value of* $\mathbf{K_9}$. *This being Data Sufficiency, it is enough to know that such an effort is possible ending up with a unique value of the asked* $\mathbf{K_9}$.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Given the additional value of just $\mathbf{K_6} = 29$ here, however, the given term $\mathbf{K_6}$ is a succeeding consecutive term in this case to the already given $\mathbf{K_5} = 18$. These two together form the immediately preceding terms for the term $\mathbf{K_7}$ – which can hence be found by the general rule by which all terms following the first two terms are bound by: $\mathbf{K_7} = \mathbf{K_6} + \mathbf{K_5}$. Which again sparks off a chain reaction wherein $\mathbf{K_7}$ (now known) and $\mathbf{K_6}$ together now form the immediately preceding terms for the term $\mathbf{K_8}$. Such a chain reaction/calculation leads us ultimately to the *unique* value of the asked $\mathbf{K_9}$. Again – *Note that it is an absolute futile effort trying to find out the actual value of* $\mathbf{K_9}$. *This being Data Sufficiency, it is enough to know that such an effort is possible ending up with a unique value of the asked* $\mathbf{K_9}$.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.67

A YES/NO target approach should work well here.

STATEMENT (1) alone: The question asks us about the combined sum of $(x + y)$. Knowing the sign polarity of just one of the variable *(i.e. variable x)* is insufficient to comment accurately on the polarity of the combined sum of $(x + y)$. Gives us a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The question asks us about the combined sum of $(x + y)$. Knowing the sign polarity of just one of the variable *(i.e. variable y)* is insufficient to comment accurately on the polarity of the combined sum of $(x + y)$. Gives us a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Together with the two statements we know the sign polarity of both *x* & *y*, yet we know nothing about their magnitudes. We'll try to create a YES/NO situation. **Case I:** $x = -9$; $y = +7$ gives us a **–ve** combined sum $x + y = -2$. A **YES** situation. **Case II:** $x = -9$; $y = +10$ gives us a **+ve** combined sum $x + y = +1$. A **NO** situation. Gives us a YES/NO situation again.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.68

The question deals with accurately tracking the digit of an integer marked out by the question stem.
A quick recap of integer representation may come in handy here.
The positive integer ***R*** may be represented as:
THTU... and so on, where:
U → the units digit of the integer.
T → the tens digit of the integer.
H → the hundreds digit of the integer.
T → the ten thousands digit of the integer.
We're asked the **tens digit** of the positive integer ***R***.

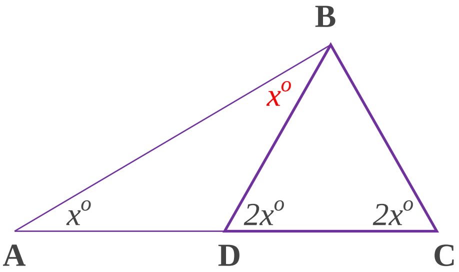
STATEMENT (1) alone: Dividing ***R*** by 10, the **tens** digit of ***R*** becomes the **units** digit of the new integer (***R***/10) (ie the first one from the left). However, we are given the **tens** digit of the integer (***R***/10) as 3. This tells us nothing about what the **units** digit of (***R***/10) or the **tens** digit of ***R*** is.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Multiplying ***R*** by 10, the **tens** digit becomes the **hundreds** digit of the new integer (10****R***) (ie the third one from the left). And, we are in fact given the **hundreds** digit as 6. This tells us exactly what the **tens** digit of ***R*** is *(i.e. 6)*.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.69

Let **AngX** denote ANGLE X
Based on the information given in the question in the form of a figure we can try to first complete the figure as much as possible and hence draw out all inferences that we can before moving on to the statements.

1. Ang(BDC) forms the exterior angle for the Δ ADB and thus forms the sum of Ang(BAD) & Ang(ABD). In other words Ang(BDC) = Ang(BAD) + Ang(ABD). Or, Substituting values in terms of *x*, Ang(ABD) is also = *x*.



2. Looking at the figure above we now notice that Δ ADB forms an Isosceles Δ with AD = BD *(sides opposite equal angles are equal in an Isosceles Δ)* & BD = BC for the Isosceles Δ BDC. Or, AD = BD = BC.

We're asked the length of side BC!

STATEMENT (1) alone: The statement says AD measures 6 & by using the inference that we arrived at above – AD = BD = BC → AD = BC = 6. A *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement gives the measure of one (& thereby of all) of the angles, but unless we know any one side we cannot get a fix on the measure of side BC. Look at it this way – For an equilateral Δ we already know (all) each of its angle is 60^o but there are infinite sizes of the equilateral Δ possible depending on what the measure of its side is. The information is thus inconclusive to arrive at a *unique* value of side BC.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.70

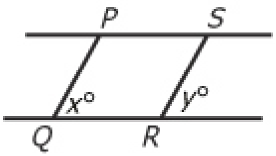
A YES/NO target approach should work well here.
x is checked for its divisibility by 6.

STATEMENT (1) alone: Given that $x + 3$ is divisible by 3 means ***x* is divisible by 3**. But this does not necessarily mean that *x* will be divisible by a multiple of 3 as shown:
If *x* is 12 the answer is **YES**, however if *x* is 15 the answer is **NO**. A YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

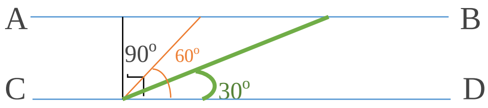
STATEMENT (2) alone: Given that $x + 3$ is an odd number only means that ***x* is an even** number *(as odd – odd will always yield even).* Considering *x* to be 24 or 26 easily yields a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (1) says ***x* is divisible by 3** & Statement (2) says ***x* is an even.** Taken together the information says that *x* is divisible by both 2 & 3, which is the criterion for a sure shot divisibility by 6. A CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.71



The question mentions angles x^o & y^o to both be acute angles and PS // QR. Now we'll begin with a known general piece of information here, for a set of parallel lines, the shortest distance is the $\perp$ (perpendicular) distance between the two lines. Now as you decrease the $\perp$ (perpendicular) angle = 90^o you increase the length of the distance you traverse between the lines or in this case the line segments PQ or RS. This is diagrammatically explained below:



The black line makes an angle 90^o with the line segment CD and hence is the shortest length possible of the segment connecting the two parallel lines. As the angle decreases, the line segments connecting the two parallel lines increase in lengths. THUS, *smaller the angle greater the length of the connecting segment between two parallel lines.*
We're asked for a comparison between the lengths of PQ & SR!

STATEMENT (1) alone: Knowing the angles the two segments PQ & SR subtend at the base QR can give us a definitive comparison between the lengths of the two segments. Or, using the inference from the discussion above, if $x > y$ then PQ < SR. A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement only provides a range of the sum of the two angles, but not a clue about their relative comparison with each other. For instance, nothing stops us from assigning x a value of say 60 & y a value of say 50 in which case $x > y \rightarrow$ PQ < SR OR assigning x a value of say 40 & y a value of say 70 in which case $x < y \rightarrow$ PQ > SR. We arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.72

Let's say the cost of a paperback book is **P** & and that of a hardcover book is **H.** Then in simpler terms we're asked the value of (**P + H**)

STATEMENT (1) alone: Mathematically the statement relates that 2***P** + 3***H** = \$12.50. This is a single equation in two variables and thus is inconclusive in arriving at a *unique* solution for our question stem.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically the statement relates that 4***P** + 6***H** = $25.00. This is again a single equation in two variables and thus is inconclusive in arriving at a *unique* solution for our question stem. Moreover, a closer look yields that if the equation divided by 2 on both sides of the equal sign yields the exact same equation arrived at using statement (1).
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same relationship and there is nothing new that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.73

The following result comes in real handy for this question:
For an odd number of *consecutive* integers the average is simply the middle integer. Hence for ***n*** *consecutive* integers (***n*** *odd*) the average is the $\{(n + 1)/2\}^{th}$ integer from either the right or the left of the series.
STATEMENT (1) alone: This statement says that 'the average of the first **nine** integers is **7**'. Applying the above result we can know that **7** must be {(***nine*** + 1)/2}th or the 5^{th} integer from either the left or the right and hence get a fix on the series. This right here should be enough to substantiate that the statement is sufficient and we need not go any further, but I'll still go a bit further for demonstration purposes. We can write down the first **nine** *consecutive* integers by writing 4 consecutive integers on either side of 7 *(Since **7** is the 5^{th} integer from either the left or the right)*. The series may then be written as {3, 4, 5, 6, **7**, 8, 9, 10, 11}. Once we know the first nine integers all we have to do is add 12 & 13 to the list to get the eleven consecutive integers.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that 'the average of the last **nine** integers is **9**'. Applying the same above result we can know that **9** must be {(***nine*** + 1)/2}th or the 5^{th} integer from either the left or the right and hence get a fix on the series. This again right here should be enough to substantiate that the statement is sufficient and we need not go any further, but I'll still go a bit further for demonstration purposes. We can write down the last **nine** *consecutive* integers by writing 4 consecutive integers on either side of 9 *(Since **9** is the 5^{th} integer from either the left or the right)*. The series may then be written as {5, 6, 7, 8, **9**, 10, 11, 12, 13}. Once we know the last nine integers all we have to do is add 3 & 4 at the beginning of the list to get the eleven consecutive integers.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.74

The 'Making Cases' approach to show that a *unique* value doesn't exist should work well here. Given x and y are integers, we're required to find a *unique* value of $(x + y)$.

STATEMENT (1) alone: From the range provided by this statement we'll begin by choosing x as 691 and y as 695. This yields a sum of 1386 or $(x + y) = 1386$. On the other hand $x = 691$ & $y = 694$ gives $(x + y) = 1385$. Two different values allows us to stop here and say inconclusive.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement is considerably narrower in assigning a range to the values of x & y. There are only and exactly **two** integers that exist between 692 & 695 *(693 & 694)*. Given the restriction $x < y$, we can have just one possible scenario where $x = 693$ & $y = 694$ giving us a *unique* value of $(x + y) = 1387$.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.75

A YES/NO targeted approach by making cases should work well here.
The question asks if $x < 20$?

STATEMENT (1) alone: We're given $x + y < 20$, and the question places absolutely no restrictions on the value of y. **case I** $x = 12$ & $y = 5$ gives $(x + y) = 17 < 20$. A **YES** answer. **case II** $x = 22$ & $y = –5$ gives $(x + y) = 17 < 20$. A **NO** answer. A YES/NO situation.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement has absolutely no bearing on the question asked *(about the variable x)* since the 'question stem' establishes no relationship between x & y.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Our restrictions together now are: $x + y < 20$ and $y < 20$. It is worth noting here that the same two cases discussed in the analysis of statement (1) can be easily applied here since in both the cases y was < 20. Hence, we'll arrive at the same YES/NO situation.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Note: the question places no restriction on what x & y can be (restrictions like – Integers, positive etc), hence the values of x & y can traverse the entire number line barring the regions on the number line that the 2 statements forbid it to traverse.

Q.76

The plug in values approach to create a YES/NO situation can work just fine here but I will try a more theoretical approach.
Now for the integer **K** to be divisible by 4, it has to have at least *two* 2's *(Since 4 = 2*2)*, when **K** is written as the product of its primes. Or in other words **K** has to be of the form:
K = 2*2*M; where M is any integer.

STATEMENT (1) alone: We're given that 8***K** is divisible by 16. Now we'll try to find the least minimum number of 2's that have to come from **K**'s side to assure that 8***K** is divisible by 16. 16 the divisor = 2^4 & 8 which is a part of the dividend = 2^3. Therefore to completely be divided by 16, **K** has to provide at least **one** 2 in the multiplication of 8***K.** Or **K** has to definitely be of the form **K =** 2*M; where M is any integer. Now if M is odd then **K** will not be divisible by 4 → a **NO** answer, however, if M is even then **K** will be divisible by 4 → a **YES** answer. A YES/NO situation.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Here we're given that 9***K** is divisible by 12. Now again we'll try to find the least minimum number of 2's that have to come from **K**'s side to assure that 9***K** is divisible by 12. 12 the divisor = $3*2^2$ & 9 which is a part of the dividend = 3^2. Therefore to completely be divided by 12, **K** has to provide at least **two** 2's in the multiplication of 9***K.** Or **K** has to definitely be of the form **K =** 2*2*M; where M is any integer. Since 4 the divisor = 2*2, regardless of the value of M **K** will always be divisible by 4. A CONFIRMEDYES.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.77

A YES/NO targeted approach by making cases should work well here.
We're given that ***n*** an integer is such that 10 < ***n*** < 99 and we're asked if ***n*** < 80.

STATEMENT (1) alone: We'll start by picking out values 80 and above to see if we can create a NO situation. Let's first pick out an appropriate prime number say 13 and see if can find a number 80 and above whose digits add up to 13. In this case we definitely can and one such number is 85 which gives us a **NO** answer. Now note that a **YES** situation can very easily and simply be created by reversing the digits of 85 to get 58.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Again we'll start by picking out values 80 and above to see if we can create a NO situation. The statement stipulates that both the digits must be prime, however the only tens digits that we can find of numbers 80 and above and below 99 are 8 & 9 – both of which are non-prime. Hence such a number that has both its digits prime numbers has to come from numbers below 80, or ***n*** definitely < 80.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.78

Putting the information mathematically, if a person buys **N** loaves of bread he would be charged ${**p** + (**N** – **1**)***q**}. We're required to find **p**.

STATEMENT (1) alone: Mathematically this statement translates into:

Total Price charged for buying 2 loaves of bread = **p + q**
Price charged per loaf of bread = (**p + q**)/2
Thus, (**p + q**)/2 = (9/10)***p** or, **p** = (5/4)***q**.
However since the value **q** is also unknown we cannot get a fix on the value of **p**.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically this statement translates into:
p + 5***q =** 10 which is a single equation in two variables and hence inconclusive in finding a *unique* value of **p**.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Using the two statements together we have two equations in two variables which can be solved to find a *unique* value of **p**. *(actually solving is futile)*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.79

We're required to find the number of terms of a finite sequence.

STATEMENT (1) alone: This simply states the total sum of all the terms of the sequence *(a sequence for which we know absolutely nothing about in the sense that are the terms related to each other in AP, GP, what is first term etc etc)*. For all we know there could be two terms summing up to 3124 – each equal to 1562 or four terms – each equal to 781 etc etc.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This again is too little information to even remotely arrive at anything. There can be a whole bunch of sequences that average to a value of 4 – for a general idea four terms each equal to 4 or five terms each equal to 4 etc etc.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Using the two statements together however, and using the most basic formula for calculating arithmetic mean →
Mean of a Set = (Total SUM / Number of terms) we can arrive at a conclusive answer. We know the SUM of the series which we can divide by the arithmetic mean of the series to get the total number of terms in the sequence.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).
Note: *This question although it may seem like a question on sequences actually has nothing to do with sequences, but only tests the basic average formula.*

Q.80

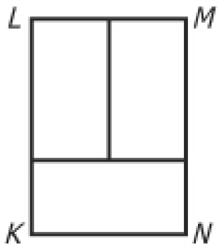
We're given that *x* is a –ve number ← *Do not forget this little piece of info.*
We require a *unique* value of *x*.

STATEMENT (1) alone: $x^2 = 1$ gives two possible solutions for x. $x = \pm 1$. It may tempt me to disregard this statement on account of bearing out two values for x, however since we're given that x is a –ve number, the only acceptable solution here is $x = –1$. A *unique* value.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: $x^2 + 3*x + 2 = 0$ can be factorized to be rewritten as $(x + 1)*(x + 2) = 0$ which gives two solutions $x = –1$ & $x = –2$. Since both the solutions pass as negative numbers, we have to consider them both and hence arrive at **no** *unique* value.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.81

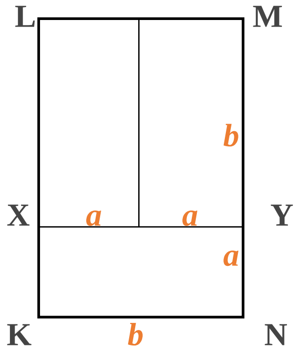
Given the figure:



We're asked the value of the ratio (KN/MN).
A Note of Caution: However much geometrical figures may seem according to scale, unless anything is specifically mentioned in the question stem about the relationship between any two sides or angles, such a relationship is never ever to be assumed. In fact figures that look exactly like a square unless and until are explicitly mentioned to be treated as a square should be treated as a general quadrilateral.

STATEMENT (1) alone: The perimeter of the rectangle is given to be 30 metres. In other words we're given that 2*(KN + MN) = 30 or KN + MN = 15. But we know of a number of pairs that will add up to 15 but will give us different values of the ratio (KN/MN). *(one such example is first considering KN = 7 & MN = 8 furnishing a ratio (KN/MN) = (7/8) and then simply considering the reverse KN = 8 & MN = 7 furnishing a ratio (KN/MN) = (8/7)).* Two different values mean inconclusive data.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Let us assume for the three smaller rectangles – the smaller side to be ***a*** units and the longer side to be ***b*** units. Putting these values on the figure at appropriate places:



From the above diagram we can write the ratio (KN/MN) in terms of ***a*** & ***b***.
(KN/MN) = (***b***/(***a*** + ***b***)). -------- (1)
Also, from the figure since XY = KN, we can write ***b*** = 2****a.*** -------- (2)
Substituting (2) in (1) → (KN/MN) = (2****a***/(***a*** + 2****a***)) = (2/3) – *unique* value answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

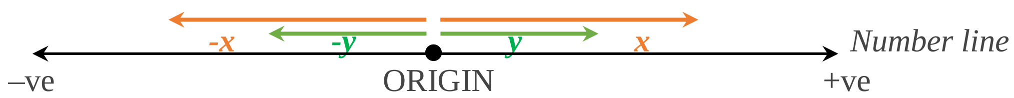
Q.82

A YES/NO targeted approach by making cases should work well here.
Although one may attempt this question algebraically, writing down different inequalities for different cases, more often than not it proves easier and clearer to think of MODS as absolute distances on the number line. We'll follow the distance approach for this question.

Let us define the MOD of x or $|x|$ accordingly. If we have two points on the number line x & a, then we define $|x – a|$ as the positive value of the distance between x & a. By the same definition $|x|$ may be defined as the distance on the number line of x from 0 or Origin.

Therefore, the question in asking us Is $|x| > |y|$ is simply asking if x is farther away from Origin (regardless of the direction from the origin – i.e. left or right of Origin) than y on the number line.

Or diagrammatically,



The diagram represents 4 possible ways of pairing status of x & y. *(i.e. either take right orange and left green…and so on)* All 4 pairs will conform to the inequality $|x| > |y|$.

<u>STATEMENT (1) alone</u>: The statement says: $x^2 > y^2$. Theoretically this means that whatever be the sign polarity of x *(+ve or –ve)* once it is squared (in a way made +ve) it exceeds the value of y. In other words for the above inequality $x^2 > y^2$ to hold true, it must be that x is farther away from the origin than y is. Only then can its +ve (squared) value can exceed the +ve squared value of y. Therefore, if $x^2 > y^2$ then only and only one of the four cases in the diagram would exist and hence $|x|$ is definitely > $|y|$. A CONFIRMED YES.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: If $x > y$ then depending on the sign of x & y the inequality may or may not hold. For instance if both x & y are positive then the inequality $x > y$ represents the right side of the diagram and the inequality $|x| > |y|$ holds to give a **YES** answer to the question. However, if x is +ve & y is –ve *(i.e. x to the right and y to the left of ORIGIN)*, then the expanse (distance from ORIGIN) of y can very well exceed that of x and the inequality $x > y$ will still hold. Such a scenario is diagrammatically represented below:

In the above case since y is –ve, *x will be* $> y$, however, as soon as you take the MOD on both sides you'll be talking in terms of distances or the lengths of the green and orange lines. And so, in the above case scenario the inequality $|x| > |y|$ will not hold giving a **NO** answer. A YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.83

Given u, v, & w as integers

We're asked if u is positive.

A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: The statement says $u = v^2 + 1$. Now given v is any integer, once squared we'll have $v^2 \geq 0$, or $v^2 + 1 \geq 1$ or $u \geq 1$, which gives us a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says $u = w^4 + 1$. Now given w is any integer, once double squared we'll have $w^4 \geq 0$, or $w^4 + 1 \geq 1$ or $u \geq 1$, which again gives us a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.84

We're to find the *unique* value of **p** which is given to be a prime number > 2

STATEMENT (1) alone: Given that **p** is a prime other than 2, (**p** + 1) is definitely a non-prime number simply by the fact that (**p** + 1) will be even as **p** is odd *(all primes except 2 are odd numbers)*. The statement accurately mentions there to be 100 primes between 1 & (**p** + 1) which means that **p** will simply be the 100th prime number beginning with 2 as the first. Now if you are counting in their increasing order the 100th (or for that matter even the nth) prime

will be a fixed definitive value and will not change once you start counting again. We get a *unique* value of **p** (the actual value of **p** is insignificant).
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given a range between which we have to count the number of prime numbers. The number of primes between a given range will always stay the same and never change *(for instance the number of primes between 1 & 10 will always and always be 4)*. Add to that the fact that the *unique* number of primes is the actual value of the prime **p**. Thus we again get a unique value of **p**.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

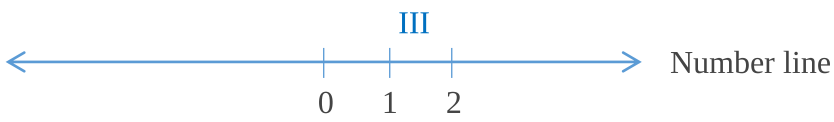
Q.85

The number line representation gives a clearer picture:
We're asked if **K** > 0?

STATEMENT (1) alone: The information can be represented on the number line as follows:

According to the statement **K** can lie in either region I or II. This gives us a YES/NO situation about **K** lying in region II & beyond definitively.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The information can be represented on the number line as follows:



According to this statement **K** lies in region III. This gives us a CONFIRMED YES answer about **K** lying to the right of origin or 0. Hence **K** > 0.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.86

Let **P**, **F** & **I** be the number of students who received the grade P, F & I respectively.
Then the total number of students in the class is = **P** + **F** + **I**.
We are required to find the *percentage* of females in the class.

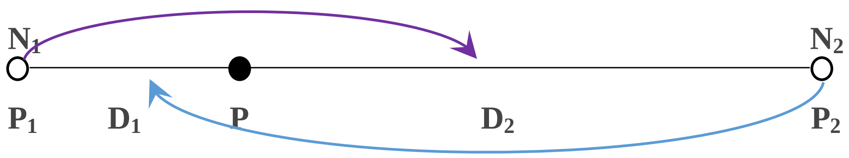
STATEMENT (1) alone: The statement says that out of **P** students (2/5)*$\mathbf{P}$ were females. However, the statement makes no sort of comment about the female composition among the students who received an F or I. The information is thus inconclusive to arrive at anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says that out of (**F + I**) students (4/5)* (**F + I**) were males or that out of (**F + I**) students (1/5)* (**F + I**) were females. However, the statement makes no sort of comment about the female composition among the students who received a P grade. The statement thus lacks information to arrive at anything concrete.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we get the total number of females in the group to be = {(2/5)*$\mathbf{P}$ + (1/5)* (**F + I**)} or = (1/5)*(2*$\mathbf{P}$ + **F** + **I**). The proportion of females is thus = {(1/5)*(2*$\mathbf{P}$ + **F** + **I**)}/(**P** + **F** + **I**) which can be rewritten as: Proportion of females = {1 + (**P**/(**P** + **F** + **I**))}*(1/5).
The above expression is heavily dependent on the values of **P**, **F** & **I** or some relation between them which is unknown. Hence insufficient data.
Alternatively, there is a **quicker approach** to seeing the clubbed data as inconclusive. We'll apply the *Combined mean* interpretation result which works for percentages as well:

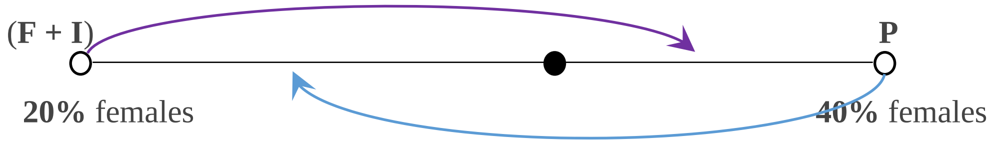
$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,
$\mathbf{N_1}$ = Sample size of SET 1
$\mathbf{N_2}$ = Sample size of SET 2
$\mathbf{P_1}$ = Percentage of females in group 1
$\mathbf{P_2}$ = Percentage of females in group 1
P = Percentage of females in the entire clubbed group.
$\mathbf{D_1}$ = ($\mathbf{P - P_1}$) = Deviation distance of $\mathbf{P_1}$ from the combined percentage figure of the two SETS
$\mathbf{D_2}$ = ($\mathbf{P_2 - P}$) = Deviation distance of $\mathbf{P_2}$ from the combined percentage figure of the two SETS

Now with this background info we can represent the clubbed information of Statements (1) & (2) as:



From the above diagram we know that if we are to club the two groups (**P** & (**F + I**)) together to find the NET percentage of females in the combined group, then we will need the values of **P**, **F** & **I** to see, by taking the ratio of **P** & (**F + I**), where the black dot exactly lies between 20% & 40%. Or in other words we lack the values of $\mathbf{N_1}$ & $\mathbf{N_2}$ – the sample sizes.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.87

It may be useful to note the easily observable results from coordinate geometry:
For a line parallel to the X–axis (the equation of the line being Y = constant = a) all points on that line share the same Y–coordinate = a &
For a line parallel to the Y–axis (the equation of the line being X = constant = b) all points on that line share the same X–coordinate = b

STATEMENT (1) alone: Segment PQ is given parallel to the Y–axis, hence points Q & P will share the same X–coordinate. → (X–coordinate)Q = (X–coordinate)P = –1. However, there is no data to point to the Y–coordinate of point P and hence this statement alone renders itself insufficient.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Segment PR is given parallel to the X–axis, hence points R & P will share the same Y–coordinate. → (Y–coordinate)R = (Y–coordinate)P = 1. However, there is no data to point to the X–coordinate of point P and hence this statement alone renders itself insufficient.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have both the (X–coordinate)P = –1 & the (Y–coordinate)P = 1. The information gives a fixed *unique* value of the sum.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.88

The question asks for the greatest common divisor (GCD) of two positive integers ***m*** & ***n***

STATEMENT (1) alone: The statement stipulates the integer ***m*** as prime, yet mentions nothing about the integer ***n***. ***n*** could be another prime in which case the greatest common divisor would be 1 OR ***n*** could be a multiple of the integer ***m*** in which case the greatest

common divisor would be ***m***. The statement thus lacks information to arrive at anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given the following relation 2****n*** = 7****m***. We can re-write this as saying that ***n*** = (7/2)****m***. Since both ***m*** & ***n*** are integers, hence ***m*** has to be even. We'll pick out simple values to substitute with the aim of arriving at at least two values of the GCD.
Case I: If ***m*** = 2, then ***n*** = 7 & GCD = 1; **Case II:** If ***m*** = 4, then ***n*** = 14 & GCD = 2. No *unique* value.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the statements say that for integers ***m*** & ***n***:
n = (7/2)****m*** & ***m*** is a prime. Again since both ***m*** & ***n*** are integers we're bound by the constraint that ***m*** has to be even. Now ***m*** is also to be a prime. There exists only one even prime number and that is 2. Or, ***m*** = 2 & hence ***n*** = 7, is the only solution possible giving us a *unique* value of the GCD = 1.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.89

Let $\mathbf{P_R}$ & $\mathbf{P_W}$ be the retail and wholesale price of the calculator respectively. We have to find a value for $\mathbf{P_R}$.

STATEMENT (1) alone: The statement translates into: $\mathbf{P_R} - \mathbf{P_W}$ = \$2.00. Since we have no idea what the value of $\mathbf{P_W}$ is, this statement lacks information to arrive at anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement translates into: $\mathbf{P_R}$ = (1 + (50/100))*4 = (3/2)*4 = \$6.00. – a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.90

The question can be easily tackled using the simple *Mean* formula:
Mean = (SUM Total / sample size)
The question states that an average of the daily balance for a 30-day billing cycle is calculated by taking the SUM of the daily balances at the end of each of the 30 days and dividing that sum by 30.
Or Average Daily Balance = (SUM of the daily balances for 30 days / 30)
The question asks for the value of the Average Daily Balance for a 30 day billing cycle.
Now, according to the conditions laid out by the question, out of the 30 days for the cycle in question the daily balance is \$600 each day for ***n*** days and \$300 for the remaining days. The entire crux of the problem boils down to finding the value of ***n.***

Till then the Average may be represented mathematically as:
Mean = {600****n*** + 300*(30 – ***n***)}/30

STATEMENT (1) alone: Since the payment was credited on the 21st day → ***n*** = 20. We thus obtain a *unique* value for the *Mean* or the average daily balance.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're an indirect piece of information which we shall try to put mathematically:
For the 25 days the average is $540
540 = {600****n*** + 300*(25 – ***n***)}/25; leaving the calculations aside – which are no doubt a waste of time – we can see that the above equation yields a fixed value of ***n*** which can then be substituted in *Mean* = {600****n*** + 300*(30 – ***n***)}/30 to find final & *unique* answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).
Top 1% expert replies to student queries (can skip) (Link)

Q.91

Picking out quick values to show that multiple remainders exist works for a quick solution to this question

STATEMENT (1) alone: The integer **N** is given to be a multiple of 5, the quickest values of **N** that come to mind would be the first three multiples – 5, 10 & 15. Divided by 6 they give remainders – 5, 4 & 3 respectively. This is enough to label this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Here the integer **N** is given to be a multiple of 12. Now 6 is a factor of 12. Thus whatever is divisible by 12 will definitely be divisible by all the factors of 12 as well. Alternatively, we can write **N = 12****M*; *M* = {1, 2, 3,…so on}, or **N** = 2*6**M*. Therefore **N** is divisible by 6. A CONFIRMED remainder = 0 answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.92

The useful result here is that the product of *N* consecutive integers is always divisible by *N*.

STATEMENT (1) alone: The integer ***r*** is given as the product of 4 consecutive integers. Now 4 consecutive integers will always contain a multiplied set of **3** consecutive integers as well. Thus the product will always be divisible by **3**. A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The integer ***r*** is given to be < 25. The best is to pick out any two values that give conflicting answers and be done with this statement. We'll choose ***r*** = 24 & 23 to yield a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.93

Given an integer **N** > 1**,** we're asked if **N** = 2?

<u>STATEMENT (1) alone</u>: The statement re-iterates the property of a prime number saying in turn that **N** is a prime number. **N** being a prime can be any number and does not necessarily have to be 2. A YES/NO answer.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: For the difference of any two integers to be odd → one of them has to be odd and the other even. *The statement should be read carefully to register the fact that the difference of* ***any two*** *distinct factors is odd*. This condition in itself stipulates that **N can have only 2 factors →** Let us form the number by choosing our factors we choose an odd factor **first**, now for the difference of the two distinct factors to be odd the **second** factor has to be an even one. Now when we come to choosing the third it can either be an odd factor or an even factor – neither of which will satisfy the condition that *the difference of* ***any two*** *distinct factors be odd* because whether we choose an odd factor or an even one as the **third**, we will end up with two factors of the same kind (even/odd) and difference of these factors will yield an even difference which violates the condition of the statement.

Now having established that **N can have only and exactly 2 factors** or in other words that **N** is a prime we start looking into the prime numbers and note that for every odd prime number the two factors are odd (the odd number and 1) yielding an even difference. Thus the only number that successfully satisfies the condition laid out be statement (2) is an **even prime number** and only one such exists N = 2 or a CONFIRMED YES.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.94

We're to find a *unique* value of Y.

<u>STATEMENT (1) alone</u>: Statement (1) says that Y can take on the following set of values {29, 31, 33}. However, we're looking for a *unique* value.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: Statement (2) says that Y can take on a range of values between 31 and 36 or 31 < Y < 36. *Kindly don't mistake Y to be an integer when analysing statement (2). The question stem taken together with Statement (2) nowhere mentions Y being an integer. That was only statement (1)*. However, we're looking for a *unique* value.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: The statements taken together say that Y = {29, 31, 33} and 31 < Y < 36. Looking for common value(s) that conform to both conditions, we find only one *unique* value of Y = 33.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.95

We'll try to simplify the best we can what is being asked in the question stem:
Kindly remember not to cross-multiply anything across an inequality unless we're sure that the quantity being cross-multiplied is positive or negative.
It says Is $\{1/(\boldsymbol{a}-\boldsymbol{b})\} < (\boldsymbol{b}-\boldsymbol{a})$?
Or, Is $\{1/(\boldsymbol{a}-\boldsymbol{b})\} - (\boldsymbol{b}-\boldsymbol{a}) < 0$
Or, Is $\dfrac{\{1+(\boldsymbol{a}-\boldsymbol{b})^2\}}{(\boldsymbol{a}-\boldsymbol{b})} < 0$
This is a more convenient form to work with since we know that the numerator $\{1+(\boldsymbol{a}-\boldsymbol{b})^2\}$ regardless of the values of ***a*** & ***b*** will always be +ve and the only expression capable of influencing the sign of the expression is the denominator. In fact the entire question reduces to Is $(\boldsymbol{a}-\boldsymbol{b}) < 0$?

STATEMENT (1) alone: Statement says $\boldsymbol{a} < \boldsymbol{b}$ or in other words $(\boldsymbol{a}-\boldsymbol{b}) < 0$ which gives a CONFIRMED YES to the *reduced* asked.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Statement says that $|\boldsymbol{a}-\boldsymbol{b}| > 1$. A quick substitution works well here → $\boldsymbol{a} = 10$ & $\boldsymbol{b} = 5$ gives $|\boldsymbol{a}-\boldsymbol{b}| = |10-5| = |5| = 5$ which is > 1. The value of $(\boldsymbol{a}-\boldsymbol{b})$ here is +5 giving a **NO** answer to the *reduced* question asked. Now $\boldsymbol{a} = 5$ & $\boldsymbol{b} = 10$ gives $|\boldsymbol{a}-\boldsymbol{b}| = |5-10| = |-5| = 5$ which is > 1. However, the value of $(\boldsymbol{a}-\boldsymbol{b})$ here is –5 giving a **YES** answer to the *reduced* question asked. We thus arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.96

Given **X** and **Y** are integers greater than 1
We're asked if **X** is a multiple of **Y**?

STATEMENT (1) alone: The statement says that $\mathbf{X} = 3*\mathbf{Y}^2 + 7*\mathbf{Y}$ or that $\mathbf{X} = \mathbf{Y}*(3*\mathbf{Y} + 7)$
Or $\mathbf{X} = \mathbf{Y}*M$ where *M* is an integer. This is an exact representation of X being a multiple of **Y**
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that $\mathbf{X}^2 - \mathbf{X}$ is a multiple of **Y.** We can thus write $\mathbf{X}(\mathbf{X}-1) = K*\mathbf{Y}$ where $K = \{1, 2, 3, \ldots$so on$\}$. We can pick out values that satisfy the equation $\mathbf{X}(\mathbf{X}-1) = K*\mathbf{Y}$ with the aim to create a YES/NO situation. $\mathbf{X} = 4$, $\mathbf{Y} = 2$ gives a **YES** answer, however, $\mathbf{X} = 4$, $\mathbf{Y} = 3$ gives a **NO** answer. We thus have a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.97

The question asks if $\sqrt{(x-3)^2} = 3 - x$?

It is important to note that the square root of any quantity is always +ve. Thus the question in a way is asking if (3 – **X**) > 0 (which is essential for the above equation to hold)
Or, is **X** < 3?

<u>STATEMENT (1) alone</u>: Statement says **X** can be anything but 3 but this does not conclusively answer our question as to if **X** < 3?
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: Statement says –**X***|**X**| > 0, since |**X**| is a +ve quantity, the inequality is only possible if **X** < 0 → this gives a CONFIRMED YES answer to the question is **X** < 3?
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.98

We're asked for a specific value of the expression $f(x) = 5*x^2 + 4*x - 1$

So all we really need is the value of *x*.

<u>STATEMENT (1) alone</u>: According to this statement 2 values of *x* are possible → $x = 0$ & $x = -2$. Substituting these values in the above expression $5*x^2 + 4*x - 1$ gives $f(0) = -1$ & $f(-2) = 11$. Two separate values allow us to label it insufficient.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement just gives one value of *x* and hence of the expression $f(x) = 5*x^2 + 4*x - 1$. $f(0) = -1$ which is a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.99

It may serve useful to note down the following as a result and have it memorized as it proves useful on a moderate number of occasion!

For any two *positive* numbers: ***m***, ***n*** & ***a***

<u>RESULT (1):</u>
If (***m***/***n***) > 1 then {(***m*** + ***a***)/(***n*** + ***a***)} < (***m***/***n***) &
If (***m***/***n***) < 1 then {(***m*** + ***a***)/(***n*** + ***a***)} > (***m***/***n***)

<u>RESULT (2):</u>
If (***m***/***n***) > 1 then {(***m*** – ***a***)/(***n*** – ***a***)} > (***m***/***n***) &
If (***m***/***n***) < 1 then {(***m*** – ***a***)/(***n*** – ***a***)} < (***m***/***n***)

Now the question concerns a similar such scenario. Given that $\boldsymbol{m}$ & $\boldsymbol{n}$ are positive numbers, we're asked if $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\} > (\boldsymbol{m}/\boldsymbol{n})$? → *Kindly remember that only* $\boldsymbol{m}$ *&* $\boldsymbol{n}$ *are given to be +ve in the question stem and not x.*

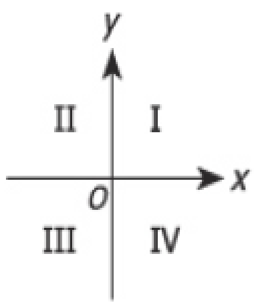
STATEMENT (1) alone: The statement says $\boldsymbol{m} < \boldsymbol{n}$. or since $\boldsymbol{n}$ is given to be +ve in the question we can say that $(\boldsymbol{m}/\boldsymbol{n}) < 1$. However, since we're unaware of whether $\boldsymbol{x}$ is +ve or –ve, $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\}$ can be $> (\boldsymbol{m}/\boldsymbol{n})$ if $\boldsymbol{x}$ is +ve giving a **YES** answer, or $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\}$ can be $< (\boldsymbol{m}/\boldsymbol{n})$ if $\boldsymbol{x}$ is –ve giving a **NO** answer. A YES/NO situation thus labels this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given that $\boldsymbol{x}$ is +ve, however no comment is made on the nature of the ratio $(\boldsymbol{m}/\boldsymbol{n})$. Which is why $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\}$ could be $> (\boldsymbol{m}/\boldsymbol{n})$ if $(\boldsymbol{m}/\boldsymbol{n}) < 1$ – giving a **YES** answer, or $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\}$ could be $< (\boldsymbol{m}/\boldsymbol{n})$ if $(\boldsymbol{m}/\boldsymbol{n}) > 1$ – giving a **NO** answer. A YES/NO situation thus labels this statement insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together both the statements lay out the following conditions: $(\boldsymbol{m}/\boldsymbol{n}) < 1$ & $\boldsymbol{x}$ is +ve. Using the two results mentioned above we can conclusively and definitively say that $\{(\boldsymbol{m} + \boldsymbol{x})/(\boldsymbol{n} + \boldsymbol{x})\}$ will be $> (\boldsymbol{m}/\boldsymbol{n})$ thus yielding a CONFIRMED answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

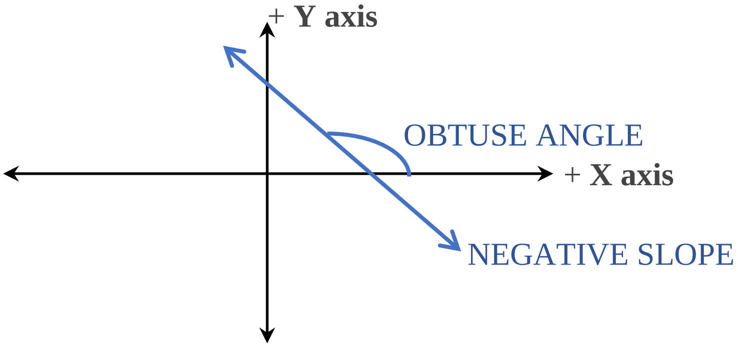
Q.100

Given the following Coordinate plane representation:

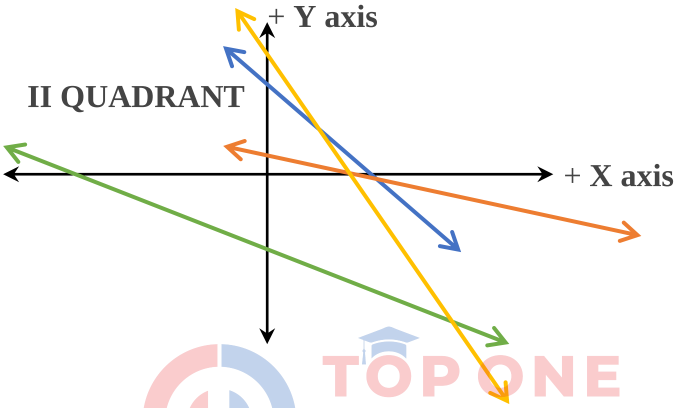


We're asked if a line **K** definitively intersects the quadrant II.

STATEMENT (1) alone: We're given the slope of the line as negative. Now a negative sloped line always subtends an obtuse angle with the +ve (→ direction) **X** axis.



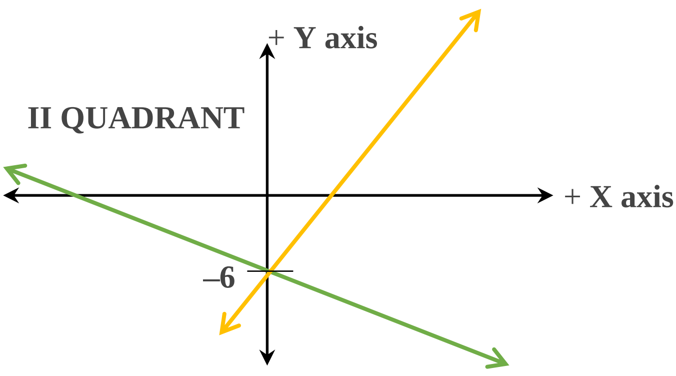
Now remember that a line extends infinitely in both directions. This property shows us that no matter where we place a negatively sloped line on the coordinate plane, we cannot help but concede that the line will eventually end up in the II quadrant sometime or the other as shown diagrammatically below.



Thus all the negatively sloped lines will at one point or the other (owing to their extending infinitely in both directions) end up in quadrant II. A CONFIRMED YES.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The Y- Intercept of the line **K** is given as –6. This option alone presents two possibilities as drawn out below:



The **green** line does extend into the II Quadrant giving us a **YES** answer whereas, the **yellow** line no matter how much it is extended in either direction will never cross the II Quadrant giving us a **NO** answer. A YES/NO situation which thus labels this statement insufficient.

STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.101

We're given that three *distinct* numbers *(not necessarily integers)* add up to a value of 54. We're then asked the value of the largest of the three.

STATEMENT (1) alone: The statement states a relation between the largest and the smallest numbers: Largest number = 2*(smallest number). If the smallest number be x say then the largest is $2*x$. Thus x + (middle value say b) + $2*x = 54$. This is a single equation in two variables and the variables here need not even be integers. There is sure to be more than one solution that satisfies the above relation. *(two such example are $x = 12$ & $2*x = 24$ and the middle value then comes out to be 18 AND $x = 13$ & $2*x = 26$ and the middle value then comes out to be 15)* This is enough to label the info in this statement as inconclusive.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This is pretty straight forward information to see through as being sufficient. Let a, b & c $(a < b < c)$ be the numbers such that $a + b + c = 54$. According to the statement $a + b = 30$. Using both it is quite easy to see that $c = 54 – 30 = 24$ which is a *unique* value of c.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.102

We're given a set M with a finite number of elements all of which are **–ve INTEGERS**. We're asked if the number of elements in the set is ODD?
We'll proceed with a targeted YES/NO approach.

STATEMENT (1) alone: This statement tells me that there is not a single even integer in the set M. However it in no manner helps to get even a remote fix on whether the NUMBER of elements in the set M is odd or even. *(We can either have an **even** NUMBER of odd –ve integers OR an **odd** NUMBER of odd –ve integers)*. This data is clearly inconclusive to arrive at anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement comments on the sign polarity (+ve/–ve) of the product of all the elements in the set M. An even number of –ve integers multiplied together will always yield a +ve product and similarly, an odd number of –ve integers multiplied together will always yield a –ve product. Given the sign of the final product we can accurately and definitively comment on whether the number of elements of the set M is odd or even.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.103

Let, for starters, **R**, **B** & **G** be the number of Red, Blue & Green marbles in the bag. We're asked the ratio of **G : R**?

STATEMENT (1) alone: This statement stipulates the ratio of **B : G** as 2 : 1. However, since no information whatsoever has been shared about the number of RED marbles, this statement renders itself inconclusive in commenting on the ratio of **G : R** accurately.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement stipulates the ratio of **B : R** as 3 : 1. However, since no information whatsoever has been shared about the number of GREEN marbles, this statement renders itself inconclusive in commenting on the ratio of **G : R** accurately.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (1) says **G** = (**B**/2) & statement (2) says **R** = (**B**/3). Together we can divide the two statements to eliminate **B** and thus yield that **G : R** = 3 : 2. A *unique* answer to the question asked.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.104

We're on the lookout for a *unique* value of *x*.

STATEMENT (1) alone: Although at first this might seem as a single equation in two variables *x* & *y*. However, a closer look and simplification reveals that since *y* gets cancelled from both sides the equation simply reduces to $x = 6$. A *unique* value of *x*.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement however is indeed a single equation in two variables. The kind of info from which it is always impossible to derive a single *unique* value of *x*.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.105

We're required to find the number of members of a club who are 35 years of age or older.

STATEMENT (1) alone: The Statement presents that Exactly $(3/4)^{th}$ of the members of the club are under 35 years of age. Consequently this leaves the remaining $(1/4)^{th}$ members 35 years of age or older. But this only gives us a **proportion** of the members that are 35 years of age or older and not the absolute value of the **number** of the members that are 35 years of

age or older. *(In simpler terms we know the group we're looking at is (1/4)th of the total number of members, but we don't know how many in total there are,)*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement if considered alone is absolutely irrelevant to what is asked in the question stem, since it does not even mention the group that is either under 35 or 35 and older. This statement is simply a means of determining the total membership of the club as follows: If the total club membership is **X**, then (40/100)***X** = 64 or **X** = 160.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considered together, we know that the number of members of the club who are 35 years of age or older = (1/4)th of the Total members and the total number of members is 160. Therefore, the number of members of the club who are 35 years of age or older = (1/4)*160 = 40. A confirmed *unique* answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.106

Let Jean's insurance premium in 1994 & 1995 be $\mathbf{P}_{1994}$ & $\mathbf{P}_{1995}$ respectively.
We're asked $\mathbf{P}_{1995}$ = ?

STATEMENT (1) alone: This statement simply says that ($\mathbf{P}_{1995}$ / $\mathbf{P}_{1994}$) = (6/5) or $\mathbf{P}_{1995}$ = (6/5)* $\mathbf{P}_{1994}$. But since even $\mathbf{P}_{1994}$ is unknown the information is incomplete for an accurate answer.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Mathematically this statement is even saying the same thing as statement (1). The statement says $\mathbf{P}_{1995}$ = (1 + (20/100))* $\mathbf{P}_{1994}$ or $\mathbf{P}_{1995}$ = (6/5)* $\mathbf{P}_{1994}$. But again since even $\mathbf{P}_{1994}$ is unknown the information is incomplete for an accurate answer.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same relationship and there is nothing new that may be achieved by combining them in any way possible. They're both just two different ways of saying the exact same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.107

Let ***a*** & ***b*** be the number of UNBOKEN BULBS in boxes 1 & 2 respectively, and let ***x*** & ***y*** be the number of BOKEN BULBS in boxes 1 & 2 respectively. So far this is what we know:

$x = 2$; $(x + y) = 7 \rightarrow y = 5$
$(a + b) + (x + y) = 55 \rightarrow (a + b) = 48$.

We're required to find the value of ***b***!

<u>STATEMENT (1) alone</u>: The statement mathematically put says: ***a*** = 15****x***, since ***x*** = 2 → ***a*** = 30. (***a*** + ***b***) = 48 → ***b*** = 18 – a *unique* value. *The solving was for demonstration purposes only. On the exam it should be enough to look at the equation in your kit and the number of known values to figure that the data is sufficient.*
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: The statement mathematically put says: (***a*** + ***x***) – (***b*** + ***y***) = 9, since ***x*** = 2 & ***y*** = 5 → (***a*** – ***b***) = 12. We also know that (***a*** + ***b***) = 48 → ***a*** = 30 & ***b*** = 18 – a *unique* value. *Again, the solving was for demonstration purposes only. On the exam it should be enough to look at the equation in your kit and the number of known values to figure that the data is sufficient.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.108

Let the total cost of renting the car be **C**. We're asked the value of **C**.

<u>STATEMENT (1) alone</u>: This statement just further adds information to state that instead of paying 2***C** they would have had to pay (1.5)***C**, had they kept the car for an additional week. Since no absolute values of costs of either a one week or a two week rental are given, the value of **C** remains unknown.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: Mathematically translating the information given in the statement we can write (**C**/3) – (**C**/4) = $15 or **C = $180**. We hence get a *unique* answer for what is asked in the question.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.109

We're given that R = $1 + 2*x*y + x^2*y^2$. Using the formula $(A + B)^2 = A^2 + 2*A*B + B^2$, we can rewrite the expression for R as R = $(1 + x*y)^2$.
We're asked the value of $x*y$.

<u>STATEMENT (1) alone</u>: The statement says that R = 0 or that $(1 + x*y)^2 = 0$. This equation gives a definitive/unique value of $x*y = -1$.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement simply gives out a range of values for the variable *x*, saying $x > 0$. This in no way narrows down the value of $x*y$ since neither anything about the value of *y* nor anything about the value of R is given in the statement.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.110

We're given the equation: $\mathbf{Z}^N = 1$ and asked to solve for a *unique* value of **Z**.

STATEMENT (1) alone: The statement stipulates N to be a non-zero integer. *One may be tempted to conclude this statement as sufficient arguing that since $N \neq 0$,* **Z** *must be = 1.* However, we'll need to exhaust all possibilities before arriving at such a conclusion. Now if N is odd say = 3, the equation is solved to yield **Z =** +1, however, if N is even say = 2 then the equation is solved to yield **Z** = ±1. This is enough to establish that a *unique* value does not exist.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement says **Z** > 0. Now given that N = 0 *(and the fact that any integer raised to the power 0 gives the answer 1)* **Z** can have any positive value {1, 2, 3, …so on}, since $1^0 = 2^0 = 3^0 = 1$
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info together, Statement (1) saying **Z** = ±1 and Statement (2) saying **Z** > 0, we get a *unique* value of **Z** = 1.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.111

Given the positive integers *x*, *y* & *z*. We're required to find the **remainder** when $100*x + 10*y + z$ is divided by 7. Now the dividend expression can at most be rearranged to be written as $(98*x + 7*y) + (2*x + 3*y + z)$ so that the first part $(98*x + 7*y)$ is completely divisible by 7 and the second part is where the value of the remainder will come depending on the values of *x*, *y* & *z*. Now since the first part $(98*x + 7*y)$ is completely divisible for any values of *x* & *y*, we can leave this part out and concentrate completely on the expression $(2*x + 3*y + z)$ in our search for the value of the **remainder**.

STATEMENT (1) alone: Statement gives out the value of $y = 6 \rightarrow (2*x + 3*y + z)$ becomes $(2*x + z + 18)$. Consider $x = 1$ & $z = 1$ then $(2*x + z + 18) = 21$ which is completely divisible by 7 or **remainder** = 0. But, consider $x = 1$ & $z = 2$ then $(2*x + z + 18) = 22$ which gives the **remainder** = 1. Hence the **remainder** does not bear a *unique* value.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Statement gives out the value of $z = 3$ → $(2*x + 3*y + z)$ becomes $(2*x + 3*y + 3)$. Consider $x = 1$ & $y = 1$ then $(2*x + 3*y + 3) = 8$ which gives a **remainder** = 1. But, consider $x = 2$ & $y = 1$ then $(2*x + 3*y + 3) = 10$ which gives the **remainder** = 3. Hence the **remainder** does not bear a *unique* value.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Together the statements simply state $y = 6$ & $z = 3$ → $(2*x + 3*y + z)$ becomes $(2*x + 21)$. Consider $x = 1$ then $(2*x + 21) = 23$ which gives a **remainder** = 2. But, consider $x = 2$ then $(2*x + 21) = 25$ which gives the **remainder** = 4. Hence still the **remainder** does not bear a *unique* value.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.112

Let the admission fee be $**F** and let the let the number of people who attended the party be **N**. We're required to find the value of **N**.

STATEMENT (1) alone: The statement mathematically translates into:

(**F** – 0.75)*(**N** + 100) = **F*N**, on simplification → 100***F** – 0.75***N** = 75. But this is a linear equation in two variables and thus is insufficient to provide for a *unique* value of **N**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement mathematically translates into:

(**F** + 1.50)*(**N** – 100) = **F*N**, on simplification → –100***F** + 1.50***N** = 150. But this is again a linear equation in two variables and thus is insufficient to provide for a *unique* value of **N**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info together, we get 100***F** – 0.75***N** = 75 from Statement (1) and –100***F** + 1.50***N** = 150 from Statement (2). These are two equations in two variables and hence are together sufficient info to solve for the *unique* values of the two variables. These can simply be added together to get the value of **N** = 300. *(Again, solving is strictly advised against in DS).*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.113

We're given a SET with **at least** 2 elements. We're asked if *Mean* = *Median* for the SET.
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: Statement (1) says that if the SET were to look like $\{X_1, X_2, X_3, X_4, X_5\}$ *(say)* where X_1 through X_5 are arranged in increasing order. Then $X_2 = X_1 + 2$, $X_3 = X_2 + 2$ and so on. In other words X_1 through X_5 form an Arithmetic Progression series in

ascending order. Thus the statement says that the elements of the SET when arranged in ascending order form an Arithmetic Progression. We know that the *Mean* is always = *Median* for an Arithmetic Progression series. Thus we get a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement stipulates the range of the SET with N elements as $2*(N-1)$. It is always helpful to assume values to create a YES/NO situation. Assuming $N = 5$, then for a SET that looks in general like $\{X_1, X_2, X_3, X_4, X_5\}$ the range is 8. Now we can have a SET with values as {2, 4, 6, 8, 10} for which the range is 8 and the *Mean* = *Median* = 6 giving us a **YES** answer. Or we can have a SET that looks like {2, 2, 2, 2, 10} for which the range is 8 except the *Mean* ≠ *Median* giving us a **NO** answer. Thus we arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.114

We'll try to put the information given to us mathematically and then try simplifying to the point possible:

Let **X, Y** & **Z** be the regular prices of the 3 items purchased during the sale and let **X** be the regular price of the most expensive item. The question then asks

If {(20/100)***X** + (10/100)***Y** + (10/100)***Z**} > (15/100)*(**X** + **Y** + **Z**) or, simplified
If **X** > (**Y** + **Z**)?

STATEMENT (1) alone: The statement says that **X** = $50, and the next most expensive item was priced at $20. → This means that the price of the third item can at most be $20. Or, in other words (**Y** + **Z**) < $40 whereas **X** = $50. Hence this stipulates that **X** > (**Y** + **Z**) which is what the reduced question asks! A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement only gives value to the least expensive item on the list and prices it at $15 (regular price). We can make cases here to discard this statement. CASE I: If the prices are 15, 16 & 17 (say) with **X** = 17, then **X** < (**Y** + **Z**) giving us a **NO** answer. CASE II: If the prices are 15, 16 & 75 (say) with **X** = 75, then **X** > (**Y** + **Z**) giving us a **YES** answer. Thus we arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.115

We're given $x*y = -18$ and then asked if $x < y$?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: Given $x < 0$ and the fact that $x*y = –18 = –ve$ → y is +ve. With a y +ve & x –ve, we can comfortably apply the inequality $y > x$. This gives us a CONFIRMED YES answer to the question asked.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says $y < 10$. The question stem stated $x*y = –18$. Let's begin picking out values *(we'll begin by picking out a +ve value of y)*. CASE I: Let $y = 9$ and hence, $x = –2$. In this case we conclude that $y > x$ giving us a **YES** answer. CASE II: Let $y = –9$ and hence, $x = 2$. In this case we conclude that $y < x$ giving us a **NO** answer. Thus we arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.116

The language might seem to be an issue going through the question, however solving this question should prove beneficial to some extent in tackling such language related issues should such scenarios be encountered further on.

Let, for starters, **D** be the percent discount offered on the NON–DISCOUNTED price for the medical test. Now the question mentions the NON–DISCOUNTED price for the medical test is \$230 *(as this is the value billed to the insurance company for a customer that is NOT referred to the laboratory in question by the insurance company. 'THE LABORATORY'S ORIGINAL BILL' wording in the question confirms this)*. We're simply supposed to find the value of **D**.

STATEMENT (1) alone: The statement already talks in percentages and mentions that the insurance company is required to pay only 20% of the original cost of the Bill *(NOTE HERE AGAIN that 'the original bill' mentioned here is the USUAL bill for the medical test on a patient, that patient who was not referred to the laboratory by the insurance)*.

In other words the statement simply says that the insurance company is required to pay 80% less on the original cost of the Bill OR that the insurance company is offered a discount of 80%. Thus the statement yields a *unique* value of **D** = 80.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement mentions the absolute value of the DISCOUNTED cost that the insurance company has to pay for a bill on a patient who is referred to the laboratory by the insurance company. Now we know the DISCOUNTED price → \$46 & the NON–DISCOUNTED price → \$230. This is more than enough to know that the discount percentage **D** can be easily evaluated using the two pieces of info to yield a *unique* value of **D**. *Any further calculations are a waste of time.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.117

We're given three random points **P**, **Q** & **R** on the number line and we're asked the **value** of the **distance** between **P** & **R**.

STATEMENT (1) alone: Knowing the *relative* positions of such as the fact that **Q** is between **P** & **R** does not give us even a remote fix on the value of the distance between **P** & **R**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone only mentions of points **P** & **Q** and shares no such information about the point or its position on the number line. The data is insufficient to conclusively arrive at anything concrete about the value of the distance between **P** & **R**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together and present the combined form on the number line gives a much clearer view of where we're at. One such possible scenario that conforms to the conditions laid out by both the statements together is presented below:

It is pretty clear from the above representation even conforming to the two conditions laid out by the two statements the point **R** can have multiple positions *(for instance, extend it as far right as possible)* thus rendering even the combined scenario insufficient in getting a fix on the value of the distance between **P** & **R**.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.118

The question mentions two **number** *(Not necessarily integers)* x & y, out of which $x > 0$, and asks for the value of y.

STATEMENT (1) alone: This statement is all to do with x and has absolutely no bearing at all on what the value of y could be! The statement says $5*x = 15$ or $\mathbf{x = 3}$.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mentions a combined relationship between x & y. The statement says $\mathbf{y*(x + 1) = 18}$. Again this is one single equation in two variables x & y. The value of y is therefore completely dependent on the value of the positive number x. In other words we cannot on the basis of this information alone furnish a *unique* value of y.
STATEMENT (2) alone – INSUFFICIENT

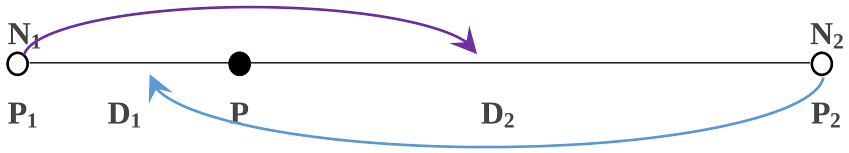
STATEMENT (1) & (2) together: Piecing the two bits of information together we can easily see that statement (1) gives out the value of $\mathbf{x = 3}$ which may then be substituted in $\mathbf{y*(x + 1) = 18}$ from statement (2) to give a *unique* value of y.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.119

We'll use the diagrammatic representation of the *Combined mean* interpretation result which works equally for percentages as well:

$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,
N_1 = Total tonnes of mixture 1
N_2 = Total tonnes of mixture 2
P_1 = Percentage by weight of Gravel in mixture 1
P_2 = Percentage by weight of Gravel in mixture 2
P = Net Percentage by weight of Gravel in the combination of mixture 1 & 2.
D_1 = (**$P - P_1$**) = Deviation distance of **P_1** from the combined percentage figure of the two mixtures.
D_2 = (**$P_2 - P$**) = Deviation distance of **P_2** from the combined percentage figure of the two mixtures.

Now with this background info we can present the information given in the question stem as follows:

The **Z** tonnes given are nothing but = (**X + Y**) tonnes. We are asked the value of **X** tonnes = ?

<u>STATEMENT (1) alone</u>: This statement gives out the value of **Y** = 10 tonnes. Now from the diagram above since the combined mixture of (**X + Y**) tonnes has a net 5% Gravel by wt composition we can infer that the ratio of the tonnes of the individual mixtures must have been (**X/Y**) = (3/5), Substituting **Y** = 10 tonnes we can get a definitive answer value of **X** = 6 tonnes. *(One should not even have to go through the few lines mentioned above. One can straight away sketch out the information as shown in the diagram and know that since the ratio can already be inferred from the diagram → (3/5), we only require one more relevant piece of information to solve for X)*

STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives out the value of **Z** = (**X + Y**) = 16 tonnes, which is a single equation in our attempt to solve for two variables **X** & **Y**. But, we also have

another equation dealing with **X** & **Y** which is the ratio inferred from the diagram above i.e. (**X/Y**) = (3/5). Together we can get a definitive fix on the value of **X** = 6 tonnes, however *solving is absolutely unnecessary.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.120

The question taken together with its statements introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

	Taking History	Not Taking History	TOTAL
Taking Science	**?**		
Not Taking Science			
TOTAL			

We're required to the **number** taking both courses.

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Taking History	Not Taking History	TOTAL
Taking Science	**?**		
Not Taking Science			
TOTAL	50		

This is far too less information to arrive at a fixed value. *No unique value.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Taking History	Not Taking History	TOTAL
Taking Science	**?**		70
Not Taking Science			
TOTAL			

Again this alone is far too less information to arrive at a fixed value. *No unique value.*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Taking History	Not Taking History	TOTAL
Taking Science	**?**		70
Not Taking Science			
TOTAL	50		

The clubbed information fills out only the two cells shown. However, the question marked cell even under these conditions can take on multiple values as long as they are less than 50. *(For Instance 10, 20 & 30 are three such among the multiple other values that the question marked cell can take)*. Again *no unique value.*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.121

Let the price of one pound of apples be $**A** and let the price of one pound of pears be $**P**. Then the question says that Pat spent a total of 5***A** dollars. We're supposed to find the number of pounds of pears that can be bought by the same amount of money. In other words if we say that *N* pounds of pears can be bought using $5***A**, then *N* = (5***A/P**) → this can be reduced to saying that we're required to find a *unique* value of the ratio (**A/P**).

STATEMENT (1) alone: The statement mathematically translates into **P – A** = 0.5. Now this is a difference equation *(difference between **P** & **A**)* and thus we can multiple sets of values of the pair (**A**, **P**) that satisfy the equation **P – A** = 0.5 yet yield different ratio values (**A/P**). *(As an example try plugging in **P** = 1, **A** = 0.5 → (**A/P**) = 0.5 & **P** = 1.5, **A** = 1 → (**A/P**) = 1.5…so on)*. Thus these multiple possibilities render the statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement directly gives away what we're looking for → the ration (**A/P**). It says **P** = (3/2)***A** or (**A/P**) = (2/3). A *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.122

The question stem consists of a lot of wordy information that has to be mathematically presented before proceeding any further with the statements.

SCENARIO 1: *Marla travels the first **Y** miles of the trip at an average speed of **X** miles per hour and the last (40 – **Y**) miles of the trip at an average speed of (1.25)***X** miles per hour.*

Total time taken = (**Y**/**X**) + ((40 – **Y**)/ (1.25)***X**) or = (**Y**/**X**) + ((160 – 4***Y**)/ 5***X**) or = (160 + **Y**)/(5***X**).

SCENARIO 2: *Marla travels the entire 40 miles at an average speed of **X** miles per hour.*

Total time taken = (40/**X**).

We're asked the ratio of the time taken in SCENARIO 1 to the ratio of the time taken in SCENARIO 2. In other words we're asked the value of the expression:

(160 + **Y**)/200 – *Obtained by dividing the total time taken in SCENARIO 1 by the total time taken in SCENARIO 2.*

STATEMENT (1) alone: The statement gives out the value of variable **X** = 48. However, the value of the expression asked in the question – (160 + **Y**)/200 – is independent of the variable **X** and has a dependency on only one variable i.e. variable **Y**. Since the statement fails to mention anything about the variable **Y**, we can easily label this as insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement gives out the value of variable **Y** = 20. And, the value of the expression asked in the question – (160 + **Y**)/200 – has a dependency on variable **Y** & **Y** alone. The statement fills in the required piece of the puzzle to yield a *unique* value of the expression and hence the quantity asked in the question.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.123

We're given an *integer* **p** > 1 and asked whether **p** is a prime?
We'll proceed with a targeted YES/NO approach.

STATEMENT (1) alone: The statement only demands that **p** be odd. However, this gives out a range of values of the *integer* **p** and it should be quite easy to see a YES/NO condition exist. *(31 & 25 are both odd but only 31 is prime out of the two)*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement itself is the exact definition of a prime. Or, in other words if for any *integer* **p** (greater than 1) the only positive factors that exist are 1 and the number itself (**p**) then the number **p** is defined as a prime number. An exact definition of a prime is definitely sufficient.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.124

Given that a certain company divides its total advertising budget into Television (**T**), Radio (**R**), Newspaper (**N**), and Magazine (**M**) budgets in the ratio 8 : 7 : 3 : 2, respectively, then for a positive integer *K*, the actual values of the individual budgets **T**, **R**, **N**, & **M** can be written as 8**K*, 7**K*, 3**K*, 2**K* respectively.
The question demands a *unique* value of **R** or in turn of 7**K* or in turn of *K*.

<u>STATEMENT (1) alone</u>: Mathematically this statement says that **T – N =** \$18,750 or 8**K* – 3**K* = 18,750 or *K* = (18750/5) = 3750 – a *unique* value. *(Again it is futile to perform the above calculations; it is enough to know that given an equation a unique value of whatever is asked in the question stem can be found down the line)*
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement, more directly, gives out the value of **M** and in turn of *K*. For demonstration purposes only → **M =** 2**K* = \$7500 or *K* = 3750 – a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.125

We're given a sequence $\mathbf{A}_1, \mathbf{A}_2, \mathbf{A}_3, . . ., \mathbf{A}_n$ of *n* integers such that $\mathbf{A}_k$ = k if k is odd & $\mathbf{A}_k = -\mathbf{A}_{(k-1)}$ if k is even. Before proceeding any further we'll chalk out the sequence just to get a taste of the pattern that the sequence might exhibit. According to the conditions:
$\mathbf{A}_1 = 1$; $\mathbf{A}_2 = -\mathbf{A}_1 = -1$; $\mathbf{A}_3 = 3$; $\mathbf{A}_4 = -\mathbf{A}_3 = -3$ and so on.
The sequence may be written out as: {1, –1, 3, –3, 5, –5, . . so on} – *This is enough to give us an idea of the pattern being exhibited and draw out a few basic inferences.*
Since the question asks about the SUM of the terms of the sequence we'll make our inferences accordingly.
INFERENCE 1: For an **even** number of terms taking the SUM would have **all** the terms cancel each other out to yield SUM = 0.
INFERENCE 2: For an **odd** number of terms taking the SUM would have **all (except the last)** terms cancel each other out to yield SUM = *K*, where *K* is the largest (and the last) odd integer in the sequence and is **positive**. In fact *K* = the number of terms of the sequence.

Given the analysis above we'll proceed with a targeted YES/NO approach.

<u>STATEMENT (1) alone</u>: We're given that the total number of terms in the sequence is **odd**. Using INFERENCE 2 above we can definitively say that the SUM will be a **positive** value. A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: We're given $\mathbf{A}_n$ is positive. Now given the conditions ($\mathbf{A}_k$ = k if k is odd & $\mathbf{A}_k = -\mathbf{A}_{(k-1)}$ if k is even) laid out by the question stem itself, it is pretty clear that ***n*** or the total number of terms in the sequence is **odd**. This brings us to the same juncture from where we began in Statement (1). Hence, Using INFERENCE 2 above we can definitively say that the SUM will be a **positive** value. A CONFIRMED YES.

STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.126

We're given a SET S of numbers with finite elements and are asked if the SET contains more *negative* numbers than *positive* numbers?
A YES/NO targeted approach by making cases should work well here.

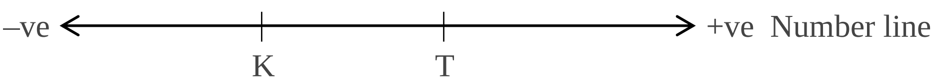
STATEMENT (1) alone: The statement says that the product of all the numbers in the SET is –ve. We can take extreme cases to label this statement insufficient. We can for instance
CASE I: have 1 *negative* number and 10 *positive* numbers giving us a **NO** answer, or
CASE II: have 13(odd) *negative* numbers and 1 *positive* number giving us a **YES** answer.
A YES/NO situation confirms the insufficiency.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This alone simply says out the total number of terms in the SET S = 6. There could be 2 *negative* and 4 *positive* numbers or the other way round.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info together we'll try to make cases with the aim to create a YES/NO situation. The only conditions that apply (considering the 2 statements together) are (1) the product of all elements is –1200 & (2) there are 6 elements in all in the SET. The simplest possibilities of SET S that we can make are {1, 1, 1, 1, 1, –1200} and {1, –1, –1, –1, –1, –1200}. The two yet again confirm a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

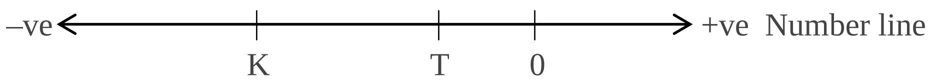
Q.127

The information in the question stem may be represented on the number line as follows:



The question asks that for the given scenario above will the product K*T lie to the right of T?
A YES/NO targeted approach by making cases can be thought of to be applied here.

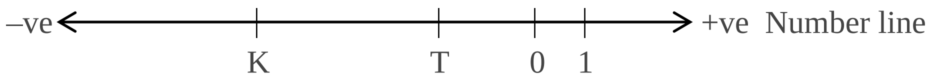
STATEMENT (1) alone: The statement confines the movement of T, T < 0. Or on the number line we'll have:



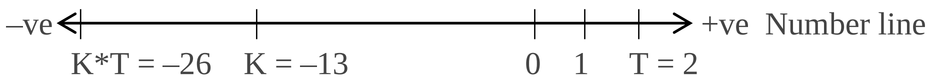
The above scenario says K & T are both –ve, which is why their product or K*T will by all means be +ve – or to the right of 0 and hence to the right of T. The analysis yields us a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement confines the movement of K, K < 1. There is no restriction here on the movement of T except that it will always to the right of K. The **first** scenario up for consideration can be the exact same one discussed in the analysis of statement (1) Here K as well as T is < 1.



The above scenario gives a +ve product which thus lies to the **right** of T as discussed in statement (1) analysis. This gives a **YES** answer. The next scenario up for consideration can be one such as shown below:



This scenario gives a –ve product which thus lies to the **left** of T as is shown using specific values in the diagram above. This gives a **NO** answer. The above diagram thus confirms a YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.128

We'll attempt this situation by making cases using the information provided to us with an aim to arrive at at least 2 different values of the distance between **B** & **D**. Hence our approach here will be to attempt to prove that a *unique* value of the distance between **B** & **D** does NOT exist. The approach is useful in that in case a *unique* value does exist, the approach helps us exhaust all possibilities before a convincing confirmation. At this juncture we're given that the distance between **A** & **B** is 18 and the distance between **C** & **D** is 8, however we know nothing of the position of any one of **A, B, C** or **D**.

STATEMENT (1) alone: Since **A** & **B** are two distinct points on the number line – given that the distance between **A** & **B** is 18. The statement (1) is another way of saying that the point **C** lies halfway between **A** & **B**. We now immediately begin making cases and noting down the corresponding values of the distance between **B** & **D** for each case that we make. I'll present the cases diagrammatically.

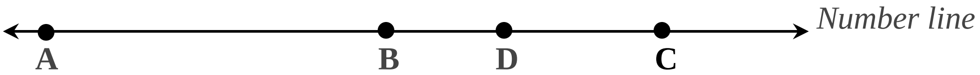
CASE I:

The distance between **B** & **D** comes out to be **1 unit**.

CASE II:

The distance between **B** & **D** comes out to be **17 units**.
This is enough to label the statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The only condition this statement stipulates is that point **A** is to the left of point **D**. Consider the arrangement below to understand how far this statement is from predicting the distance between **B** & **D** accurately:

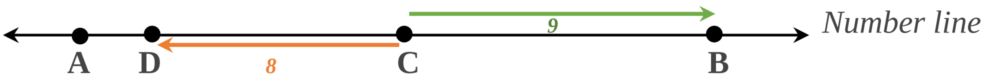


Let's say we fix the position of segment **AB** on the number line, now relative to this segment and respecting the fact that point **A** should always lie to the left of point **D**, we can have infinite positions of the segment **DC** *(as we keep pushing it further to the right on the number line)*. Each position yields a new distinct value of the distance between **B** & **D.**
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Even considering and conforming to the two conditions laid out by the 2 statements, we'll still be able to create cases that yield different values of the distance between **B** & **D.** A closer look shows us that the two cases we created in our analysis of statement (1) coincidently also conform to the condition laid out by statement (2) yet yield different values. I'll just present the two cases again just so that we're clear!
CASE I:

The distance between **B** & **D** comes out to be **1 unit**.

CASE II:

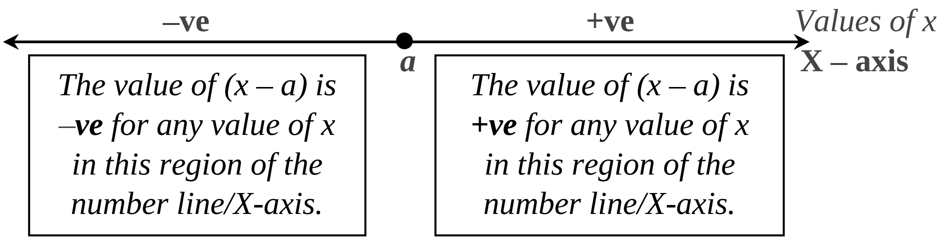


The distance between **B** & **D** comes out to be **17 units**.
In both the above cases (point **C** being midway between **A** & **B** as stipulated by statement (1)) the point **A** lies to the left of point **D**.
This was in statement (1) and again is enough to label the combined info insufficient.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.129

We'll begin by recapitulating a little bit of theory on the sign polarity of functions before delving into the question.

For a simple function say $Y = f(X) = x - a$ the sign of the expression $(x - a)$ or $f(x)$ for various values of x on the number line can be represented as follows:



Similarly, for the function $Y = (X) = \frac{(x-a)*(x-b)}{(x-c)}$, assuming a > b > c

To represent the sign polarity (i.e. whether for a particular value of *x* the sign of the expression is +ve or –ve) we

1. Begin by marking *a, b* & *c* on the number line/X-axis.
2. Start from the extreme right region and label it +ve
3. Proceed to the left and mark each successive region (while moving leftwards from the extreme right) in alternate succession of –ves and +ves.

Coming back to the question, the question asks if $(x+1)/(x-3) < 0$?
Tracking the sign polarity of $(X) = (x+1)/(x-3)$

Hence, the question in asking whether $(x+1)/(x-3) < 0$? Is reduced (using the above number line showing the sign polarity of $(x+1)/(x-3)$ for various values of *x* on the number line) to asking → **whether *x* lies between −1 & 3** (the green portion on the number line). Because it is only in this region that the value of $(x+1)/(x-3)$ will be < 0.

<u>STATEMENT (1) alone</u>: Statement says that $-1 < x < 1$. Hence *x* lies between −1 & 3 or the green region on the number line. This gives us a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: Statement says that $x^2 - 4 < 0$ or that $-2 < x < 2$. Here *x* can or cannot lie between −1 & 3 or the green region on the number line. This gives us a YES/NO answer.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.130

We're given a sequence of positive numbers $X_1, X_2, X_3, \ldots$ so on. We're asked the value of X_1.

STATEMENT (1) alone: We're given $\mathbf{X_N} = \mathbf{X_{(N-1)}} / 2$; N > 1. We'll try to generate a more generic term involving $\mathbf{X_1}$ out of this. $\mathbf{X_N} = \mathbf{X_{(N-1)}} / 2 = \mathbf{X_N} = (\mathbf{X_{(N-2)}} / 2)/2$ – *(writing $X_{(N-1)} = X_{(N-2)} / 2$)*. Thus $\mathbf{X_N} = \mathbf{X_{(N-2)}} / 2^2$. Moving further we can now write the general term for the sequence in terms of $\mathbf{X_1}$ as: $\mathbf{X_N} = (1/2^{(N-1)})*\mathbf{X_1}$. But since we do not know any of the terms ($\mathbf{X_N}$) in the sequence this info is incomplete and insufficient.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives a relation between two terms of the sequence $\mathbf{X_4}$ & $\mathbf{X_5}$. This can at most be simplified to give: $(1/\mathbf{X_5}) – (1/\mathbf{X_4}) = 1$. This may be treated as a single equation in two variables; moreover this equation has nothing to do with the value of $\mathbf{X_1}$ nor is there any information given in the statement that relates this information anyhow with $\mathbf{X_1}$.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Using the two results derived from the analysis of each statement we might be able to reach somewhere. Statement (1) gives us a tool to write any term of the sequence $\mathbf{X_N}$ in terms of $\mathbf{X_1}$ → $\mathbf{X_N} = (1/2^{(N-1)})*\mathbf{X_1}$.

Statement (2) gives a relationship between two of the terms of the sequence $\mathbf{X_4}$ & $\mathbf{X_5}$ → $(1/\mathbf{X_5}) – (1/\mathbf{X_4}) = 1$. It should be clear from the information that we have with us at this juncture that since $\mathbf{X_4}$ & $\mathbf{X_5}$ can be written in terms of $\mathbf{X_1}$ using the tool developed in Statement (1) analysis, we will get an equation in $\mathbf{X_1}$ *(single equation, single variable)* that can be solved for a *unique* value of $\mathbf{X_1}$. The solving is absolutely unnecessary; realizing the sufficiency of the information is the only necessity.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.131

Before we begin, a **Note** on how to find the **number** of factors of any positive integer *K*!

1. The integer *K* is first of all broken down to the product of distinct prime numbers raised to their respective powers. So Let $K = (m^A)*(n^B)*(p^C)$, where *m, n & p* are prime numbers that raised to their respective powers – A, B & C – are multiplied together to yield *K*.
2. Then the total number of factors (inclusive of 1 & *K*) of *K* will be (A + 1)*(B + 1)*(C + 1), where A, B & C are positive integers. *(hence, (A + 1), (B + 1) & (C + 1) will at least be equal to 2)*

Now returning to the original question, we're given that *K* has a total of 6 positive factors, including 1 and *K*. Now **6** to be written as product of the sort (A + 1)*(B + 1)*(C + 1) – where each of (A + 1), (B + 1) & (C + 1) are at least equal to 2 – can only be written in the following possible way: 6 = 2*3 = (1 + 1)*(2 + 1) and since given that *K* has exactly two positive prime factors, 3 and 7, the complete form of *K* can be written as:
Either $K = 3*7^2$ or $K = 7*3^2$. These are the only two possible values of the integer *K*. Any statement that helps us narrow down our search to one out of the two possibilities shall be deemed sufficient.

STATEMENT (1) alone: Statement says that 3^2 is a factor of K. Or K is completely divisible by 3^2. Out of the two choices for K possible – $K = 3*7^2$ or $K = 7*3^2$ – only $K = 7*3^2$ fits the criterion. Hence the statement helps us narrow down our search to one out of the two possibilities.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Statement says that 7^2 is NOT a factor of K. Or K is NOT completely divisible by 7^2. Out of the two choices for K possible – $K = 3*7^2$ or $K = 7*3^2$ – only $K = 7*3^2$ fits the criterion again. Hence this statement too helps us narrow down our search to one out of the two possibilities.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.132

Asking if the product of the slopes of lines ***l*** and ***k*** equal to –1 is equivalent to asking if the lines ***l*** and ***k*** are perpendicular to each other.

STATEMENT (1) alone: The exact fixed position of the line ***l*** is given on the X-Y plane, however, nothing is mentioned about the line ***k***. The data is far too less to accurately comment on the relationship between the two lines.
STATEMENT (1) alone - INSUFFICIENT

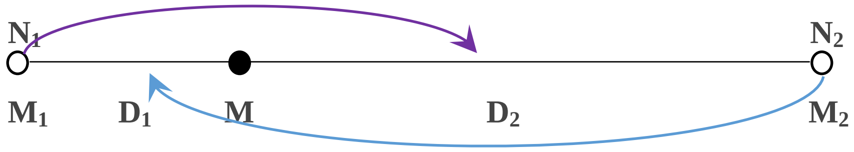
STATEMENT (2) alone: The exact fixed position of the line ***k*** is given on the X-Y plane, however, nothing is mentioned about the line ***l***. The data again is far too less to accurately comment on the relationship between the two lines.
STATEMENT (2) alone - INSUFFICIENT
STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together it is enough to know that since each statement gives away the exact fixed position of the lines, the statements together will provide an absolute fix on the position of each of the two lines in question. The slopes may then be individually calculated to check the answer to the question asked – the answer whatever it may be will definitely be a CONFIMRED answer. *Kindly don't waste your time trying to evaluate the product of both the slopes and then comment that a confirmed YES or a confirmed NO situation exists. The confirmation of an answer whatever it may be should be clear from the discussion in the beginning of the analysis of STATEMENT (1) & (2) together.*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.133

This is a perfect case scenario to view things via the *Combined mean* interpretation result:

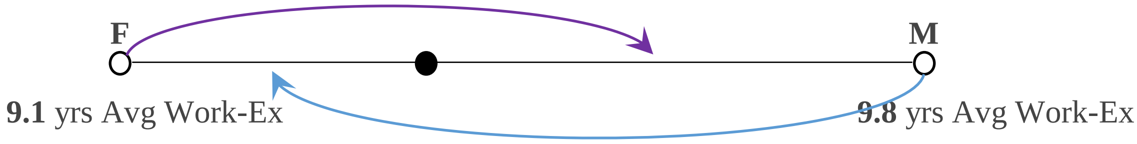
$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,
$\mathbf{N_1}$ = Sample size of SET 1
$\mathbf{N_2}$ = Sample size of SET 2
$\mathbf{M_1}$ = Mean of elements of SET 1
$\mathbf{M_2}$ = Mean of elements of SET 2
M = Combined Mean of the two SETS
$\mathbf{D_1}$ = $(\mathbf{M} – \mathbf{M_1})$ = Deviation distance of $\mathbf{M_1}$ from the combined Mean of the two SETS
$\mathbf{D_2}$ = $(\mathbf{M_2} – \mathbf{M})$ = Deviation distance of $\mathbf{M_2}$ from the combined Mean of the two SETS

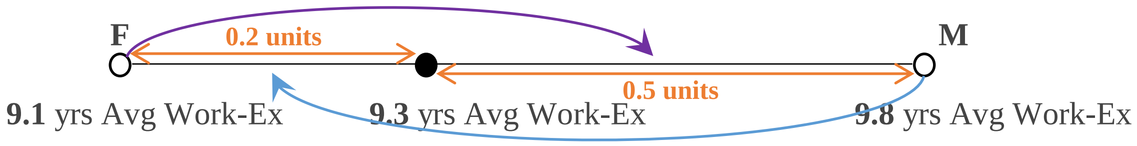
Now with this background info we can present the information given in the question stem as follows:
If **M** & **F** are the number of male and female employees at the company



We're asked the value of (**M/F**).

STATEMENT (1) alone: This statement only gives the absolute value of **M**. At most this information can help us to find the SUM total Work-Ex of all the male employees taken together, which is completely irrelevant. Since we know nothing of the combined group – something that links the property calculated for one group with the property calculated for the other – this statement does little to arrive at anything concrete regarding what is asked.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The information presented in this statement may be added to the diagram originally made for this question as:



As is clear from the above diagram, the ratio of the sample sizes of the two sets or of the number of the company's male employees (**M**) to the number of the company's female employees (**F**) may easily be calculated by taking the ratio of the two units mentioned in orange in the diagram or, (**M/F**) = (0.2/0.5) = (2/5). *Again going through all these calculations is absolutely a waste of time once the concept has been mastered. The whole key lies in how quickly one realizes the CONFIRMATION of an answer with the least amount of calculations on paper.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.134

Let the fee charged by the attorney be **F** & let the assessed value of the estate be **V**. We simply require the value of (**F/V**).

STATEMENT (1) alone: This statement says **V** = $1.2 million, however no mention of the fee charged renders this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says **F** = $2400, however no mention of the assessed value of the estate renders this statement insufficient too.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together – **V** = $1.2 million & **F** = $2400 – it is all we require to know the value of the ratio (**F/V**). *No calculations needed please!*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.135

Simplifying the intentionally complicated language of the question → all the question is trying to say is that during a one-day sale, the store sold each sweater of a certain type at a profit of $30. If *N* such sweaters were sold, then we're required to find the value of *N*. Also let SP & C denote the Sale Price and Cost of one of the sweaters.

STATEMENT (1) alone: This statement talks of the total revenue generated from the sale. We, however, do not know the value of the Sale Price at which the sweaters were sold. All we know is that the *profit* = SP – Cost was $30. We know the difference between the Sale price and the cost but not their individual values. The statement does little to arrive at anything concrete regarding what is asked.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically the statement translates into:
SP = (1 + (50/100))*Cost or SP = (3/2)*Cost; Now we're also given that SP – Cost = $30. Using these pieces of information we can calculate the Cost = $60 and SP = $90. But knowing the information about one sweater takes us nowhere close to estimating the number of sweaters sold. This is just information about one of the item sold. Again, the statement does little to arrive at what is asked.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together – we now know the SP = $90 for each sweater and we know the total revenue = $270. The two can be divided to yield what we need with a *unique* value.
STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.136

Going by the question stem we're given a two-digit integer **N** that falls in the following range → 20 < **N** < 100. We're asked if **N** is composite?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: One approach is to start considering the possible tens digits one by one with the hope that the process isn't too time consuming. For the tens digit **2** the possible values of **N** are – 22, 24, 26 & 28 – all composite, basically we're looking for a prime number that fits the model laid out by the question and this statement. This approach should work perfectly fine.

I'll, however, take on a more algebraically inclined approach. Let my two-digit integer **N** be represented as **N =** 10*X + Y. Where X & Y are digits such that X > 1 (**N** > 20). Now according to the statement X is a factor of Y or conversely Y is a multiple of X. Y can thus be written as Y = *K**X, where $K \geq 0$ is an integer. Thus **N** = 10*X + *K**X = (10 + *K*)*X. Since X an integer > 1, hence **N** can always be written as a product of two integers none of which are 1. A prime number P can only be written as P = P*1. Since none of the two integers being multiplied – (10 + *K*) & X – to make up the two digit integer **N** is 1, **N** has to be a composite number. A CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This little piece of information can easily be tackled using the YES/NO approach. The numbers 23 & 24 confirm the insufficiency of this statement.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.137

Given that x is an *integer*, we're asked if $(x^2 + 1)*(x + 5)$ is an even number?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: The statement mentions x to be an integer. Now in the product $(x^2 + 1)*(x + 5)$ if either one of $(x^2 + 1)$ or $(x + 5)$ is even, then the product would be even. For an odd integer x in this case both of $(x^2 + 1)$ & $(x + 5)$ turn out to be even. Hence the product is even. A CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Since the squaring of any integer never generates any new prime factors for the squared number, hence the statement implies that each prime factor of x is greater than 7. In other words 2 is not a factor of x → x is ODD. This the exact juncture from where we started off in statement (1) and by the same analysis → for an odd integer x both of $(x^2 + 1)$ & $(x + 5)$ turn out to be even. Hence the product is even. A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.138

The question stem tells us about a total of 884 seats, of which 500 are of one kind and the remaining 384 of the other. If $\mathbf{P_O}$ & $\mathbf{P_B}$ be the prices in dollars of the orchestra and balcony seats respectively, then the hidden mathematical information in the question can be written as 500* $\mathbf{P_O}$ + 384* $\mathbf{P_B}$ = $34,600.
We're required to find the theatre's total revenue from the sales for a particular night's performance.

<u>STATEMENT (1) alone</u>: This statement simply states $\mathbf{P_O}$ = 2*$\mathbf{P_B}$, clubbed with the information given in the question stem we can get the individual values of $\mathbf{P_O}$ & $\mathbf{P_B}$. *Not at all necessary to solve but for the sake of demonstration the values come out to be $\mathbf{P_O}$ = $50 & $\mathbf{P_B}$ = $25*. But since the statement mentions nothing about the seat occupancy on the particular night in question, this information is of limited use to arrive at the solution asked for in the question.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: Considering this statement alone says that the total revenue from the sales of the tickets on the particular night would come out to be {(4/5)*500* $\mathbf{P_O}$ + 384* $\mathbf{P_B}$} or {400* $\mathbf{P_O}$ + 384* $\mathbf{P_B}$}. But since no other information is given which may relate to a relationship between $\mathbf{P_O}$ & $\mathbf{P_B}$, the value of the expression {400* $\mathbf{P_O}$ + 384* $\mathbf{P_B}$} is near impossible to find as a *unique* value.
STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Together, by now, it is quite easy to see the that statement (1) provides the values of $\mathbf{P_O}$ & $\mathbf{P_B}$ *($\mathbf{P_O}$ = $50 & $\mathbf{P_B}$ = $25)* that when substituted in the expression {400* $\mathbf{P_O}$ + 384* $\mathbf{P_B}$} – which is an expression for revenue from the particular night in question – will yield a *unique* value for what is asked in the question stem.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.139

Before attempting the question it proves useful here to note an observation – the observation that the statements that follow talk in terms of average speed. It therefore will prove quite beneficial to convert the question stem into an average speed question. We do this as follows:
The question stem enquires on the status of the following inequality:
Is distance traversed > 6miles?
Using the distance = speedAVG*time formula, we can rephrase this same question as:
Was his speed < (6*5280)/(30*60) ft/s or
Was his speed(**S**) < 17.6 ft/s? – *Unfortunately the calculations here are required!*

<u>STATEMENT (1) alone</u>: The statement put in the form of an inequality says: **S** > 16 ft/s. However, this statement gives a YES/NO answer to the question asked → Was his **S** < 17.6 ft/s? *(S = 16.6 ft/s → **YES**, S = 19 ft/s → **NO**)*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement put in the form of an inequality says: **S** < 18 ft/s. However, this statement too like the previous one gives a YES/NO answer to the question asked → Was his **S** < 17.6 ft/s? *(S = 15 ft/s* → ***YES***, *S = 17.9 ft/s* → ***NO*** *)*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the two statements give us a sort of a bound range for **S** → 16 ft/s < **S** < 18 ft/s, However this too is insufficient information in conclusively answering the question → was his **S** < 17.6 ft/s? *(S = 16.5 ft/s* → ***YES***, *S = 17.9 ft/s* → ***NO*** *)*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.140

Let the total number of pets at the shop be **X**.
Number of Dogs = (**X**/3)
Number of Birds = (**X**/5)
Indirectly we're required to find the *unique* value of **X** in order to answer the question.

STATEMENT (1) alone: The statement says **X**/5 = 30 or **X** = 150, and hence the number of dogs come out to be = 50.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says **X**/3 – **X**/5 = 20 or **X** = 150, and hence the number of dogs come out to be = 50. *Calculations again for demonstration purposes only!*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.141

In a way in this question we're given that the total size of the order is 1000**N*. We're asked the value of *N*.

STATEMENT (1) alone: Reading this statement alone, we get the sort of feeling that this piece of information alone constitutes a fragment to the entire calculation process. This piece simply says that the manufacturer produced 5*600 = 3000 (thus incurring a deficit of 5000 – 3000 = 2000 tools thus far) tools during the first 5 days because of some production problems. However, there is still no indication in this piece of information about the number of days it took to compensate for this deficit *(if at all he did compensate)* and the number of days the production was as required or the total number of tools he was required to produce. Therefore, even an estimate on the value of *N* based on the information given seems improbable.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Reading this statement alone, we again get the sort of feeling that this is but a piece of the larger puzzle that constitutes the entire calculation process. This piece simply says that the manufacturer produced 4*1500 = 6000 (a surplus of 6000 – 4000 = 2000 tools) tools during the last 4 days to compensate for some production problems he had had earlier. However, there is still no indication in this piece of information about the number of days it took to cause this deficit and the number of days the production was as required or the total number of tools he was required to produce. Therefore, again even an estimate on the value of *N* based on the information given seems improbable.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Careful while piecing the two bits of information together as it may seem that we've got all the information we need to solve the case. However, even together the information in Statement (1) says that the manufacturer incurred a deficit of 2000 tools during the first 4 days and the information in Statement (2) says that he compensated for a loss of 2000 tools, a loss that he had incurred some time earlier. Thus, all the two statements together say is that going just by these statements alone, thus far there is neither a net loss nor a net gain in the number of tools. However, the information mentions about the production behaviour for 9 (4 initial + 5 final) days. There may be countless other days during which the production might have remained as expected or another pair of such gain and loss. Even the total number that the manufacturer was ordered to make can't be inferred from the information given.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.142

Given a *positive* integer ***x***, we're asked the LCM of ***x***, 6 & 9.
The LCM of 6 & 9 is 18. Thus we're required to find the LCM of ***x*** & 18 in a way.
Generally making all cases/figuring out all possible values helps to get a fix on what is asked in the question.

STATEMENT (1) alone: The statement gives us the LCM of ***x*** & 6 as 30. We'll begin by splitting up 30 to see what it's composed of: 30 = 2 x 3 x 5 and 6 = 2 x 3. Now given the LCM of ***x*** & 6 to be 30, ***x*** must be a factor of 30 such that ***x*** is neither a factor nor a multiple of 6 (except the multiple 30 of course). *(If x is a factor of 6 as well, then the LCM of x & 6 would be 6, consequently if x is a multiple of 6 as well, then the LCM of x & 6 would be x)*
Hence the values that ***x*** can take on are {5, 10, 15 & 30}. For clarity sake we'll write these values out as:
5 = 5
10 = 2 x 5
15 = 3 x 5
30 = 2 x 3 x 5
& 18 can similarly be written as 2 x 3 x 3. Now *LCM means taking the common occurrence only **once***. Each value in blue when put against 18 = 2 x 3 x 3 in order to calculate the LCM will all yield the same LCM = 2 x 3 x 3 x 5 = 90. Thus whatever be the value of ***x***, the value of the LCM will always remain *unique* = 90.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement gives us the LCM of ***x*** & 9 as 45. We'll begin by splitting up 45 to see what it's composed of: 45 = 3 x 3 x 5 and 9 = 3 x 3. Now given the LCM of ***x*** & 9 to be 45, ***x*** must be a factor of 45 such that ***x*** is neither a factor nor a multiple of 9 (except the multiple 45 of course). *(If x is a factor of 9 as well, then the LCM of x & 9 would be 9, consequently if x is a multiple of 9 as well, then the LCM of x & 9 would be x)* Hence the values that ***x*** can take on are {5, 15 & 45}. For clarity sake we'll write these values out as:

5 = 5
15 = 3 x 5
45 = 3 x 3 x 5

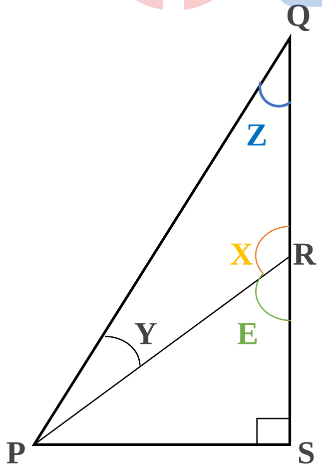
& 18 can similarly be written as 2 x 3 x 3. Now *LCM means taking the common occurrence only* ***once***. Each value in blue when put against 18 = 2 x 3 x 3 in order to calculate the LCM will all yield the same LCM = 2 x 3 x 3 x 5 = 90. Thus whatever be the value of ***x***, the value of the LCM will always remain *unique* = 90.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.143

Let us re-make the figure and label the angles concerned in the question according to our convenience.



In the figure above we're suppose to find the value of (**E** – **Z**).

STATEMENT (1) alone: The statement gives out the value of **Y** = 30°. If we apply the exterior angle theorem to the Δ PQR, we'll arrive at **E = Y + Z** or **E – Z = Y** = 30°. Hence in a way we are given the value of whatever is asked in the question stem directly.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement gives out the value of **X + Z** = 150°. Since the SUM of the measures of all the angles of a Δ is 180°, **Y** comes out to be 30°. We arrive at the exact

same juncture from where we began in statement (1) analysis. Again applying the exterior angle theorem to the Δ PQR, we'll arrive at **E = Y + Z** or **E – Z = Y** = 30^o.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.144

This is a classic example of how avoiding actual lengthy calculations can help save a considerable amount of seconds at times.

To begin with we're given the description of calculating the compound interest accrued to an account followed by the mathematical formula (for $1000 deposited).

$$\mathbf{I} = 1000 * [\left(1 + \frac{r}{100}\right)^n - 1]$$

I is the interest accrued in dollars and *r* is % rate interest. We're asked if *r* > 8%?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: Note very carefully that the exact value of the Interest for *n* = 2 years is given in the statement! **Should we proceed to plug in all the given values in this statement into the formula given in the question stem to see whether *r* > 8% or not?** **ABSOLUTELY NOT!** *Please try and keep in mind what we are always after in DS question.* ***The question is not about knowing whether the exact value of r% is greater than 8 or not*** *BUT about knowing whether the information given in the statement is SUFFICIENT enough to positively/accurately answer the question r > 8%. We could care less about the actual value of r% and instead try and concentrate on whether knowing the value* ***I*** *and the value of n is sufficient to DEFINITIVELY answer the question raised by the examiner.*

Bearing this in mind we can say that the information given in this statement (**I** = $210 & *n* = 2) will lead us to a fixed value of *r* or a *unique* value of *r*. That value will then give us a CONFIRMED answer.
STATEMENT (1) alone – SUFFICIENT

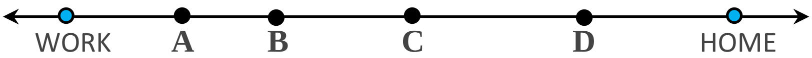
STATEMENT (2) alone: This simply gives us an inequality in *r*. One trick to going about this statement is to substitute the value of *r* = 8% in the expression $\left(1 + \frac{r}{100}\right)^2$ and see where it leads us. In other words we'll try and estimate the value of $\left(1 + \frac{8}{100}\right)^2 = (1.08)^2$ *(use the $(a + b)^2 = a^2 + b^2 + 2*a*b$ to calculate $(1.08)^2$)* = 1.1664. Hence in order for *r* to be greater than 8% $\left(1 + \frac{r}{100}\right)^2$ must be > 1.16 *(since greater the r greater the value of the expression* $\left(1 + \frac{r}{100}\right)^2$*)*. Thus the question stem is now translated into → Is $\left(1 + \frac{r}{100}\right)^2 > 1.16$?

However the statement says that $\left(1 + \frac{r}{100}\right)^2 > 1.15$ → meaning the expression can take values 1.155 (giving a **NO** answer) or 1.19 (giving a **YES** answer). This gives a YES/NO mixed answer to the modified/reduced question stem enquiry –
Is $\left(1 + \frac{r}{100}\right)^2 > 1.16$?
STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.145

A YES/NO targeted approach by making cases should work well here.
We'll approach this using the help of the diagram below!
Let's say the situation looks somewhat like:



Let A, B, C,…so on be the toll booths. Then we're asked if the distance between any two consecutive black dots is less than 10 miles?

<u>STATEMENT (1) alone</u>: This statement just mentions the **distance = 25 miles** between the *first* and the *last* **black dot**. No mention of how many dots lie in between impedes us from answering the question YES or NO confidently.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: On the contrary this statement just mentions the **number of black dots = 4**. No mention of the distance these 4 dots span over the straight line again impedes us from answering the question YES or NO confidently.
STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Together the 2 statements mention both the **distance = 25 miles** between the first and the last black dot – Statement (1) & the **number of black dots = 4** – Statement (1). If we wish to maximize each distance between 2 successive dots such that none is less than 10, then the only way of doing so is to space out the dots equidistant to each other. So that the distance between any two successive dots is (24/3) = 8 miles which is less than 10. Hence at least one pair of tollbooths exist such that the distance between them is less than 10 miles – CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.146

This question is all about getting a fix on what the symbol Δ represents! The symbol is said to represent either the *addition* or the *multiplication* operation.
The best and the easiest way to go about this question is to test out both operations and see if the information allows us to narrow it down to just one single choice.
Let LHS & RHS stand for *Left Hand Side* & *Right Hand Side* respectively.
An identity is said to be true for all numbers if LHS = RHS of the identity/relationship for all numbers on the number line.

<u>STATEMENT (1) alone</u>: Since the identity for addition – $a + b = b + a$ – also holds for multiplication – $a*b = b*a$ – for all numbers a & b, the symbol Δ can represent either of the two operations. NO FIX.

STATEMENT (1) alone - INSUFFICIENT

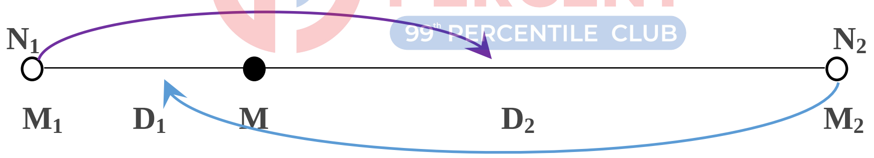
STATEMENT (2) alone: We'll test out the given relationship for both the operations individually one by one:
ADDITION: LHS = $\boldsymbol{a} + (\boldsymbol{b} - \boldsymbol{c}) = \boldsymbol{a} + \boldsymbol{b} - \boldsymbol{c}$ & RHS = $(\boldsymbol{a} + \boldsymbol{b}) - (\boldsymbol{a} + \boldsymbol{c}) = \boldsymbol{b} - \boldsymbol{c}$, clearly LHS ≠ RHS which is why we can rule out one of the two possibilities. *One need not go any further since there were only 2 possibilities to begin with and having eliminated one of them, the other one has to be true. Or in other words we get a fix on one of the two operations that the symbol ∆ represents.* Only for demonstration purposes we'll try out the other one too!
MULTIPLICATION: LHS = $\boldsymbol{a} * (\boldsymbol{b} - \boldsymbol{c}) = \boldsymbol{a*b} - \boldsymbol{a*c}$ & RHS = $(\boldsymbol{a*b}) - (\boldsymbol{a*c}) = \boldsymbol{a*b} - \boldsymbol{a*c}$, clearly LHS = RHS and we get a fix on MULTIPLICATION operation.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.147

This is a perfect case scenario to view things via the *Combined mean* interpretation result:

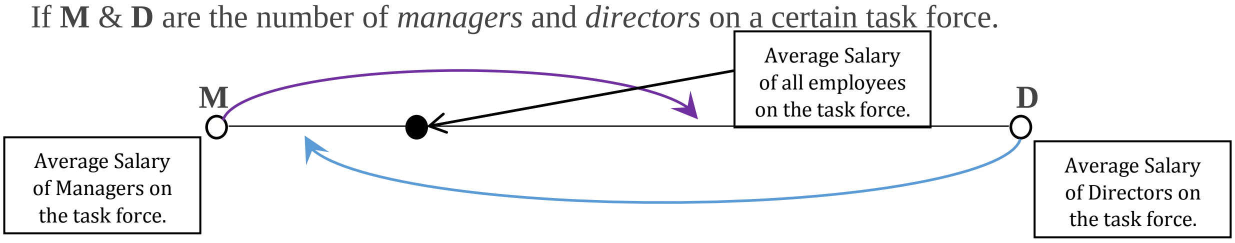
$$\frac{\boldsymbol{N1}}{\boldsymbol{N2}} = \frac{\boldsymbol{M2 - M}}{\boldsymbol{M - M1}} = \frac{\boldsymbol{D2}}{\boldsymbol{D1}}$$

Diagrammatically, this may be represented as follows:



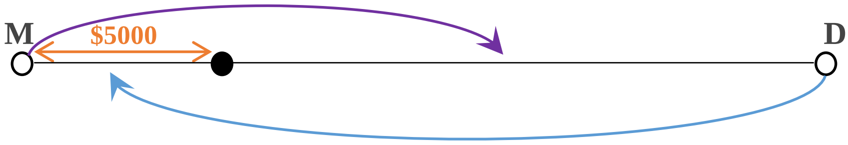
Where,
N_1 = Sample size of SET 1 – *Managers*
N_2 = Sample size of SET 2 – *Directors*
M_1 = Mean of elements of SET 1 – *Mean Salary of the Managers*
M_2 = Mean of elements of SET 2 – *Mean Salary of the Directors*
M = Combined Mean of the two SETS – *of the entire task force*
D_1 = (**$M - M_1$**) = Deviation distance of **M_1** from the combined Mean of the two SETS
D_2 = (**$M_2 - M$**) = Deviation distance of **M_2** from the combined Mean of the two SETS

Now with this background info we can present the information given in the question stem as follows:
If **M** & **D** are the number of *managers* and *directors* on a certain task force.



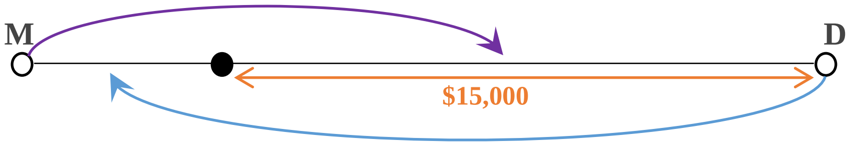
We're asked the value of (**D**/(**M** + **D**)) or of (**D**/**M**).

STATEMENT (1) alone: The information presented in this statement may be added to the diagram originally made for this question as:



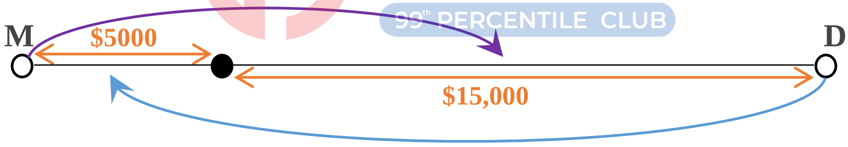
However, as is evident from the diagram above, this is just one piece of the puzzle required to form a complete picture of the entire task force. The statement alone is insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The information presented in this statement may be added to the diagram originally made for this question as:



However, as is evident from the diagram above, this is just one piece of the puzzle required to form a complete picture of the entire task force. The statement alone is insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The information presented in both statements considered together may be added to the diagram originally made for this question as:



The Diagram above now forms a complete picture that allows us to infer accurately what the ratio of the number of *managers* to the number of *directors* on the task force might be. In fact taking the ratio of the two distances we can find the value of (**D/M**) = (1/3) or that there are 25% directors on the task force.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.148

For a point say – (X_1, Y_1) to lie on a line say – A*X + B*Y + C = 0, where A, B & C are constants, the point (X_1, Y_1) has to satisfy the equation of the line and hence the following must be true → A*X_1 + B*Y_1 + C = 0.

Similarly, if the point (*r*, *s*) is to lie on the line Y = 3*X + 2, then (3**r* + 2 – *s*) must be = 0.

STATEMENT (1) alone: The statement says: (3**r* + 2 – *s*)*(4**r* + 9 – *s*) = 0, This equation implies that either the expression (3**r* + 2 – *s*) = 0 or the expression (4**r* + 9 – *s*) = 0, in order that their product comes out to be 0. However, since we're unsure of which of the two exactly

is = 0, this piece of information lacks the justification for a confirmed answer to the question asked.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says: $(4*r-6-s)*(3*r+2-s)=0$, This equation implies that either the expression $(3*r+2-s)=0$ or the expression $(4*r-6-s)=0$, in order that their product comes out to be 0. However, since we're again unsure of which of the two exactly is = 0, this piece of information lacks the justification for a confirmed answer to the question asked.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The two statements combined together requires that we take with us only the common portion → the portion that conforms to or obeys both the conditions laid out by each of the two statements. This means we wish to choose the one expression that makes both the products in the two statements = 0. That expression turns out to be $(3*r+2-s)$. Hence together the conditions stipulate that $(3*r+2-s)=0$ or in other words that (r, s) point lies on the line Y = 3*X + 2 – CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.149

We're given 4 positive numbers m, r, x & y, and we're asked if $(m/r)=(x/y)$?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: We're given that $(m/y)=(x/r)$ and the ratios that are asked for in the question stem do not derive from the information given – i.e. $(m/y)=(x/r)$ – by means of any mathematical operation. The ratios that are asked for in the question stem are formed by simply swapping the denominators of (m/y) & (x/r) with each other. A **YES** is easy to see – simply assume all the numbers m, r, x & y equal to 1. For a **NO** answer simply assume $(m/y)=(2/4)$ & $(x/r)=(3/6)$ i.e. $m=2$, $r=6$, $x=3$ & $y=4$. Now $(m/y)=(x/r)=(2/4)=(3/6)=0.5$. However, $(m/r)=(2/3)\sim 0.67$ & $(x/y)=(3/4)=0.75$. Hence, $(m/r)\neq(x/y)$.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given that $(m+x)/(r+y)=(x/y)$. There is a property for ratios that says that if (A/B) = (C/D) then both the ratios are also equal to the ratios (A + C)/(B + D) & (A – C)/(B – D). Or (A/B) = (C/D) = (A + C)/(B + D) = (A – C)/(B – D). We'll apply the above property to the info in the statement → If $(m+x)/(r+y)=(x/y)$ then it is also $=((m+x)-x)/((r+y)-y)=(m/r)$, Hence, a CONFIRMED YES.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.150

We're given A, B, K & M as *positive* integers, and asked if A^K is a factor of B^M?
A YES/NO targeted approach by trying different values should work well here.

STATEMENT (1) alone: We're given that A is a factor of B. Making a **YES** case is simple – simply assume K = M = 1, then if A is a factor of B, A^K also becomes a factor of B^M as it is the same thing. Now let's pick out some simple values – A = 2, B = 4 *(2 is a factor of 4)*, K = 5 & M = 1. Now we ask ourselves – Is A^K a factor of B^M? Or, Is 2^5 a factor of 4^1? Or, Is 32 a factor of 4? We get a **NO** answer.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says that the integer K is ≤ M. Given this statement alone which mentions nothing about the bases to which the powers are raised, it is too little to substantiate anything concrete about the relationship asked in the question. A & B can take on a range of value yielding a YES/NO answer.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two pieces of information together, we'll proceed with a more algebraically inclined approach → If A is a factor of B, this implies that A completely divides B or that B is a multiple of A. Thus B may be written as: B = q*A, where q is a *positive* integer *(A & B are given positive integers)*. Raising both sides of B = q*A to the power M, we get $B^M = (q^M)*(A^M) = j*A^M$, where j is an integer. In other words A^M is a factor of B^M. Then for any number K such that K ≤ M, A^K will also be a factor of B^M definitely.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

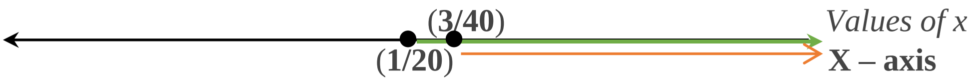
Q.151

This is quite a simple number line range question which can be best tackled by presenting the entire picture on the number line. Once any sort of FIX can be obtained on the range of the variable ***x***, the information is deemed sufficient.
In other words all this question deals with is *accurately* tracking the range of the variable ***x***.

The question asks if ***x*** > 0.05? Or if ***x*** > (1/20)?
Diagrammatically,

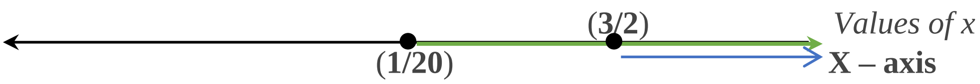
Does ***x*** lie in the GREEN region?

STATEMENT (1) alone: The statement diagrammatically says:



The range of values exhibited by ***x*** is depicted using the ORANGE region which surely lies in the GREEN region.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement diagrammatically says: *(3% of 50 = (3/100)*50 = 3/2)*



The range of values exhibited by ***x*** is depicted using the BLUE region which surely lies in the GREEN region.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.152

A YES/NO targeted approach by simple interpretation can prove to be beneficial here.
We're given the product of three numbers ***x*y*z*** > 0 & asked if ***x is positive?***

STATEMENT (1) alone: This statement adds to the original stem saying ***x*y*** is also > 0. Using this in conjunction with ***x*y*z*** > 0, we can surely say that ***z*** > 0. *(Our surety is only of the variable **z** and **z** alone)*. ***x*** in this scenario can either be positive *(given that **y** is also positive)* or ***x*** can also be negative *(given that **y** is also negative)*. In other words the statement only stipulates that ***x*** & ***y*** be of the same sign. Surely a YES/NO answer.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement adds to the original stem saying ***x*z*** is also > 0. Using this in conjunction with ***x*y*z*** > 0, we can surely say that ***y*** > 0. *(Our surety is only of the variable **y** and **y** alone)*. ***x*** in this scenario can either be positive *(given that **z** is also positive)* or ***x*** can also be negative *(given that **z** is also negative)*. In other words the statement only stipulates that ***x*** & ***z*** be of the same sign. Surely a YES/NO answer.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The ***first*** statement (***x*y*** > 0) can be interpreted as saying – ***x*** & ***y*** be of the *same* sign and the ***second*** statement (***x*z*** > 0) can be interpreted as saying – ***x*** & ***z*** be of the *same* sign. Thus together these two statements say that:
Either CASE I: ***x, y*** & ***z*** are all *positive* **Or,** CASE II: ***x, y*** & ***z*** are all *negative*.
However, the condition in the original question stem ***x*y*z*** > 0 negates CASE II leaving us with CASE I alone – saying that ***x*** is POSITIVE → a CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.153

Let the lengths of the two pieces be x & y inches respectively, with $x > y$, we're asked the value of x.

STATEMENT (1) alone: The statement mathematically put says: $x - y = 20$ inches. But this is hardly of any help in concluding the absolute value of x. *(Single equation in one variable)*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says: $x = 3*y$. But again this alone is hardly of any help in concluding the absolute value of x. *(Single equation in one variable)*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together, $x - y = 20$ – statement (1) & $x = 3*y$ – statement (2). This is a system of two equations in two variables which can be appropriately solved to give $x = 30$ inches & $y = 10$ inches – A *unique* definitive answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.154

We're given X + Y = 77, where X & Y are *POSITIVE INTEGERS*. We're required to calculate the value of X*Y.
An algebraic approach (using certain identities) seems best to tackle this question as we'll see later on in the question.

STATEMENT (1) alone: We're given an additional equation X – Y = 1 (or X & Y are consecutive). Using this in conjunction with X + Y = 77 we get a system of two equations in two variables and it is **enough** to know that this system can be solved to get the individual/*unique* values of X, Y and thus of X*Y. We may now label this statement as being sufficient.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that X & Y have the same tens digit. Now we can make cases see what all fits both the above definition and the equation X + Y = 77.

However, I'll try and approach this part algebraically as well. We'll assume the positive integer X as X = 10*a + b and Y as Y = 10*a + c, where a, b & c are all digits between 0 & 9 inclusive. Then, X + Y = 77 may be written as (10*a + b) + (10*a + c) = 77. Or 20*a + (b + c) = 77.

b & c are both digits between 0 & 9 inclusive, i.e. $0 \le b \le 9$ & $0 \le c \le 9$, or $0 \le (b + c) \le 18$. Now we'll try out different options for a. We will see that only one such option exists, which is a = 3. Thus (b + c) = 17. Remember here that b & c are digits that can take on integer values between 0 & 9 inclusive. A little analysis will reveal that b & c can

only be 9 & 8 or 8 & 9 respectively. Hence either X = 38 & Y = 39 or vice versa, but either way the product X*Y will come out to be the same – a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.155

The question stem here talks in terms of time *(in hours)* and if we take a look at the statements, they each talk in terms of average rate or speed. It might prove beneficial here to convert the question stem into one that talks in terms of speed rather than time.

Did it take Pei more than 2 hours to walk a distance of 10 miles along a certain trail? – can be translated in terms of speed as → Was the average speed of Pei **less** than ((10*1.6)/2) Km/hr? Or Was the average speed of Pei **less** than 8 Km/hr?

STATEMENT (1) alone: This statement says the average speed of Pei was less than 6.4 Km/hr. You may use the number line approach to see that if avgSPEED < 6.4 Km/hr, then it is definitely less than 8 Km/hr. – CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement requires a little mathematical re-iteration. The statement says that – time taken to travel 1 Km > 9 minutes or > (9/60) hours. Therefore his avgSPEED < (60/9) Km/hr *(lesser the speed the more time it takes him)*. Or the statement says that avgSPEED < (20/3) Km/hr < 6– Km/hr which is definitely less than 8 Km/hr. – CONFIRMED YES again.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).
Top 1% expert replies to student queries (can skip) (Link)

Q.156

Let *H* denote the number of one-half gallon cartons of milk and *Q* denote the number of one-quarter gallon cartons of milk sold yesterday.
Then the question says $H + Q = 300$.
We in turn are required to find the value of the expression $((1/2)*H + (1/4)*Q)$ gallons.

STATEMENT (1) alone: We're directly given the value $Q = 120$. Using the complementary information in the question stem $H = 180$, once the individual values of *H* & *Q* are known the *unique* value of the expression can be found.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement directly gives out the value of $(1/2)*H = 90$ or that $H = 180$. Using the complementary information in the question stem $Q = 120$, once the individual values of *H* & *Q* are known the *unique* value of the expression can be found.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.157

N is given to be a *POSITIVE INTEGER*. We're required to find the **remainder** when (4 + 7*N) is divided by 3. Now the **remainder** can have 3 possible values → 0, 1 & 2. Any statement that gives a fix on any one single value does the job for us. I'll be more algebraically inclined in my approach but doing the question by trying out values should work as well – could however be a bit more time consuming.

STATEMENT (1) alone: We're given that $N + 1$ is divisible by three. We'll therefore try to form an $N + 1$ in the original expression in the question stem; (4 + 7*N) may be written as 4 + 7*N + 3 – 3 = 7*(N + 1) – 3. Since N + 1 is divisible by three, therefore 7*(N + 1) is divisible by three or therefore, 7*(N + 1) – 3 is divisible by three, or the **remainder** = 0 – *unique* value.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement simply gives out a range of the values N, $N > 20$. This can be easily and quickly discarded as insufficient by taking a few easily sought answers *(N = 1 gives **remainder** 2 and N = 2 gives **remainder** 0).*

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.158

If **R**, **B** & **W** be the number of Red, Blue & White balls in a certain box, then the question stem says that **R + B + W =** 25. For a specific ball with a number N ($1 \leq N \leq 10$) painted on it, we'll represent the ball using the following denotation: $\mathbf{R}_N$, $\mathbf{B}_N$ or $\mathbf{W}_N$. We're asked the PROBABILITY (**Either** white **or** even number print)?

One formula that comes to mind glancing at the statements is

P (**Either** A **or** B) = P (A) + P(B) + P(**Both** A **&** B)

STATEMENT (1) alone: This statement says:

PROBABILITY (**Both** white **&** even number print) = 0. However, even with this piece of information we still need to know the individual probabilities → P (white) & P (even number print) so that we can add them up to get the required probability. Since neither the individual probabilities mentioned above nor any other sort of information *(number of each of coloured balls etc)* is mentioned, this statement alone does little to get a fix on the actual value asked.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically this statement says:

P (white) – P (even number print) = 0.2. This to begin with is not even the piece of the puzzle required to complete the entire picture of the question stem. The piece of the puzzle more directly connected to what we're looking for is 'P (white) + P (even number print)', so that we may apply the formula P (**Either** A **or** B) = P (A) + P(B) + P(**Both** A **&** B). This statement alone is far from getting a fix on the actual value asked.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Now together, this is all the information we've got:

P (**Both** white **&** even number print) = 0 & P (white) – P (even number print) = 0.2. Again the relevant piece of the puzzle would have been P (white) + P (even number print), which given 'P (white) – P (even number print) = 0.2', can have any value. Hence even together the two statements fail to provide a fix on the value asked in the Question.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.159

We're given a *POSITIVE integer* N and asked the value of the **remainder** when the expression (N – 1)*(N + 1) is divided by 24.

Let's just break open 24 in terms of the primes that multiply to form the number 24. We may write 24 as 24 = 2 x 2 x 2 x 3 or = 2^3 x 3

Before we proceed any further it proves beneficial to note that (N – 1) & (N + 1) form the immediately preceding and immediately succeeding integers in relation to the integer N. Or, in other words (N – 1), N & (N + 1) form three consecutive integers. ← *This piece of information how much ever trivial it may seem is sometimes missed out on. This piece forms a crucial part of the solution framework for this question.*

I'll be following a more theoretical approach with the aim of explaining the crux of attacking divisibility question, but a plug in simple values approach to generate a YES/NO situation should also work just fine here.

STATEMENT (1) alone: This statement simply says that N is odd. We'll represent N as N = (2**k* + 1), where *k* is a non–negative integer {0, 1, 2,…so on} → *this is the usual representation of an odd number*. Now (N – 1) is then = 2**k* & (N + 1) is then = 2**k* + 2 = 2*(*k* + 1). The expression (N – 1)*(N + 1) may now be written as
(N – 1)*(N + 1) = 2**k**2*(*k* + 1) = 2^2*{*k**(*k* + 1)}.

We'll keep this aside for a while and take the expression *k**(*k + 1*) up for a little further analysis. Note that this expression is nothing but the product of **two** *non-negative integers*. (*as k in the expression 2*(k + 1) has values = {0, 1, 2,…so on}*) Since the product of any two consecutive integers is always even, *(one of them will be even and the other odd)* the expression *k**(*k + 1*) will always be divisible by 2.

Now let's go back to the original expression 2^2*{*k**(*k + 1*)} and count the number of 2s in this product. We've got a 2^2 outside and then we've got the even expression *k**(*k + 1*) that is at least divisible by 2. Or, the expression 2^2*{*k**(*k + 1*)} is at least divisible by a product of three 2s or by 2^3 which is 8.

Summarizing the expression (N – 1)*(N + 1) given N is odd is definitely divisible by 8.

However, the expression's divisibility by 3 *(as 24 = 8* x *3)* is uncertain as we're not given whether N is divisible by 3. → If N is divisible by three then the expression (N – 1)*(N + 1) is a product of numbers that immediately precede and immediately succeed a multiple of three – namely N and hence is not divisible by three giving **NO** answer. However, If N is not a multiple of 3 say 31 for instance, then the expression (N – 1)*(N + 1) becomes = 30*32 – which is divisible by three and hence yields a **YES** answer. This creates a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Before beginning with our analysis it may prove beneficial to note that the expression (N – 1)*(N + 1) forms but a part of the slightly larger expression

(N – 1)*N*(N + 1) – which is a multiple of three consecutive integers. Now given that the product of three consecutive integers is always divisible by, the expression (N – 1)*N*(N + 1) will thus be divisible by 3 for any value of N as **one** of the numbers out of (N – 1), N & (N + 1) will always definitely be a multiple of three. However, the moment we take out N from the larger expression (N – 1)*N*(N + 1) to be left with (N – 1)*(N + 1) alone, the whole scenario about divisibility by 3 boils down to specifically tracking exactly which of the three numbers (N – 1), N & (N + 1) is the multiple of three.

Moving on, the statement says that N is not a multiple of three, thereby stipulating that the multiple of three has to come from either of the two numbers (N – 1) or (N + 1). Thus, in other words the expression (N – 1)*(N + 1) DOES contain a multiple of 3 or is definitely divisible by 3.

However, the statement says nothing about whether N is odd or even. If N is even for instance, then (N – 1) & (N + 1), forming the immediately preceding and immediately succeeding integers in relation to the integer N, are both odd giving us a **NO** answer. But if N is odd, then as shown in the analyses of statement (1) the expression (N – 1)*(N + 1) will be divisible by 8 and thus by 24 giving us a **YES** answer. This again creates a YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together →
Statement (1) says: the expression (N – 1)*(N + 1) given N is odd is definitely divisible by 8.
Statement (2) says: the expression (N – 1)*(N + 1) DOES contain a multiple of 3 or is definitely divisible by 3.
Hence in conjunction the two say that the expression (N – 1)*(N + 1) is definitely divisible by both 8 as well as 3. Or, in other words the expression is definitely divisible by 24.
A CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.160

Let C_M, C_N, P_M & P_N be the number of computers ordered by company M, the number of computers ordered by company N, the number of printers ordered by company M & the number of printers ordered by company N respectively. We're given:
$C_M + P_M = 50$ & $C_N + P_N = 60$. We're asked the value of C_M.

STATEMENT (1) alone: This statement simply says that $C_M = C_N$. However, this alone even in conjunction with the information shared in the question stem is not even close to furnishing a *unique/definitive* value of C_M. In other words there can be multiple values of the asked quantity. *($C_M = C_N = 20$ say or $C_M = C_N = 30$ say)*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically says that $P_N – P_M = 10$. However, again this alone even in conjunction with the information shared in the question stem is not even close to furnishing a *unique/definitive* value of C_M. In other words there can be multiple values of the asked quantity. *($P_M = 5, P_N = 15$ say or $P_M = 10, P_N = 20$ say will both yield different values of C_M)*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together we get two statements $C_M = C_N$ – by statement (1) and $P_N – P_M = 10$ – by statement (2) in addition to the already mentioned $C_M + P_M = 50$ & $C_N + P_N = 60$.

NOW this at first seems like a system for 4 distinct equations in 4 variables that can be solved to furnish *unique* values of each of the 4 variables.

However, we must before marking our option *(that we think here is right i.e. option C)* make sure that the 4 equations that we have at our disposal are indeed distinct. *(Two equations are said to be distinct when one cannot be derived from the other by simple mathematical operations. For instance y = 2*x and x = (y/2) are not two distinct equations. They're both basically saying the same thing and one can easily be derived from the other. Y = 2*x & x + y = 30 are two distinct equations)*

Coming back to the question analysis now, if we subtract $C_M + P_M = 50$ from $C_N + P_N = 60$ we get $(C_N – C_M) + (P_N – P_M) = 60 – 50 = 10$. Now using the info $C_M = C_N$ – by statement (1) and substituting back in $(C_N – C_M) + (P_N – P_M) = 10$ we get $(P_N – P_M) = 10$. We have thus derived what statement (2) says using the equations in the question stem and statement (1). Thus statement (2) does not offer any new information → It offers information that can already be derived using the statements in the question stem and in Statement (1).

The 4 equations are hence not a system of 4 unique equations → such that each of the 4 equations has something new to bring to the table. So in a nut shell the seemingly 4 equations in 4 variables are actually just 3 distinct equations in 4 variables. There are multiple solutions possible to such a system. *($C_M = C_N = 20$ say or $C_M = C_N = 30$ say will both work here as solutions, conforming to all 4 conditions laid out by the question stem and the 2 statements).*

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.161

In median questions it is always a good idea to first arrange the known values/elements of the SET in ascending order. So we'll write it out as shown below with the unknown(s) kind of hovering above the known values:

X

2 7 11 16

We're given that the *Mean* of the 5 numbers must be equal to the *Median*. We're then asked for a *unique* value of **X**. The *Mean* so far can be written as

Mean = (2 + 7 + 11 + 16 + **X**)/5 = (36 + **X**)/5. Also Note that since the SET given contains an odd number (= 5) of elements, the *Median* of the SET has to be a value physically present in the SET.

STATEMENT (1) alone: The statement confines the value of **X** between 7 & 11 (neither inclusive). Since *Mean* = *Median*, and since **X** lies in between 7 & 11 (neither inclusive) → the *Median* must be **X**. Mathematically, this means that *Mean* = (36 + **X**)/5 = **X** = *Median*. This gives a *unique* value of **X** = 9.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This states the derived result in statement (1) analysis rather more directly. As was seen in the previous statement analysis all we need to do now is equate *Mean* & *Median* mathematically to obtain a *unique* value of **X** = 9.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.162

Although the language in the question stem and the statements that follow is typical of applying the combined *Mean* interpretation results, I feel a more direct mathematical approach here might prove quicker.

Let's simply assume **M** and **F** be the number of graduating males and females respectively at a certain college this year. So the total number of graduating students this year = (**M** + **F**)
We're required to find **M**/(**M** + **F**) or simply (**M**/**F**) ratio.

STATEMENT (1) alone: The statement takes us in an altogether different direction. It says that – Of this year's graduating students, the number of students transferred from another college = (33/100)*__M__ + (20/100)*__F__. That is it! Obviously alone this is miles away from estimating the ratio (**M**/**F**) accurately, since we don't have the actual value of the number of students that transferred in this statement info.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says that (25/100)*(**M** + **F**) graduating students in all this year transferred from another college. Again this alone has no bearing on what the ratio (**M**/**F**) could be. This is just providing us with a total figure of what is being discussed in the question stem.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The two statements combined piece together the information as follows:
Of this year's graduating students, the number of students transferred from another college = (33/100)*__M__ + (20/100)*__F__ – Statement (1)
Of this year's graduating students, the number of students transferred from another college = (25/100)*(**M** + **F**) – Statement (2)
Hence, we can equate the above two to get an equation that gives us a definitive value of the ratio (**M**/**F**).
This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal, we can furnish a unique value of the ratio asked (**M/F**) is enough to mark option C and move on. THE CALCULATIONS that follow are for demonstration purposes only.*
Equating the above two we get (33/100)*__M__ + (20/100)*__F__ = (25/100)* (**M** + **F**) or,
33*__M__ + 20*__F__ = 25*__M__ + 25*__F__ or, 8*__M__ = 5*__F__ or, (**M**/**F**) = (5/8) – a *unique* value.
STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.163

Let P_A & P_B be the amount of money Linda put into each of the two new investments, A and B & let r_A & r_B be the *simple* annual interest rate offered on the two investments A & B. Now given that $r_B = 1.5*r_A$, we're asked the value of P_A.

STATEMENT (1) alone: The information given forms two mathematical equations: $P_A*(r_A/100) = 50$ and $P_B*(r_B/100) = 150$. These two equations can be divided to give $(P_A*r_A/P_B*r_B) = (1/3)$. Using $r_B = 1.5*r_A$ further simplifies the ratio $(P_A*r_A/P_B*r_B) = (1/3)$ to give $(P_A/P_B) = (1/2)$ or $P_B = 2*P_A$. This is merely a relationship between P_A & P_B, and since the absolute value of even P_B is unknown, does little to help us figure out a *unique* value of the variable P_A.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement simply and directly states the result $P_B = 2*P_A$ that was arrived at by working with the various information provided in statement (1). In other words there is nothing new that this statement is telling us. At most we can use the relation $P_B = 2*P_A$ in conjunction with $r_B = 1.5*r_A$ to arrive at the results that were directly stated in Statement (1) to begin with.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements in a way are saying the same thing in two different ways. One begins with a relationship and arrives at one that the other statement begins with then. In a nutshell we'll be moving in variable-relation cycles if we rely on just these pieces of information. Hence In a way we arrive at the same relationship and there is nothing new *(most certainly not the value of P_A)* that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.164

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that we require a percentage value as an answer not a numerical value!

	Present on the First Day	Absent on the First Day	TOTAL
Present on the Second Day			
Absent on the Second Day		**?**	
TOTAL	90%	10%	100%

STATEMENT (1) alone: The additional information fills in the original table as follows:

	Present on the First Day	Absent on the First Day	TOTAL
Present on the Second Day			
Absent on the Second Day		**?**	
TOTAL	90%	10%	100% = 1000

We're required to find our answer in percentages and this statement alone only puts an absolute value to an already known cell (The absolute total cell). This information alone does least to even point us in the direction of finding a *unique* percentage value for the **?** cell.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Present on the First Day	Absent on the First Day	TOTAL
Present on the Second Day			80%
Absent on the Second Day		**?**	20%
TOTAL	90%	10%	100%

We have values for all the summation cells, but know nothing about the inner four cells. Numerous values/solutions are almost always possible under such a scenario. We can choose values for the required cell and the remaining three cells will adjust accordingly. *(5% and 6% are possible solutions for the percentage of those registered that were absent on both days).*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Present on the First Day	Absent on the First Day	TOTAL
Present on the Second Day			80%
Absent on the Second Day		**?**	20%
TOTAL	90%	10%	100% = 1000

The statements even when considered together present the exact same scenario presented in statement (1). *(5% and 6% are again possible solutions for the percentage of those registered that were absent on both days).*

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.165

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that here we require a numerical value as an answer not a percentage value!

	MEN	WOMEN	TOTAL
YES to engaging in research			(42/100)*1400 = 588
NO to engaging in research			812
TOTAL		**?**	1400

STATEMENT (1) alone: The additional information fills in the original table as follows:
Let **M** & **W** be the total number of Male and Female teachers surveyed
We Now are required to find a *unique* value of the variable **W**.

	MEN	WOMEN	TOTAL
YES to engaging in research	(36/100)***M**	(50/100)***W**	(42/100)*1400 = 588
NO to engaging in research			812
TOTAL	**M**	**W = ?**	1400

It is clear from the table above that we can garner two equations *(one from the top row and the other from the bottom most row)* in two variables (**M** & **W**), that can then be solved for *unique* values of each of the variables **M** & **W**.

This right here should be the end of the analysis of this statement on the actual exam → *the confident knowledge that using the info that we have at our disposal, we can furnish a unique value of the variable asked (W) is enough to label this statement sufficient and move on. THE CALCULATIONS that follow are for demonstration purposes only.*

The top row gives us: (9/25)***M** + (1/2)***W** = 588 and the bottom most row gives us: **M** + **W** = 1400. Solving the two gives us: **M** = 800 & **W** = 600.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	MEN	WOMEN	TOTAL
YES to engaging in research	288	300	(42/100)*1400 = 588
NO to engaging in research			812
TOTAL		**?**	1400

Even with the information filled thus far, we're still uncertain about how the value 812 is split up between the two highlighted cells. In other words, there are multiple ways of filling in information in the two highlighted cells that will all add up to 812, however there will always be a different value for the **?** cell every time – no *unique* value.

STATEMENT (2) alone - INSUFFICIENT

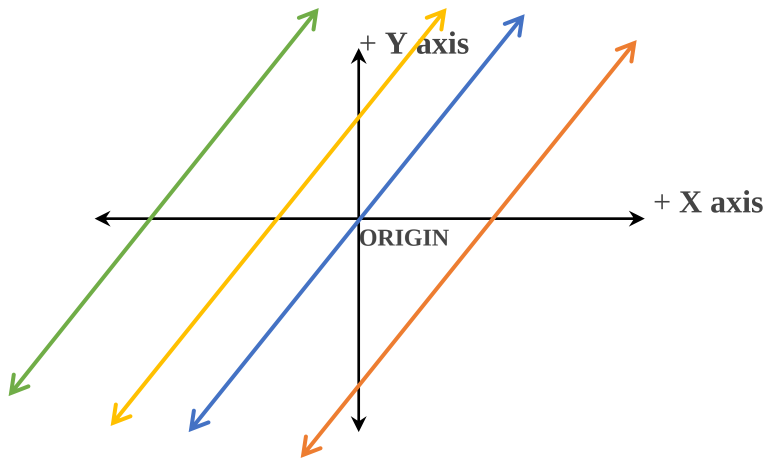
ANSWER – (A).

Q.166

Before we attempt this question, the following piece of information may prove beneficial in solving the question in a matter of seconds.

On the XY plane given two **fundamental** & **distinct** properties *(say – the slope, X-intercept, passing through a particular point,...so on)* of a line, there will be one and only one unique line on the XY plane that will satisfy both the given properties. *In other words*, to get a fix on a line in the XY plane that is to ensure that the line is unique, we need **two** properties that conform to the behaviour of the line. I'll exemplify this for further clarification.

Say we're given just one property, – *say the slope of the line is 1.5* – then we may have infinite lines on the XY plane that satisfy this property as shown below.



However, if add one more constraint to which the lines above should be bound to, i.e. if we introduce one more property of a line, – *say the line passes through origin* – and scan for all possible lines on the XY plane that will satisfy these **two** conditions simultaneously, then we'll be able to find just ONE such line *(blue line)*. Thus there is one and only one *(unique)* line that will satisfy two properties on the XY plane simultaneously.

Now with this background we can proceed with the question at hand. The question gives the slope of a line ***l*** as a definitive value = (3/4) & asks if the line passes through the point (–2/3, 1/2). A YES/NO targeted approach by simple interpretation can prove to be beneficial here.

STATEMENT (1) alone: This statement gives out another property that the line ***l*** satisfies. Together with the slope of ***l*** = (3/4) we can map out a *unique* line on the XY plane. (i.e. we can get an accurate fix on the position of the line and all kinds of behaviour it exhibits) Thus whatever the question be, that is asked in the question stem, once we've got a fixed line our answer will be a CONFIRMED answer. *Please do not waste any time trying to find the equation of the line and then checking for the point mentioned. Kindly remember that the question is not whether the line passes through the point, but is whether the statement data is sufficient for convincingly answering the question stem enquiry.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement again gives out another property that the line ***l*** satisfies. Together with the slope of ***l*** = (3/4) we can again map out a *unique* line on the XY plane. (i.e. we can get an accurate fix on the position of the line and all kinds of behaviour it exhibits) Thus whatever the question be, that is asked in the question stem, once we've got a fixed line our answer will be a CONFIRMED answer. *So once again please do not waste any time trying to find the equation of the line and then checking for the point mentioned. Kindly remember that the question is not whether the line passes through the point, but is whether the statement data is sufficient for convincingly answering the question stem enquiry.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.167

Given that X, Y & Z are *integers* and that X*Y + Z is an *odd integer*, we're asked if X is an *even integer*.
Before we proceed any further we'll analyse the information given a bit further:
X*Y + Z implies that Either X*Y odd & Z even OR X*Y even and Z odd.
A YES/NO targeted approach by making cases/plugging in appropriate values can prove to be beneficial here.
I'll also be using a bit of an algebraically inclined approach.

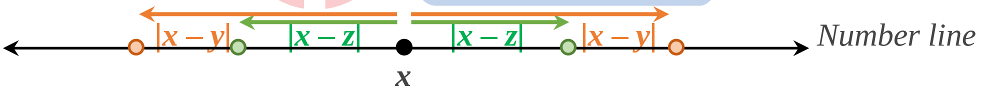
STATEMENT (1) alone: The statement says that X*Y + X*Z is an *even integer*. We've also got that X*Y + Z is an *odd integer*. Since the term X*Y appears in both it seems best to subtract the two terms yielding an *odd integer* → *as even – odd is always odd*. Thus, (X*Y + X*Z) – (X*Y + Z) is *odd* or, X*Z – Z is *odd* or, Z*(X – 1) is *odd*. This is only possible if both Z & (X – 1) are *odd*. Now if (X – 1) is *odd*, then X is definitely EVEN – a CONFIRMED YES.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that Y + X*Z is an *odd integer*. We've also got that X*Y + Z is an *odd integer*. Here by observation one term contains an X*Y and the other an X*Z. We'll proceed by adding the two terms together yielding an *even integer* → *as odd + odd is always even*. *(Note: Such questions on GMAT do not any high end mathematical manipulation, a simple adding or subtracting by hit and trial does the trick)* Thus, (Y + X*Z) + (X*Y + Z) is *even* or rearranging, (Y + X*Y) + (X*Z + Z) is *even* or, (Y + Z)*(X + 1) is *even*. Here on, two possibilities arise, **either** (X + 1) is *even*, in which case X is *odd* – giving us a **NO** answer, **or** (X + 1) is *odd* and (Y + Z) is *even*, in which case X is *even* – giving us a **YES** answer. We thus arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.168

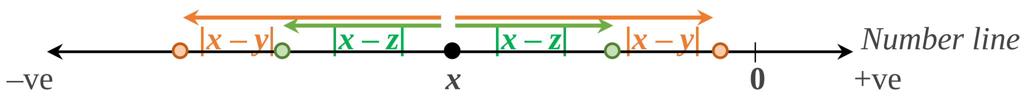
The clearer we are in representing the information diagrammatically, the easier it is for us to interpret results and see all the cases through.
The question stem deals with accurately predicting the positions of numbers ***x***, ***y*** & ***z*** relative to each other. We're given that the distance between ***x*** and ***y*** is greater than the distance between ***x*** and ***z***. *(algebraically this translates into* $|x - y| > |x - z|$, *this sort of representation to work with makes things tougher on us)*
With ***x*** as centre we'll try and represent the question stem diagrammatically,



The above diagram, conforming to the conditions laid out by the question stem presents all possibilities of the relative placement of numbers ***x***, ***y*** & ***z*** to each other. The Green dots represent the position possibilities of ***z*** relative to ***x*** & the Orange dots represent the position possibilities of ***y*** relative to ***x***.

We're asked ***z*** lies between ***x*** and ***y*** on the number line? Or diagrammatically, does the green dot lie between the orange and the black dot?
A YES/NO targeted approach by making cases should work well here.

STATEMENT (1) alone: The statement stipulates $x*y*z < 0$. Let's try to chalk out a few of the cases to begin with *(the moment we get a YES/NO answer we can call off our search)*:
CASE I: ***x***, ***y*** & ***z*** are all negative. Diagrammatically,

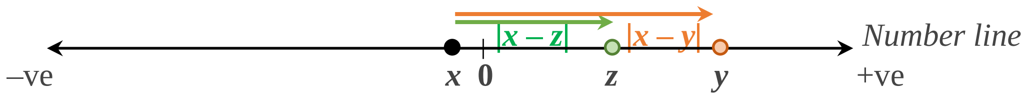


Even in this case alone we can have the green dot either lie outside ***(x = –5, y = –15 & z = –3)*** the black and orange dot – giving us a **NO** answer OR lie inside ***(x = –5, y = –15 & z = –7)*** the black and the orange dot – giving us a **YES** answer. We thus arrive at a YES/NO situation.

STATEMENT (1) alone - INSUFFICIENT

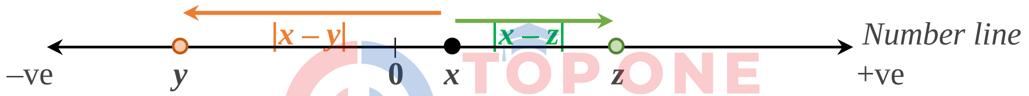
STATEMENT (2) alone: The statement stipulates ***x*y*** < 0 and has no mention of ***z***. Let's again try to chalk out a few of the cases to begin with *(the moment we get a YES/NO answer we can call off our search)*:

CASE I: ***x*** is negative and ***y*** & ***z*** are both positive. Diagrammatically,



The only possible arrangement of ***x***, ***y*** & ***z*** in this case is the one shown above – yielding a **YES** answer.

CASE II: ***y*** is negative and ***x*** & ***z*** are both positive. Diagrammatically,

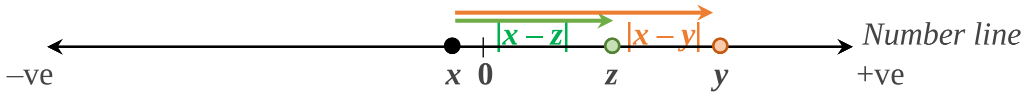


The only possible arrangement of ***x***, ***y*** & ***z*** in this case is the one shown above – yielding a **NO** answer. We thus arrive at a YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

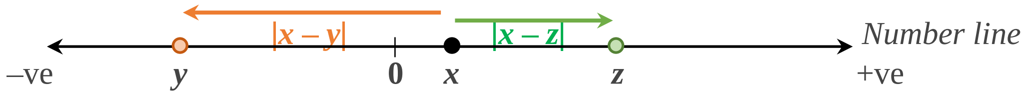
STATEMENT (1) & (2) together: Together the statements say that ***x*y*z*** < 0 & ***x*y*** < 0. The only thing that can be said with certainty using the two in conjunction is that ***z*** > 0, the only inference on ***x*** & ***y*** is that if one is *positive*, the other is *negative*. A closer look back into our analyses of the statement separately will reveal that the statement (2) analysis considers cases that both conform to the conditions laid out by both statements together. I'm just re pasting the cases down below but they are an exact copy of what was discussed while analysing Statement (2) alone. In actual practice we obviously need not do it all again, we can just look back and mark E.

CASE I: ***x*** is negative and ***y*** & ***z*** are both positive. Diagrammatically,



The only possible arrangement of ***x***, ***y*** & ***z*** in this case is the one shown above – yielding a **YES** answer.

<u>CASE II:</u> ***y*** is negative and ***x*** & ***z*** are both positive. Diagrammatically,



The only possible arrangement of ***x***, ***y*** & ***z*** in this case is the one shown above – yielding a **NO** answer. We thus arrive at a YES/NO situation.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.169

We're given two INTEGERS A & N each > 1. We're also given that 8! is a multiple of A^N. We're asked the value of A. Now given that 8! is a multiple of A^N → that A^N is a factor of 8! Or that A^N completely divides 8!.

<u>STATEMENT (1) alone</u>: We're given a kind of an equation to solve – $A^N = 64$, since both A & N are unknown, the equation can have multiple solutions. *(For instance, A = 4, N= 3 or A = 8, N = 2)*. Since A isn't *unique* we can label it off as insufficient.

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: It is extremely tempting to discard this off as insufficient as all this gives is a value of N (N = 6) with no mention of A, seeming miles away from an exact value of A.

However, the mistake lies in not considering the piece of information in the original question stem → 8! is a multiple of A^N Or that A^N completely divides 8!. Since A > 1, this means that the multiplication of first 8 positive integers should contain at least 6 multiplication terms of the same kind to be completely divisible by A^6. We'll see how many values we can get for A under these conditions.

We'll start off with the smallest number 2, now the power of 2 in 8! can be found using the formula: Power = $[8/2] + [8/2^2] + [8/2^3] + [8/2^4] = 4 + 2 + 1 + 0 = 7$, since 7 > 6, A = 2 passes our test *(2^6 will be a factor of 8!)*. Next we take up 3, power of 3 = $[8/3] + [8/3^2] = 2 + 0 = 2 < 6$. Hence the only value of A that conforms to the conditions is A = 2 – *unique* solution.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.170

We're given two *positive Integers* N & T. We're asked for the greatest prime factor of the product N*T. A value plug in approach by taking examples should prove a lot quicker and beneficial here.

STATEMENT (1) alone: The GCF or the HCF of N & T is 5 – given. However this is only the factor that is common to both N & T and thus gives us no clue about all the other factors that N & T might have. More simply put the HCF of N & T is 5 means we can represent N & T as follows:
N = 5 x P, P is some positive integer & T = 5 x Q, Q is some positive integer. Since nothing about P & Q is known we cannot comment on the HCF of N*T = 25*P*Q
We'll take the simplest cases to help our cause.
CASE I: Let both N = T = 5, HCF of N & T = 5; N*T = 25 therefore the HCF of N*T = 5
CASE II: Let N = 5 & T = 5*31, HCF of N & T = 5; N*T = 5*5*31 therefore the HCF of N*T = 31 → this is more than enough to reveal the insufficiency.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This says that the LCM of N & T is 105. Now an LCM of two numbers is taken by taking the common factors only once along with the remaining uncommon factors between the two numbers. In other words the LCM of N & T will incorporate all the prime factors that belong to either N or T or both. If HCF can be thought of as the intersection of the factors of N & T, then LCM can be understood as the UNION of all the factors that belong to either N or T or both. To exemplify
If N = *a x b x c* & T = *a x f x g*, then the LCM will be (*a x b x c x f x g).*

Also since the product of any two numbers retains the prime factors of each of the individual two numbers, i.e. since taking the product of any two numbers does not generate any new prime numbers not already included in either one or both of the numbers, the highest prime factor of the product of N & T is also contained in the LCM *(UNION of factors)* of N & T – a definitive fix on the answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.171

Although MODS do signal distances on the number line, however, we'll try to approach this via simple interpretation of what is being asked.
The question asks if |(X – Y)| > |X| – |Y|? We'll try to delve a bit deeper as to understand when this is possible. Between X & Y there are 4 sign polarity cases possible – X & Y both +ve, X & Y both –ve, X +ve Y –ve & lastly X –ve Y +ve.
By simple plug and observe we can see that the inequality only holds if X & Y are of opposite signs. X & Y of the same sign equates the two sides of the inequality.

Thus the question in effect can be reduced to asking: Are X & Y of opposite signs?

STATEMENT (1) alone: This statement simply says that X is ahead of Y on the number line. They could both be positive OR one positive (X) with the other negative (Y). The statement thus lacks information to arrive at anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement directly says what we're looking for X*Y < 0 means X & Y are of opposite signs and therefore directly answers the simplified version of the enquiry made in the question stem.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.172

We're given *positive* numbers *(not necessarily integers)* M, K, X & Y.
We're asked if M*X + K*Y > K*X + M*Y? We'll try to reduce this down to a convenient form before proceeding further. If we take everything to one side and rearrange, we get something like: Is (M – K)*X – (M – K)*Y > 0 OR
Is (M – K)*(X – Y) > 0

STATEMENT (1) alone: This statement says: M > K or (M – K) > 0 but since nothing is mentioned about either X or Y, the statement alone lacks information to arrive at anything concrete regarding the question stem.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says: X > Y or (X – Y) > 0 but since nothing is mentioned about either M or K, the statement alone again lacks information to arrive at anything concrete regarding the question stem.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information from each of the individual statements we garner that both (M – K) & (X – Y) are positive. Therefore, their product must also be positive – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.173

Given a *positive integer* N, we're asked for its divisibility by 10.

STATEMENT (1) alone: Divisibility by 14 implies that it must also be divisible by all factors of 14 or that **N must also be divisible by 2**. Divisibility by 35 implies that it must also be divisible by all factors of 35 or that **N must also be divisible by 5**. Together N can be said to be divisible by both **2** & **5** – which means N is an even multiple of and is thus divisible by 10 or has a units digit = 0 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement simply gives the value of N. *Kindly remember that in all DS questions all we're actually bothered with is SUFFICIENCY*. Once a *unique/fixed*

value of N is given, then the CONFIRMATION of the answer is guaranteed, whatever the answer may be – at least it will be one of CONFIRMED YES or CONFIRMED NO.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.174

Given a line ***l***, we're required to find the Y – Intercept of the line. Here instead of the graphical approach, we'll follow the simple algebraic approach.

Also, a glance at the statements shows that they, together with the question stem, talk in terms of slope and Y-Intercept. The equation of a line in terms of these two properties is given as Y = *m**X + *c*, where *m* & *c* are the **slope** and the **Y-Intercept** of the line respectively.

STATEMENT (1) alone: This statement says that *m* = 3**c*. Substituting, in the equation of the line formed above we get: Y = 3**c**X + *c*. However, *c* is a variable in this equation and can hence take on multiple values. The Y – Intercept is thus not *unique*.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says that the X – Intercept of the line ***l*** is –1/3. We'll substitute this in the same equation that we formed Y = *m**X + *c* to see what we arrive at. The X – Intercept of a line is always found by substituting Y = 0 and solving for X. Thus X – Intercept = –*c/m* = –1/3 or *m* = 3**c*, which is what we began with in statement (1) analysis and eventually ended up discarding the statement info as insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements in a way are saying the same thing in two different ways. One begins with a relationship and arrives at one that the other statement begins with then. In a nutshell we'll be moving in cycles if we rely on just these pieces of information. Hence In a way we arrive at the same relationship and there is nothing new *(most certainly not the value of Y – Intercept)* that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).
*Note: The above may also be seen as a result that – for a line with a slope 3 times the line's Y – Intercept, the X – Intercept for such a line will always come out to be –1/3. Substitute Y = 0 in the equation Y = 3*c*X + c to get X = –1/3.*

Q.175

Most Statistics questions can be handled quite effectively by the case making approach; however this question does demonstrate the application of some direct formulae.

Now we're two SETS of *integers* – SET S & SET T. Also, all the integers in SET S add up to the same SUM as the integers of SET T add up to. We're asked for a comparison between the numbers of elements in both sets.
Let N_S & N_T represent the number of elements in SETS S & T respectively.

<u>STATEMENT (1) alone</u>: We'll use the very basic *Mean* formula
(*Mean* = SUM/Sample Size) to conclusively arrive at a CONFIMATORY result.
We're given that $(Mean)_S < (Mean)_T \rightarrow \frac{(SUM)_S}{N_S} < \frac{(SUM)_T}{N_T}$

Since, $(SUM)_S = (SUM)_T$ according to the question stem and since all quantities being dealt with on both sides of the inequality are positive, we get: $\mathbf{N_T < N_S}$ – a CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: A median is simply the middle value element of the SET when all its elements are arranged in ascending order. The case making to discard this piece of info should be less of a hassle thus.
Let $(Median)_S = 1$ & $(Median)_T = 0$
CASE I → $N_S > N_T$: SET S = {0, 0, 0, 1, 1, 1, 1} SET T = {0, 0, 4} *(SUM = 4 each)*
CASE II → $N_S < N_T$: SET S = {0, 1, 1} SET T = {–2, 0, 0, 0, 4} *(SUM = 2 each)*
The cases demonstrate a YES/NO answer situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.176

We're given *positive integers* X & Y. We're asked if the product X*Y is even?
A YES/NO targeted approach should work well here.

<u>STATEMENT (1) alone</u>: The statement says that the expression 5*X – 4*Y is even. Now, the difference of two integers is even only if either both the Integers involved are even, or both the integers are odd. Since 4*Y is definitely even → For the difference 5*X – 4*Y to be even, 5*X must therefore, also be even → 5 being an odd integer, X must therefore be even. Thus X is definitely even or, the product X*Y is definitely even – CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: The statement says that the expression 6*X + 7*Y is even. Now, the sum of two integers is even only if either both the Integers involved are even, or both the integers are odd. Since 6*X is definitely even → For the sum 6*X + 7*Y to be even, 7*Y must therefore, also be even → 7 being an odd integer, Y must therefore be even. Thus Y is definitely even or, the product X*Y is definitely even – CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.177

We're given *positive integers* X & Y. We're asked the value of the product X*Y?
Making cases to discard info as insufficient does prove effective at times.

STATEMENT (1) alone: The HCF of the given integers is mentioned 10. The integers can, however, at best be written as:
X = 10**M* & Y = 10**N*, where the only common factor between *M* & *N* is 1. Since *M* & *N* can take on any values, we're least certain of what the value of the product X*Y will be based on the given information.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The LCM of the given integers is mentioned 180. The integers X & Y can take on a range of values that will all give different values of the product X*Y. *(As an example consider X =180 & Y = 1; X*Y = 180, X = 180 & Y = 90; X*Y = 16200)* Since we don't have a fix on the value of the product X*Y, we can label this statement as insufficient too.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the statements tell us that for the *positive integers* X & Y, HCF (X & Y) = 10 & LCM (X & Y) = 180. Now using the result that for Positive Integers A & B, the product of the integers → A*B = HCF*LCM.
Therefore, the product of the integers X & Y may be written as X*Y = 180*10 = 1800, which is a *unique* value.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).
*Kindly remember that the formula X*Y = HCF(X & Y)*LCM(X & Y) only holds for two Integers X &Y and not necessarily for three integers.*

Q.178

We're given a SET/LIST L with at least 3 elements and are asked if each of elements in the list is equal to 0?
Making cases to discard info as insufficient might prove effective at times.

STATEMENT (1) alone: The **YES** case is easy to visualize given the condition in the statement – simply have a set with all elements = 0. For a **NO** case we can have for an N elements SET, (N – 1) elements each = 0 and the N^{th} element ≠ 0. The **NO** case will still conform to the condition laid out by the statement but will not have all elements = 0. An example is {0, 0, 0, 0, 0, 0, 4} → the product of any two elements in this SET is also = 0, yet there is one non-zero element present. Thus a YES/NO situation exists.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Before we proceed with the statement analyses, whenever we say that the SUM of two numbers = 0, say for instance A + B = 0, then **either** A = B = 0, **or** A = –B (i.e. A & B are of opposite signs equidistant from the origin on the number line).

Now returning to the statement, we'll try for a **NO** situation first. We begin building our set by taking the first two elements as non-zero integers *(say 1 & –1)* {1, –1}→ the elements till now add up to 0, so far so good. Now the SET according to the question stem requires a minimum of three elements. We therefore have to choose a third element **C** such that **C** + 1 = 0 and **C** – 1 = 0 should be satisfied simultaneously, however such a value of **C** does not exist and therefore such a set with even on single non-zero integer is not possible given the condition laid out by this statement info.

Thus the only SET possible is one in which all elements are equal and equal to 0. A CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Top 1% expert replies to student queries (can skip) (Link)

Q.179

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that we require a fraction value as an answer and not necessarily a numerical value!

	Buy product P	Do NOT Buy Product P	TOTAL
Buy product Q			
Do NOT Buy Product Q		**?**	
TOTAL			1

We'll be talking in terms of fractions here!

<u>STATEMENT (1) alone</u>: The additional information fills in the original table as follows:

	Buy product P	Do NOT Buy Product P	TOTAL
Buy product Q			
Do NOT Buy Product Q	1/3	**?**	
TOTAL			1

This information alone does least to help us find a *unique* fraction value for the **?** cell. Since we do not have a value to affix to the highlighted cell, there could be multiple values that can be assigned to the cell whose *unique* fraction value we're looking for.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Buy product P	Do NOT Buy Product P	TOTAL
Buy product Q			1/2
Do NOT Buy Product Q		**?**	1/2
TOTAL			1

This information alone again does little to help us find a *unique* fraction value for the **?** cell. Here we know the SUM total of the two highlighted cells = ½, however, we do not know how this sum is divided up between the two highlighted cells. There could be multiple values that can be assigned to the cell whose *unique* fraction value we're looking for.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Buy product P	Do NOT Buy Product P	TOTAL
Buy product Q			1/2
Do NOT Buy Product Q	1/3	**? = 1/6**	1/2
TOTAL			1

The above table makes it clear that the value that we're looking for can simply be found by subtracting 1/3 from 1/2. Thus using the two statements in conjunction we arrive at a *unique* value for what is asked in the question stem.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.180

We're given two numbers *(not necessarily integers)* X & Y and asked if both X & Y are positive?
Making cases to discard info as insufficient and going by the typical YES/NO targeted approach might prove effective here. We'll go for plugging in values that can be used to create a YES/NO type scenario.

STATEMENT (1) alone: This statement gives out a mathematical relationship: X – Y = 1/2. Now X = 6.5 & Y = 6 says **YES** to what is enquired in the question stem, however X = 0.5 & Y = 0 says **NO** to what is enquired in the question stem. *(0 is not a positive number!)*. We thus arrive at a YES/NO answer situation.
STATEMENT (1) alone - INSUFFICIENT

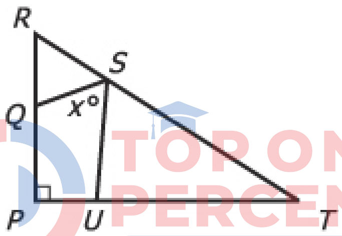
STATEMENT (2) alone: This statement gives out a mathematical inequality: X/Y > 1.

Now X = 6 & Y = 2 says **YES** to what is enquired in the question stem, however X = –6 & Y = –2 says **NO** to what is enquired in the question stem. We thus yet again arrive at a YES/NO answer situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: We'll take the relationship given in statement (1) → X – Y = 1/2 and write X as X = Y + 1/2. We can then substitute for X in the inequality stipulated by statement (2). We arrive at something like (Y + ½)/Y > 1 or 1 + (1/(2*Y)) > 1 or 1/(2*Y) > 0, which is only possible if Y > 0, Now given that X = Y + ½, since Y > 0, Y + 1/2 > ½ or X > ½. Hence using the two statements in conjunction, we've established that X & Y are both > 0, or that X & Y are both positive – which is what is asked in the question stem – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.181

The question gives us the following figure:

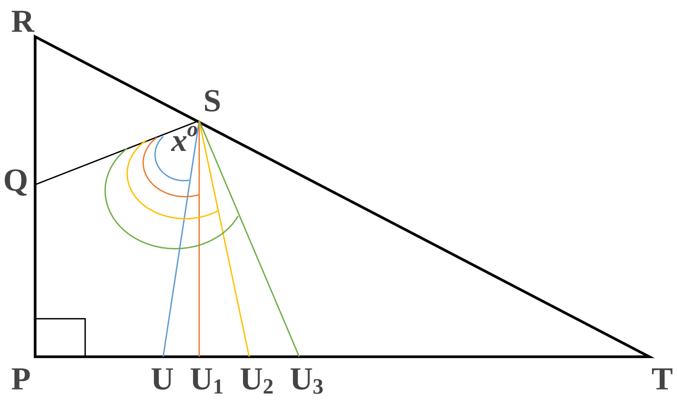


We're asked to find/solve for a *unique* value of the variable ***x*** shown in the figure.
Kindly note that this is all the information that the figure provides us with, it would be a SIN to make assumptions of the sort – this say looks like a 30, 60, 90 triangle. In geometry we accept only the information that is explicitly mentioned in the question stem.

Now although a lot of geometry questions involve the actual solving for the quantity that is asked in order to be convinced that a *unique* answer exists, I will follow a slightly different yet obvious approach that may at times prove beneficial for a geometry DS question tackling.

STATEMENT (1) alone: Statement (1) says that the length of line segment QR is equal to the length of line segment RS. In an indirect sort of a way we can say that this statement restricts the *POSSIBLE movement* of the line segment **QS**. In other words for a given position of S on the side RT, the position of **QS** gets fixed under the conditions laid out by this statement.

However, there has been no restriction/condition that has been placed on the *POSSIBLE movement* of the segment **SU**. **SU** here hence may assume **multiple** positions resulting in **multiple** values of ***x***. Diagrammatically, the above discussion is presented below:



The multiple coloured ARCs represent the multiple values of ***x*** possible.

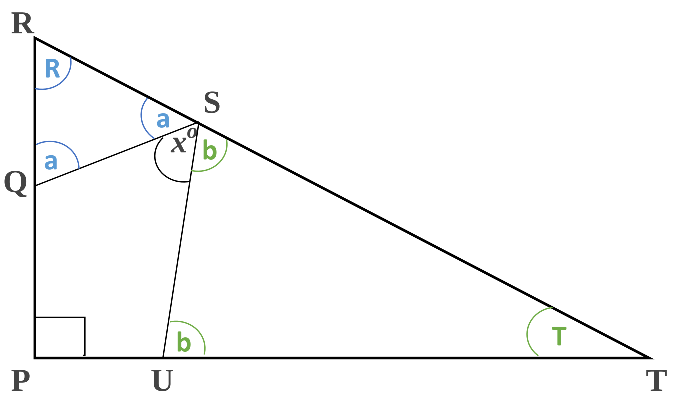
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Statement (2) says that the length of line segment ST is equal to the length of line segment TU. In an indirect sort of a way we can say that this statement restricts the *POSSIBLE movement* of the line segment **SU** now. In other words for a given position of S on the side RT, the position of **SU** gets fixed under the conditions laid out by this statement.

Again however, there has been no restriction/condition that has been placed on the *POSSIBLE movement* of the segment **QS**. **QS** here hence may assume **multiple** positions resulting in **multiple** values of ***x***. *– as was shown diagrammatically in the analysis of statement (1).*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Now the statements (1) & (2) used in conjunction lay out the conditions, that for a given position of S on the side **RT**, restrict the movement of both the segments **QS** & **SU**. In other words, for a given position of point S on the side **RT**, there may exist only one *unique* position of each of the segments **QS** & **SU**.



Now, it may be enough to know that since for any position of S on RT, there is only one *unique* way to draw out segments **QS** & **SU**, the value of ***x*** *(regardless of what it is)* will always be *unique*.

If unconvinced with the discussion above at this point, we may take a couple of more seconds to calculate the value of ***x*** to convince ourselves of the sufficiency. Δ RQS is isosceles with RQ = RS & Δ STU is isosceles with ST = TU. Let the variables shown in the

figure mark the angles shown. Δ RQS requires all of its interior angles to sum up to 180^o, which is why **R + a + a =** 180 or **a** = 90 – (**R**/2); an exact similar application to Δ STU yields **b** = 90 – (**T**/2). Now at point **S,** RT is a straight line segment, therefore **a** + **b** + ***x*** = 180^o. Substituting the values of **a** & **b**, we get something like →
{90 – (**R**/2)} + {90 – (**T**/2)} + ***x*** = 180 or, ***x*** = (**R** + **T**)/2. Δ RPT is a right angled triangle and hence **R** + **T** = 90, substituting this back in ***x*** = (**R** + **T**)/2, we get ***x*** **=** 45^o – a *unique* answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.182

We'll first try and translate the long and wordy description given in the question stem into a mathematical equation which we can better relate to.
For this purpose, let **M**, **J**, & **K** represent the annual salaries of Mary, Jim & Kate respectively. Then the question stem says that |**M – J| =** 2*(|**M – K**|).

→***Important Note:*** *On the GMAT whenever you're given the difference between two numbers (say salaries, hourly earnings, time taken…etc etc), PLEASE bear in mind that this difference in our minds should always and always be represented as with a MOD sign around it. So if I say that the difference between A & B is 65 then this information is accurately depicted as |(A – B)| = 65. Never make the MISTAKE of representing this information as simply A – B = 6. In other words, QUESTIONS ON GMAT in using the language* ***difference between A & B is 65*** *simply by mentioning A before B does not imply that A > B → A > B is simply our assumption and assuming on GMAT questions almost always comes with a harsh penalty. Therefore,* ***difference between A & B is 65*** *alone does not say anything about which of the two (A or B) is greater and therefore should always be at first represented using the MOD symbol |(A – B)| = 65. The representation |(A – B)| incorporates both (A – B) & (B – A).*

Coming back to the question, since Mary's annual salary is given to be the highest of the three *(i.e.* ***M*** *>* ***J*** *&* ***M*** *>* ***K****)*, we can remove the MOD sign and write the simple difference appropriately:
Thus, **M – J =** 2*(**M – K**) or the question stem says that **M** = 2***K – J.** Given this info the question asks us to find the average of the three variables **M**, **J**, & **K**.
Mean = (**M** + **J** + **K**)/3, Substituting for **M** as **M** = 2***K – J**, *Mean* = ((2***K – J**) + **J** + **K**)/3, or the question stem reduces to *Mean* = **K** ← this means all we need is Kate's annual salary to solve our puzzle.
We're asked the *unique* value of *Mean*.
We'll now proceed with the statements:

<u>STATEMENT (1) alone</u>: The statement gives out the value of **J =** $30,000. But this is not the piece of the puzzle that we're looking for. Moreover, a value of **J =** $30,000 can have multiple values of **M** & **K** that will satisfy **M** = 2***K – J** *(which is the additional condition laid out by the question stem)*, however all these values will give different values for the *Mean* of the three.
There is no need for substituting different values of ***M*** *&* ***K*** *to check that multiple values of Mean exist. This should be clear just by looking at* ***M*** *=2** ***K – J*** *equation.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement gives out the value of **K** = $40,000. This is the exact piece of the puzzle that we're looking for. A *unique* value of **K** means we've got a *unique* value of the *Mean* asked in the question. Thus *Mean* = **K** = $40,000.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.183

We're given three *positive integers* X, Y & Z.
X is given to be a factor of Y, or we can say that Y is a multiple of X, or we may write Y as **Y = *k**X**, where *k* is a positive integer.
Y is given to be a factor of Z, or we can say that Z is a multiple of Y, or we may write Z as **Z = *m**Y**, where *m* is a positive integer.
We're asked if Z is even?
A YES/NO targeted approach should work well here.

STATEMENT (1) alone: We're given the product X*Z as even. This means that *either* Z is even *or* X is even *or* both are even. If *either* Z *or* both X & Z in the product are even, then we get a straight and direct answer (**YES**) to our question → Is Z even?
We'll therefore look into the case where we assume that only X is even. Since **Y = *k**X** *(as per the analysis in the question stem)*, this means that **Y** is definitely even and since **Z = *m**Y** this means that Z is definitely even. Hence either way Z comes out to be even – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that Y is even. Since **Z = *m**Y** *(as per the analysis in the question stem)*, this means that Z is definitely even – a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.184

Let **J** & **M** denote the hourly wages of Jack and Mark respectively. After the 6% wage increase that they both received, their wages become **J***$(1 + \frac{6}{100})$ & **M***$(1 + \frac{6}{100})$ respectively.
We're then asked the absolute value of the expression: { **J***$(1 + \frac{6}{100})$ – **M***$(1 + \frac{6}{100})$ } or of the expression: (**J** – **M**)*$(1 + \frac{6}{100})$

STATEMENT (1) alone: This statement out rightly gives the piece of the puzzle that we're looking for. The statement directly says: (**J** – **M**) = 5. Hence, the value of the expression becomes: (**J** – **M**)*$(1 + \frac{6}{100})$ = 5*(1.06) = $5.30 – a *unique* answer. → *The Calculations are for demonstration purposes only.*

STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: Here we're given the ratio of (**J/M**) = (4/3). A simple look will reveal that a ratio of (**J/M**) can generate **multiple values** of the difference (**J – M**) *(**J** = 4 & **M** = 3 gives us (**J – M**) =1, and **J** = 8 & **M** = 6 gives us (**J – M**) =2)* and thereby of the expression (**J – M**)*(1 + $\frac{6}{100}$).

STATEMENT (2) alone - INSUFFICIENT

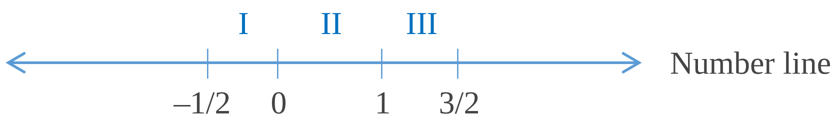
ANSWER – (A).

Q.185

We're asked if 0 < ***x*** < 1?

We'll take help of the number line approach just so that we form a clearer picture of what we're dealing with.

<u>STATEMENT (1) alone</u>: This statement says that –1/2 < ***x*** < 3/2 gives a range of values of ***x*** that we can represent on the number line as follows:



According to the statement question stem ***x*** can lie in either region I or II or III. This gives us a YES/NO situation about ***x*** lying in region II definitively.

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives a linear equation in one variable ***x***. This is enough to substantiate a unique value of ***x***. *Solving is unnecessary and a waste of time!*

x + (1/4) = (3/4) or ***x*** = (1/2).

*Unique value of **x** obtained and a unique value can always be accurately tracked on the number line to give a CONFIRMED answer as to whether **x** lies in a particular asked region.*

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.186

This question involves a bit of algebraic manipulation via the use of some known algebraic identities.

We're give two numbers X & Y – *both POSITIVE* – such that Y > X.

We're asked for a *unique* value of the expression: $\frac{(X + Y)^2}{(X - Y)^2}$

Glancing at the statements, it seems to be a better idea to leave the expression as it is, and try and work the statements to the form of the expression to try to solve for a *unique* value of the expression.

STATEMENT (1) alone: The statement says – $X^2 + Y^2 = 3*X*Y$. A look at the Left side of the equation ($X^2 + Y^2$) tells us that we can manipulate the left side to mould it in the form of the kind that would be convenient to substitute back into the expression in the question.
We'll use the two identities → $(X + Y)^2 = X^2 + Y^2 + 2*X*Y$ & $(X – Y)^2 = X^2 + Y^2 – 2*X*Y$
Using the identities along with the info that $X^2 + Y^2 = 3*X*Y$ we get:
$(X + Y)^2 = 5*X*Y$ & $(X – Y)^2 = X*Y$. Back Substitution into the expression in the question gives a *unique* value of the expression $\frac{(X + Y)^2}{(X – Y)^2} = 5$ – a *unique* value.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the value of only X*Y = 3. This simple product can generate a range of values of both X & Y that will give out **multiple** values of the expression asked in the question stem. *(X = 1, Y = 3 & X = 0.5, Y = 6 are two of the many such examples that will yield different values of the expression in the question stem)*

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.187

We're given three *integers X*, *Y* & *Z* such that each is greater than 1. We're asked for a *unique* value of their SUM → (*X* + *Y* + *Z*)

STATEMENT (1) alone: This statement gives out the product of the three integers *X*Y*Z* = 70. Let's begin by breaking up the number 70 to see the factors it is composed of. 70 can be written as 70 = 2 x 5 x 7. Note here that since, each of *X*, *Y* & *Z* is greater than 1, and since 70 is composed of exactly 3 factors that are greater than 1, *X*, *Y* & *Z* must have values equal to 2, 5 & 7 (not necessarily in that order). In other words there is **only one possible** way of having three integers each greater than 1 such that they all multiply to give 70. Now whatever be the respective values of *X*, *Y* & *Z* with respect to the values 2, 5 & 7. The SUM (*X* + *Y* + *Z*) will always have a *unique* value = 2 + 5 + 7 = 14.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out a ratio *X*/(*Y*Z*) = 7/10. With the only other restriction being that each of *X*, *Y* & *Z* is greater than 1, we'll try and see if we can generate different values of the SUM (*X* + *Y* + *Z*).
CASE I: We can borrow the same values from the previous statement (*X* = 7, *Y* = 5 & *Z* = 2) to get a SUM of 14.
CASE II: This time we'll simply double the values of *X* & *Y* *(so as to keep the ratio the same)* considered in the previous case (*X* = 14, *Y* = 10 & *Z* = 2) to get a SUM of 26.
This analysis is enough to label the info insufficient.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.188

Given nothing about what **p** & **z** are *(i.e. assuming they're real numbers in general)*, we're asked if **p + p*z = p**? or, Is **p*z** = 0?

STATEMENT (1) alone: This statement says **p =** 0 which thereby implies that **p*z** = 0 giving us a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says **z =** 0 which again thereby implies that **p*z** = 0 giving us a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.189

We're given that the symbol Δ represents one of the four arithmetic operations (which one → that's unknown)
We're asked if the following identity holds for the above symbol:
(6 Δ 2) Δ 4 = 6 Δ (2 Δ 4)?
Since we're supposed to find a definitive answer to the enquiry in the question stem, a YES/NO targeted approach should work well here! *It's useless to riddle your minds with what the operation represented by the symbol could be. It proves easier to just concentrate on generating a YES/NO scenario and be done with the statement.*
Let LHS & RHS stand for *Left Hand Side* & *Right Hand Side* respectively.
An identity is said to be true for all numbers if LHS = RHS of the identity/relationship for all numbers on the number line.

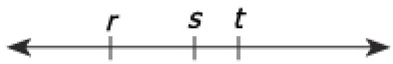
STATEMENT (1) alone: We're given that the operation represented by the symbol Δ conforms to the following inequality 3 Δ 2 > 3. Based on this inequality we can rule out *subtraction* and *division*. We're therefore left with the symbol Δ representing either ADDITION or MULTIPLICATION *(however this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what Δ represents but with whether Δ satisfies the identity* (6 Δ 2) Δ 4 = 6 Δ (2 Δ 4)*)*. We'll check for both one by one:
ADDITION: LHS = (6 + 2) + 4 = 12, RHS = 6 + (2 + 4) = 12 → LHS = RHS – a **YES** answer.
MULTIPLICATION: LHS = (6 x 2) x 4 = 48, RHS = 6 x (2 x 4) = 48 → LHS = RHS – a **YES** answer again.
Thus whichever of the two operations (ADDITION or MULTIPLICATION) the symbol Δ represents, we get a CONFIRMED YES answer as to whether Δ satisfies the identity given in the question stem.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given that the operation represented by the symbol Δ conforms to the following identity 3 Δ 1 = 3. Based on this identity we can rule out *addition* and *subtraction*. We're therefore left with the symbol Δ representing either DIVISION or MULTIPLICATION *(however again this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what Δ represents but with whether Δ satisfies the identity* (6 Δ 2) Δ 4 = 6 Δ (2 Δ 4)*)*. We'll check for both one by one:

DIVISION: LHS = (6 ÷ 2) ÷ 4 = 0.75, RHS = 6 ÷ (2 ÷ 4) = 12 → LHS ≠ RHS – a **NO** answer.
MULTIPLICATION: LHS = (6 x 2) x 4 = 48, RHS = 6 x (2 x 4) = 48 → LHS = RHS – a **YES** answer again.
Thus the information that the symbol Δ represents either DIVISION or MULTIPLICATION is not enough to substantially answer whether the identity given in the question stem is valid or not. *(We need a bit more info as to which one of the two operations DIVISION or MULTIPLICATION does the symbol Δ specifically represent)*. In other words we arrive at a YES/NO situation regarding the enquiry in the question stem.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.190

The clearer we are in representing the information diagrammatically, the easier it is for us to interpret results and see all the cases through.
According to the question stem we're already given the relative positions of the numbers ***r***, ***s*** & ***t*** on the number line.

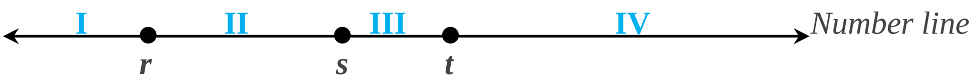


What we're asked is their relative positions with respect to 0 or the Origin.
We're asked if zero is halfway between ***r*** and ***s***?
A YES/NO targeted approach by making cases should be the way to go about this question.

In our approach we'll keep the numbers ***r***, ***s*** & ***t*** on the number line as they are and check making cases whether it is possible *(given the conditions laid out)* to have 0 lie in the four regions shown. In other words, we'll be checking for these 4 regions only.

STATEMENT (1) alone: This statement considered alone in a way says that 0 can lie in either region I or region II. So clearly there is a possible **YES** scenario where 0 lies exactly in the middle of region II as well as a possible **NO** scenario where 0 lies elsewhere in regions I & II. A YES/NO scenario renders this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

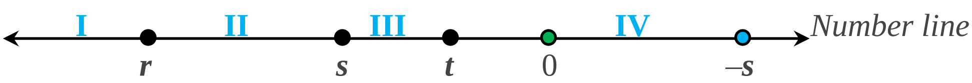
STATEMENT (2) alone: This statement considered alone says that the point ***t*** is equidistant from the point ***r*** & –***s***. Now considering the diagram – we made in the question stem – again:



The conditions laid out by this statement alone say that 0 or Origin can lie in regions II & IV only.
*(Explanation: If 0 were to lie in REGION I – meaning all of **r**, **s** & **t** are positive – then the distance that one would have to travel from **t** to –**s** will always be greater than the distance*

*one would have to travel from **t** to **r**. This is simply because travelling from **t** to –**s** would entail travelling till **r** and then going beyond to crossover to the negative side to reach –**s**. SIMILARLY, If 0 were to lie in REGION III – meaning only **t** is positive – then the distance that one would have to travel from **t** to –**s** **(**both of which in this scenario will lie to the right of 0**)** will always be less than the distance one would have to travel from **t** to **r**. This again is simply because travelling from **t** to **r** would entail travelling till 0 and then going beyond to crossover to the negative side to reach **r**)*

Hence again there is a possible **YES** scenario where 0 lies exactly in the middle of region II as well a possible **NO** scenario where 0 lies in the regions IV such that the condition is satisfied. Diagrammatically,



We can even put numbers to the above **NO** case scenario ***r*** = –7, ***s*** = –3 & ***t*** **=** –2.
A YES/NO scenario renders this statement insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Now, Statement (1) considered alone says that 0 can lie in either region I or region II & Statement (2) considered alone says that 0 can lie in either region II or region IV. Taking the two statements together, the only region possible for 0 to lie in is region II. If 0 can lie only in region II (in other words ***r*** is negative and ***s*** & ***t*** are both positive) and given the condition *(as per statement (2))* that the point ***t*** is equidistant from the point ***r*** & –***s***, we can arrive at only one conclusion → that ***r*** and –***s*** must be the same points. Now given that ***r*** & ***s*** are both distinct points on the number line, *(meaning they both can't be equal to 0)* this means that 0 lies midway of ***r*** & ***s*** – a CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.191

We're asked to find a *three digit positive* Integer *K* such that the product of its digits is 14.

In attempting such question our approach will generally be aimed at proving that a *unique* value of the asked quantity does not exist. That means we'll target ourselves to find at least two different values of the quantity/variable asked so that the info may be discarded as insufficient. One main advantage that I reckon this approach has is that in arriving at places where sufficiency is achieved we're sure that we have exhausted all possible cases that we had to go through. In other words, this precisely is the YES/NO targeted approach.

Coming back to the question we'll begin my splitting up 14 first. 14 as a product may be written as 14 = 1 x 2 x 7*(this is the only possible way of splitting up 14 such that each factor is between 0 and 9 and there are exactly 3 factors)*, hence in a way we know that the number is made up of the digits 1, 2 & 7.

STATEMENT (1) alone: *K* is given to be ODD. The two odd numbers that can be made using the digits 1, 2 & 7 that immediately come to mind are 127 & 721. We've proved that the value isn't *unique*.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given $K < 700$. Two such numbers that can be made using the digits 1, 2 & 7 that immediately come to mind are 127 & 172. We've again proved that the value isn't *unique*.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the statements stipulate that K is an ODD integer < 700. Two such numbers that can be made using the digits 1, 2 & 7 that immediately come to mind are 127 & 271. We've finally again proved that the value isn't *unique*.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.192

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.2).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that we require a numerical value as our final answer!

	With Patio	Without Patio	TOTAL
With Swimming Pool			**?**
Without Swimming Pool			
TOTAL	48	27	75

STATEMENT (1) alone: The additional information fills in the original table as follows:

	With Patio	Without Patio	TOTAL
With Swimming Pool	10		**?**
Without Swimming Pool	38		
TOTAL	48	27	75

This information alone again does little to help us find a *unique* value for the **?** cell.
Here we know the SUM total of the two highlighted cells = 27, however, we do not know how this sum is divided up between the two highlighted cells. There could be multiple values that can be assigned to these cells which will then have respectively multiple values for the **?** cell.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: If **X** be the number of houses in the community that have a patio and a swimming pool, then the additional information from this statement fills in the original table as follows:

	With Patio	Without Patio	TOTAL
With Swimming Pool	**X**	27 – **X**	**? =** (27 – **X**) + **X** = 27
Without Swimming Pool	48 – **X**	**X**	= (48 – **X**) + **X** = 48
TOTAL	48	27	75

With little mathematical manipulation we see that our cells to the far right have fixed/*unique* values that are independent of the assumed variable **X**. Thus with the information in this statement alone, we arrive at a *unique* value for what is asked in the question stem.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.193

The language of the question together with the information given in the statements presents a perfect case scenario to view things via the *Combined mean* interpretation result:

$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:

Where,

$\mathbf{N_1}$ = Sample size of SET 1 – *Male attendees*

$\mathbf{N_2}$ = Sample size of SET 2 – *Female attendees*

$\mathbf{M_1}$ = Mean of elements of SET 1 – *Mean books purchased by the male attendees*

$\mathbf{M_2}$ = Mean of elements of SET 2 – *Mean books purchased by the female attendees*

M = Combined Mean of the two SETS – *Mean books purchased by all attendees*

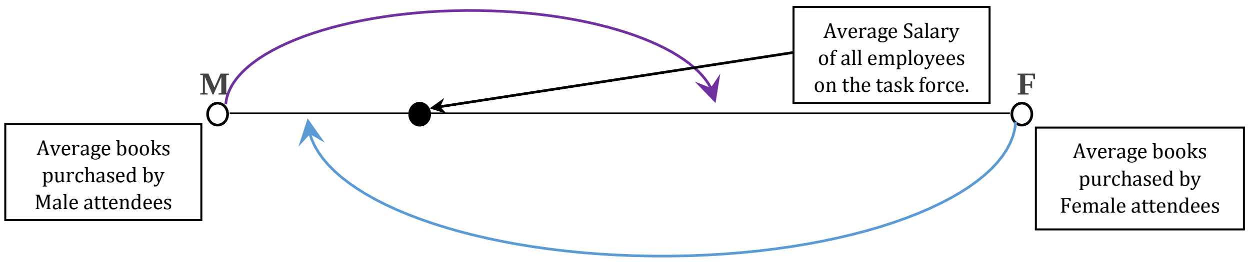
$\mathbf{D_1}$ = ($\mathbf{M - M_1}$) = Deviation distance of $\mathbf{M_1}$ from the combined Mean of the two SETS

$\mathbf{D_2}$ = ($\mathbf{M_2 - M}$) = Deviation distance of $\mathbf{M_2}$ from the combined Mean of the two SETS

Now with this background info we can present the information given in the question stem as follows:

We're given that the total number of books purchased was 15,000.

If **M** & **F** be the number of *male* and *female* attendees at the convention.



We're asked the absolute value of **F**.

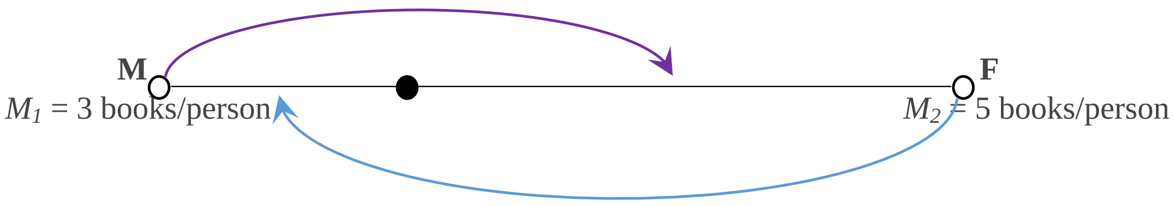
<u>STATEMENT (1) alone</u>: This statement simply tells us the total number of attendees at the convention. In other words the statement says **M + F =** 4000. At best using the information in the question stem *(total number of books purchased = 15,000)*, we can find the NET combined average of the number of books purchased by the entire group.

Average Number of books purchased by the entire group = (15000/4000) = $3\frac{3}{4}$ books/person.

However, the statement alone lacks information to arrive at anything concrete regarding the absolute value of **F**.

STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: The information presented in this statement may be added to the diagram originally made for this question as:

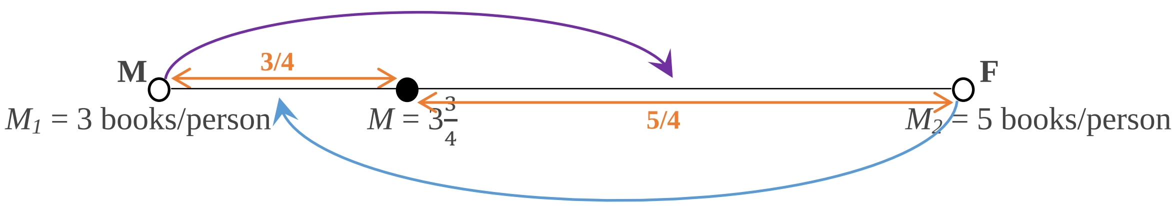


However, the information still lacks information about the entire group as a whole, and therefore this statement alone too lacks information to arrive at anything concrete regarding the absolute value of **F**. At best the information can form a single linear equation in two variables → 15000 = 3***M** + 5***F**.

STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: The information presented in both statements considered together may be added to the diagram originally made for this question as:

(We know the individual means of the female and male attendees as well as the combined mean of all the attendees)



This is pretty much all the information that we need to get a *unique* value of the variable **F**! The diagram shows that the clubbed information can easily help us arrive at the ratio of Male to Female attendees: (**M/F**) = (5/3) or (**F/M**) = (3/5) or (**F/**(**F + M**)) = (3/8) or **F =** (3/8)*(**F + M**). Since **F + M** is given = 4000 in statement (1). → **F** = 1500 – a *unique* answer value.

All calculations presented are for demonstration purposes only, the confident knowledge seeing the equations at hand that a unique value can be arrived at is most crucial to the crux my presenting the solution as well as to saving time on the exam.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.194

Given that X & Y are *positive* Integers, we're asked for a unique value of the SUM (X + Y).
A targeted approach aimed at trying to find multiple values of the SUM asked should pretty much do the job for us.

STATEMENT (1) alone: We're given the equation → $(2^X)*(3^Y) = 72 = (2^3)*(3^2)$. Since the only way that the two sides of the equation $(2^X)*(3^Y) = (2^3)*(3^2)$ will be equal to each other is if the powers of 2 & 3 are same on both sides, X = 3 & Y = 2. (X +Y) in turn turns out to be = 5 – a *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given the equation → $(2^X)*(2^Y) = 2^{(X + Y)} = 32 = (2^5)$. Since the only way that the two sides of the equation $2^{(X + Y)} = 2^5$ will be equal to each other is if the power of 2 is the same on both sides, (X +Y) = 5 – a *unique* answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.195

We're asked for a *unique* value of the variable *H*, *H* is any *number*.
A targeted approach aimed at trying to find multiple values of *H* is what we'll adopt here.

STATEMENT (1) alone: The statement says that $H^2 = 36$ → $H = \pm 6$. There hence exist two possible values of the variable *H* under this statement.
STATEMENT (1) alone - INSUFFICIENT
STATEMENT (2) alone: This statement gives out a Quadratic equation in *H*. Now given that a quadratic equation almost always has two root/solutions, this statement may seem unworthy of looking deeper into. However, it proves beneficial to work with equations to the point where one feels confident about what he can expect down the calculation line.
The statement says $H^2 + 12*H = -36$ or, $H^2 + 12*H + 36 = 0$ or, $H^2 + 2*6*H + 6^2 = 0$
Using the formula $(A + B)^2 = A^2 + B^2 + 2*A*B$
We arrive at: $(H + 6)^2 = 0$ – the only solution to which is $H = -6$ – a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.196

This question is all about general counting accuracy.
Given two *integers* X & Y, were supposed to find the exact number of ODD *integers* between X & Y (non-inclusive).
A YES/NO targeted approach aimed at trying to find multiple solutions to the question can be used here.

STATEMENT (1) alone: The statement says that there are 12 EVEN *integers* between X & Y (non-inclusive). The answer to the question stem all depends on what the values of X & Y are as we'll see below! We'll make cases by taking appropriate values of X & Y to demonstrate. *The demonstration given below is only for the purpose of explaining the idea behind the solution. Such an analysis is not recommended for the exam. The exam requires one to understand the working behind counting even & odd integers.*

Let me begin by first choosing my even numbers – I'll choose 2 to 24 inclusive. Now for these even integers to be included between X & Y, my X integer variable and Y integer variable may take on the following values
CASE I: X & Y are both even X = 0, Y = 26. The total number of integers between 26 & 0 (non-inclusive) will be = (26 – 0) – 1 = 25. Given there are 12 Even → there will be 13 ODD integers.

CASE II: X is even & Y is odd X = 0, Y = 25. The total number of integers between 25 & 0 (non-inclusive) will be = (25 – 0) – 1 = 24. Given there are 12 Even → there will be 12 ODD integers.

CASE II: X & Y are both odd X = 1, Y = 25. The total number of integers between 25 & 1 (non-inclusive) will be = (25 – 1) – 1 = 23. Given there are 12 Even → there will be 11 ODD integers.
Hence depending on what the values of X & Y are (and more specifically depending on what how many integers there are between X & Y), we may have multiple answers to the number of ODD integers between X & Y.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says that there are a total of 24 integers between X & Y. Now it is worth noting that ODD & EVEN integers always exist in conjugation of one another, one is preceded and succeeded by the other – {(O, E), (O, E),…so on}. Because of this paired pattern that extends on to infinity on both sides between any two Integers on the entire number line We'll either have (1) equal number of evens and odds giving us an EVEN *number of total integers* between X & Y or have (2) one more of one kind (even or odd) than the other *(example 12 even 13 odd)* giving us an ODD *number of total integers* between X & Y.

Since the information given in this statement conforms to giving us an EVEN = 24 number of total integers between X & Y → there must be an equal number of even and odd integers to yield an EVEN total. Hence there are 12 even and 12 odd integers between X & Y – a CONFIRMED answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.197

Let **J** & **K** denote Jason's salary & Karen's salary in 1995 respectively. Then their salaries in 1998 according to the question stem are **J***$(1 + \frac{p}{100})$ & **K***$(1 + \frac{p}{100})$. We are required to find the value of **p**.

STATEMENT (1) alone: The statement mathematically says that **K** – **J** = $2000. However, this statement has no mention of what their salaries in 1998 were or any other information that might possibly provide links to the value of **p**. The statement alone thus lacks information to arrive at anything concrete regarding the absolute value of **p**.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement mathematically says that
K*$(1 + \frac{p}{100})$ – **J***$(1 + \frac{p}{100})$ = $2440 or, (**K** – **J**)*$(1 + \frac{p}{100})$ = 2440. However, this statement has no mention of what their salaries in 1995 were or any other information that might possibly provide links to the value of (**K** – **J**). The statement alone thus lacks information to arrive at anything concrete regarding the absolute value of **p**.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (2) says $(1 + \frac{p}{100})$ = 2440/(**K** – **J**) and using statement (1) we can substitute for the value of (**K** – **J**) to get a single equation one variable **p**.
This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable asked (**p**) is enough to mark option C and move on. THE CALCULATIONS that follow are for demonstration purpose only.*
$(1 + \frac{p}{100})$ = 2440/2000 = 1.22 or **p** = 22%.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.198

We'll try to treat this in terms of a SET S of values X_1, X_2 & X_3. Where X_1, X_2 & X_3 represent the number of raffle tickets sold by the individual members of the three member team.
Therefore, we can write S = {X_1, X_2, X_3} such that each of X_1, X_2 & X_3 are non-negative Integers, i.e. each of X_1, X_2 & $X_3 \geq 0$.
The question asks if at least one of X_1, X_2 or X_3 is ≥ 2.
A YES/NO targeted approach with the aim of proving within the confines of the statement(s) that neither of X_1, X_2 or X_3 is ≥ 2 is what we'll adopt here.

STATEMENT (1) alone: The statement says in a way that $X_1 + X_2 + X_3 = 6$. The YES case generation is easy → Let each variable be assigned the value 2. Then **YES** one of the members (In fact all three) did sell at least 2 raffle tickets.

The NO case would require that none of the three members sold more than 1 ticket or, In other words any member sold AT MOST 1 ticket, then the largest SUM of tickets all three members could have sold is 1 + 1 + 1 = 3 which is < 6 – the condition laid out by the question stem. Hence as we can see from the discussion above, it is impossible to create a NO answer scenario. Or in other words if all of them sold a SUM total of 6 tickets, then **YES** someone must have sold at least 2 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement says that all three of the elements X_1, X_2 & X_3 of the SET S are distinct. The YES case generation is again easy → say X_1, X_2 & X_3 = 4, 5 and 10. Then **YES** one of the members (In fact all three) did sell at least 2 raffle tickets.

The NO case would require that we start off with the bare minimum (possible) for the first variable (or any variable for that matter). Since X_1, X_2 & X_3 are non-negative Integers such that each of X_1, X_2 & $X_3 \geq 0$. *(well no one sells a negative amount of tickets)*, then let us begin with $X_1 = 0$, X_2 must then be equal to the next biggest (distinct) integer which is 1 and finally X_3 must then be equal to the next biggest (distinct) integer which is 2. Hence as we can see from the discussion above, here too it is impossible to create a NO answer scenario. Or in other words if all of them sold distinct number of tickets, then **YES** someone must have sold at least 2 – a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.199

We're given ***s*** & ***t*** as two numbers on the number line such that $s \neq t$.

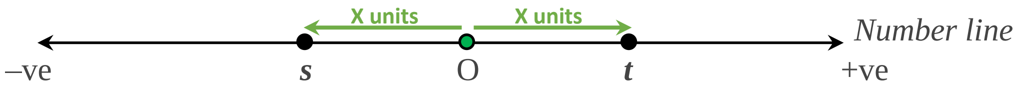
We're asked if $s + t = 0$?

Before we begin analysing the statement info let actually take a look at the conditions under which $s + t$ is = 0.

$s + t = 0$ → Either CASE I: $s = t = 0$ Or CASE II: $s = -t$. *(This means **s** & **t** lie on opposite side of the origin on the number line and are equidistant from the origin)*

Since the question stem states that $s \neq t$, we can rule out CASE I. **Therefore, the only way we get a CONFIRMED answer is if CASE II applies in either of the statements.**

CASE II diagrammatically represented (one possible scenario):



<u>STATEMENT (1) alone</u>: This statement mathematically says: $|s| = |t|$. This can mean two scenarios (1) $s = t$ OR (2) $s = -t$. Since the question stem stipulates that $s \neq t$. We're only left with $s = -t$ or rearranging, $s + t = 0$ → a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: 0 is between ***s*** & ***t***. This statement alone simply says that ***s*** & ***t*** lie on the opposite sides of the origin on the number line, kind of like the diagram drawn above. However the main difference between the diagram and what this statement stipulates is that the statement mentions nothing about the distances that ***s*** & ***t*** are at from the origin. If they're equidistant we get a **YES** answer to – Is $s + t = 0$? However, all other cases yield a **NO** answer. We thus have with ourselves a YES/NO situation.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.200

This is a relatively easier and most direct question in this data set.
We're given 1,000 companies that responded to a certain survey, and we're asked the *percentage* of these companies that indicated that they had a business recovery plan.
Note that for a survey that asks you if you if you have a business recovery plan or not, you can either answer YES or NO. No other possibility exists. Hence the 1000 respondents consisted of YES and NO answers only and no other reply

STATEMENT (1) alone: If 200 out of the 1000 i.e. 20% did not indicate a recovery plan, then that leaves us with the rest 80% that replied that they did have such a plan. 80% is a *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that those replying with a positive response on the survey were 4 times the ones that gave a negative response. This means that the positive respondents to negative respondents ratio is (4:1) or that the positive respondents are $(4/5)^{th}$ of the total respondents or 80%. 80% is a *unique* answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.201

Let C_A & C_C be the cost at which Martha bought the Armchair & the Coffee table respectively. Let SP_A & SP_C be the price at which Martha sold the Armchair & the Coffee table respectively. According to the question stem we are then looking for the following ratio → $(SP_A – C_A)/(SP_C – C_C)$.

STATEMENT (1) alone: The statement mathematically says that $C_A = (1 + \frac{10}{100})*C_C$. Or that $\mathbf{C_A = (11/10)*C_C}$. But since this statement makes no mention of Sale price at which Martha sold off the two items, this statement alone is far from delivering anything concrete.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement mathematically says that $SP_A = (1 + \frac{20}{100})*SP_C$. Or that $\mathbf{SP_A = (6/5)*SP_C}$. But since this statement makes no mention of cost incurred on the two items, this statement alone again is far from delivering anything concrete.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Thus far, taking the two statements together we've got: $\mathbf{C_A = (11/10)*C_C}$ – Statement (1) & $\mathbf{SP_A = (6/5)*SP_C}$ – Statement (2). Let's try to substitute the two relationships between the variables into the expression that we came up with in the question stem. → $(SP_A – C_A)/(SP_C – C_C)$. Substituting for C_A & SP_A, we get:
$\{(6/5)*SP_C – (11/10)*C_C\}/(SP_C – C_C)$. which further can be simplified to
$\{(12/10)*SP_C – (11/10)*C_C\}/(SP_C – C_C)$ or, splitting 12 as 12 = 1 + 11,
$\{(1/10)*SP_C + (11/10)*(SP_C – C_C)\}/(SP_C – C_C)$ or,

$(1/10)*\{SP_C/(SP_C - C_C)\} + (11/10)$

Even down to the most simplified form the ratio is dependent on the Individual values of SP_C & C_C or at least on the ratio – (SP_C/C_C). Since all the mathematical manipulation cannot yield a *unique* answer, we can label this as insufficient.

➔ ***A quicker** approach to see that the ratio does not deliver a unique value is to see that the numerator of the expression $\{(6/5)*SP_C - (11/10)*C_C\}/(SP_C - C_C)$ which is$\{(6/5)*SP_C - (11/10)*C_C\}$ is of the form $\mathbf{a}*X - \mathbf{b}*Y$, where $\mathbf{a} \neq \mathbf{b}$. And the ratio in such a case → $(\mathbf{a}*X - \mathbf{b}*Y)/(X - Y)$ **a** & **b** known will never yield a unique or known value unless and until the individual values of X & Y are known. We should have discarded the discussion as insufficient right at the point of the expression $\{(6/5)*SP_C - (11/10)*C_C\}/(SP_C - C_C)$ because $(6/5) \neq (11/10)$. Any further working with the expression is a waste of time.*

STATEMENT (1) & (2) together - INSUFFICIENT

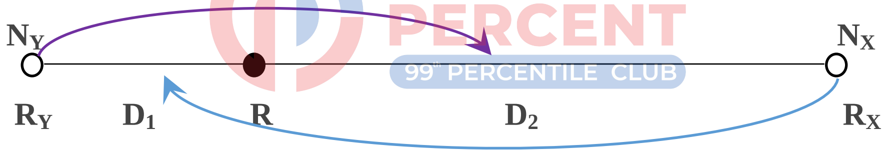
ANSWER – (E).

Q.202

The language of the question together with the information given in the statements presents a perfect case scenario to view things via the *Combined mean* interpretation result:

$$\frac{NY}{NX} = \frac{RX - R}{R - RY} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,

$\mathbf{N_Y}$ = Sample size of SET 1 – *Employees in division Y*

$\mathbf{N_X}$ = Sample size of SET 2 – *Employees in division X*

$\mathbf{R_X}$ = Ratio property of SET 1 – *Ratio of Full time to Part time for division X*

$\mathbf{R_Y}$ = Ratio property of SET 2 – *Ratio of Full time to Part time for division Y*

R = Combined Ratio for the two SETS – *Ratio of Full time to Part time for the company*

$\mathbf{D_1} = (\mathbf{R} - \mathbf{R_Y})$ = Deviation distance of $\mathbf{R_Y}$ from the combined Ratio for the two SETS

$\mathbf{D_2} = (\mathbf{R_X} - \mathbf{R})$ = Deviation distance of $\mathbf{R_X}$ from the combined Ratio for the two SETS

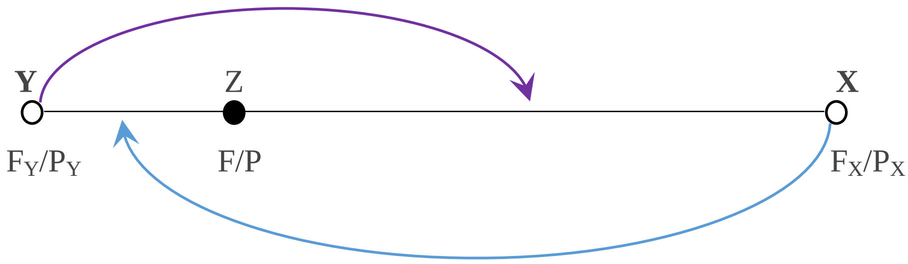
Now with this background info we can present the information given in the question stem as follows:

We're given that the total number of books purchased was 15,000.

Let **X** & **Y** be the total number of employees in division X & Y respectively.

Let F_X, F_Y, P_X & P_Y be the number of full time employees in division X, number of full time employees in division Y, number of part time employees in division X & number of part time employees in division Y respectively.

Let F & P be the number of full time and part time employees in company Z *(total)*



We're asked the absolute value of $F_X/P_X > F/P$. In other words, on the diagram above, we're simply asked if we can definitively say that F_X/P_X lies on the right side of the line drawn.

STATEMENT (1) alone: This statement simply says that the ratio $F_Y/P_Y < F/P$. Now since F/P for the company as a whole has to lie in between the line joining F_X/P_X & F_Y/P_Y, thus one of F_X/P_X & F_Y/P_Y will be greater than F/P and the other will be smaller. The statement says that F_Y/P_Y lies to the left of F/P in the diagram as shown above, then the only possibility for F_X/P_X is to lie to the right of F/P or in other words F_X/P_X is definitely > F/P. A CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We'll begin by trying to interpret this statement mathematically. The statement says that (1) $F_X > F_Y$ & (2) $P_X < P_Y$. If we combine these two bits of information together, we can say definitively say that $F_X/P_X > F_Y/P_Y$. This means while representing the information diagrammatically on the line segment diagram F_X/P_X will lie to the right of F/P *(which will always lie in between the values of F_X/P_X & F_Y/P_Y)* F_Y/P_Y to the right of F/P – as shown in the diagram above. In other words F_X/P_X is definitely > F/P. A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.203

We're given a *positive integer* X and are asked the value of the **remainder** when X is divided by 6.

STATEMENT (1) alone: The statement says that (1) X is ODD & that (2) X is divisible by 3. In other words, X is an ODD multiple of 3. We can thus write X as:
X = 3*(2*K + 1), where K = {0, 1, 2, 3,…so on}
Or, X = 6*K + 3
The above simple representation is clear enough to definitively say that X divided by 6 (for all value of K) will yield a **remainder** = 3. A *unique* value obtained!
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: 12 is a multiple of 6, therefore whatever **remainder** X divided by 12 yields, the same **remainder** will result when X is divided by a factor of 12 i.e. 6.

Hence **remainder** = 3.
Alternatively, by the statement info, X can be written as X = 12*K + 3, where K = {0, 1, 2, 3,…so on}. X = 2*6*K + 3 when divided by 6 will always yield a **remainder** = 3. A *unique* value obtained!
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.204

Let M, W & C be the number of Men, Women & Children on the tour. We're given (W/C) = (5/2) and asked the absolute value of M.

STATEMENT (1) alone: This statement simply gives out the ratio: C/M = 5/11 even clubbed with the info in the question stem that W/C = 5/2, we can get the ratio in which all three (Men, Women & Children) were present at the tour. We can re-write C/M = 10/22 and W/C = 25/10. Clubbing the two we get: **W : C : M :: 25 : 10 : 22**. But this can generate a range of absolute values of the variable M.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This alone simply says **W < 30**, how is this information together with W/C = 5/2 even close to getting a fix on the value of the variable M. It shouldn't take more than a couple of seconds to label this info as insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Statement (1) says - **W : C : M :: 25 : 10 : 22.** From the ratio equation we can write the absolute values of all three variables as W = 25*K, C = 10*K & M = 22*K, where K = {1, 2, 3,…so on}
Now statement (2) stipulates that **W < 30**. Or 25*K < 30 Or K < (6/5). The only possible value of K from the set then is K = 1. → Thus M = 22*1 = 22. A *unique* value obtained!
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).
Top 1% expert replies to student queries (can skip) (Link)

Q.205

We'll begin by calculating the amount it costs Ellen in the two cases described in the question stem.

CASE I: – The Local Store – Cost = **p***(1 + —) = **p***(1.06)

CASE II: – Catalogue – Cost = **q**.
We're asked if **p***(1.06) > **q**?
We'll adopt the YES/NO targeted approach by the use of plugging in values.

STATEMENT (1) alone: The statement gives out an inequality: **q – p** < 50. The first values that come to mind are **q** = 2 & **p** = 1 yielding a **NO** answer & **q** = 101 & **p** = 100 yielding a **YES** answer. We thus arrive at a YES/NO answer situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement just says out the value of one of the variables: **q** = 1150. However, since nothing about the variable **p** is mentioned in the statement or in the question stem, this statement alone lacks information to arrive at anything concrete regarding the inequality.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the two statements say **q – p** < 50 – Statement (1) & **q** = 1150 – Statement (2). Substituting for **q** in the inequality → **p** > 1100,
Or **p***(1.06) > 1166 and **q** = 1150 → This can easily lead us to a definitive answer to the asked question – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.206

The question requires us to find a *unique* value of the *positive Integer* **P**.

STATEMENT (1) alone: The statement says that **P**/4 = prime number. There can be infinite values of the Integer **P** as **P** = 4**K*, where *K* = {2, 3, 5, 7,…so on}
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says **P** is divisible by 3 or that **P** is a multiple of 3. Thus **P** = 3**M*, where *M* = {1, 2, 3,…so on}. There can be infinite values of the Integer **P**.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: According to statement (1) **P** = 4*(prime number) & according to statement (2) **P** is divisible by 3. Now since in the product 4*(prime number), 4 is not divisible by 3 and the only prime number that is divisible by 3 is the number 3 itself, the only value **P** can take on is **P** = 4*3 = 12. A *unique* value obtained!
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.207

This is one of the most direct questions in this data set!
The question asks if Y < 2*X?

STATEMENT (1) alone: The statement introduces the inequality (Y/4) < (X/2) which when multiplied by 4 on both sides straight out gives Y < 2*X – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement introduces the inequality ((Y – 2*X)/3) < 0 which when rearranged/simplified straight out gives Y < 2*X – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.208

This is again a pretty direct question once the statements are analysed.
The question asks if X > Y?
A quick approach is to plug in simple values of X & Y to generate a YES/NO situation wherever we can.

STATEMENT (1) alone: The statement introduces the inequality X + Y < 0. To respond to the question asked (Is X > Y?), we can take X = –3 & Y = –10 for a **YES** answer and X = –3 & Y = 1 for a **NO** answer. A YES/NO answer renders this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement introduces the inequality X – Y > 0. We can simply rearrange to get X > Y which is a direct answer to the question raised – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.209

Let the Monthly revenue target of Company R for its month of January be **J**, then the question asks the value of (**J** + 2****x***)?

STATEMENT (1) alone: We're given the value of **J** + 11****x*** = $310,000, however, since this is a single linear equation in two variables, it is hard to get a fix on the individual values of **J** & ***x*** and hence on the value of (**J** + 2****x***).
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically we can chalk this out as:
(**J** + 8****x***) – (**J** + 5****x***) = $30,000, or ***x*** **=** $10,000, However since the value of **J** is still unknown, it is hard to get a fix on the value of (**J** + 2****x***).
STATEMENT (2) alone - INSUFFICIENT
STATEMENT (1) & (2) together: It's not hard to see that together the piece together sufficient information to answer our question definitively. We've got ***x*** = $10,000 and we substitute this in the equation formed in statement (1) analysis → **J** + 11****x*** = $310,000 to get **J** = 200,000. This further yields a *unique* value of the expression (**J** + 2****x***) = $220,000
Again calculating to the exact point till where I have calculated is ill advised and is a waste of time. Once you're confident of the fact that given the info a unique value for what is asked can be furnished Mark C and move on.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.210

We're asked if M + Z > 0?
Some simple rearrangement/mathematical manipulation does the trick here!

We will of course still try out our YES/NO targeted approach by making cases wherever we can.

STATEMENT (1) alone: Given M – 3*Z > 0, we can at most write this as: M > 3*Z. To respond to the question asked (Is M + Z > 0?), we can take M = 13 & Z = 1 for a **YES** answer and M = –3 & Z = –11 for a **NO** answer. A YES/NO answer situation renders this statement insufficient.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Given 4*Z – M > 0, we can at most write this as: M < 4*Z. To respond to the question asked (Is M + Z > 0?), we can take M = 3 & Z = 1 for a **YES** answer and M = –30 & Z = –1 for a **NO** answer. A YES/NO answer situation renders this statement insufficient too.

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information, we're given two positive quantities (M – 3*Z > 0 & 4*Z – M > 0) and we can add them together to get yet another positive quantity: (M – 3*Z) + (4*Z – M) > 0 or Z > 0, now since M > 3*Z as per statement (1), M is also > 0. Since both M & Z turn out to be > 0, M + Z must also definitely be > 0 – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.211

The question requires us to find the number of factors of 20**K*, where *K* is a *positive Integer*. I'll be as usual adopting an approach that is aimed at finding multiple solutions to what is asked.

Before we begin, a **Note** on how to find the **number** of factors of any positive integer *K*!

1. The integer *K* is first of all broken down to the product of distinct prime numbers raised to their respective powers. So Let $K = (m^A)*(n^B)*(p^C)$, where *m, n & p* are prime numbers that raised to their respective powers – A, B & C – are multiplied together to yield *K*.
2. Then the total number of factors (inclusive of 1 & *K*) of *K* will be (A + 1)*(B + 1)*(C + 1), where A, B & C are positive integers. *(hence, (A + 1), (B + 1) & (C + 1) will at least be equal to 2)*

Now returning to the original question, we'll split up 20 in terms of its prime factors:
$20 = 2^2 \times 5$

STATEMENT (1) alone: 20**K* can now be written as $20*K = 2^2 \times 5 \times K$, where *K* is a prime number, or *K* = {2, 3, 5, 7,…so on}. Now, if *K* = 2, then $20*K = 2^3 \times 5$ and the total number of factors of 20**K* thus become (3 + 1)*(1 + 1) = **8**. Yet, if *K* = 31, then $20*K = 2^2 \times 5 \times 31$ and the total number of factors of 20**K* thus become (2 + 1)*(1 + 1)*(1 + 1) = **12**. Thus a *unique* value to the question asked in the question stem does not exist.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're directly given the value of K = 7 or the value of 20*K = 140. This right here should be enough to deem this statement sufficient. *(as a fixed number will always have a fixed number of factors) I'll still go a bit deeper to find the actual value that is asked, however everything from here on is a waste of time on the exam.*

20*K can now be written as 20*7 = 2^2 x 5 x 7, the total number of factors of which then are (2 + 1)*(1 + 1)* (1 + 1) = **12** – a *unique* answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.212

Let **V** be the volume of the container which was full with sugar initially. Some of the sugar is taken out and the new volume of the sugar in the container becomes **X** *(say)*. Then according to the question we're required to find the ratio (**X/V**).

STATEMENT (1) alone: The statement if mathematically translated says that

X*(1 + $\frac{30}{100}$) = **V** or (**X/V**) = 10/13 or the % decrease in the amount of sugar in the Jar is = (3/13)*100 ~ 23% - a *unique* answer value.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This says that 6 cups of sugar were taken out of the jar. However, there is no other information present to link the volume of the cup with the volume of the Jar. In short this information is miles away in substantiating any sort of conclusive answer that the question asks us.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.213

We're given *positive numbers* A & B, and are asked to find the coordinates of the mid-point of a line segment CD.

Note here that even though the statements give out the coordinates in terms of A & B, the sufficiency of any information is only substantiated when a *unique numerical* value of the coordinates is found using that information.

→The coordinates of the mid-point of the line joining the points (X_1, Y_1) & (X_2, Y_2) are

$$\left(\frac{X1+X2}{2}, \frac{Y1+Y2}{2}\right)$$

STATEMENT (1) alone: This statement gives out the coordinates of only one of the ends of the line segment – point C. This alone is clearly insufficient information as point D according to this statement could be anywhere on the XY plane.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the coordinates of only one of the ends of the line segment – point D. This alone again is clearly insufficient information as point C according to this statement could be anywhere on the XY plane.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the coordinates of point C are {A, (1 – B)} and those of point D are {(1 – A), B}. The coordinates of the mid-point of the segment CD thus are $\left(\frac{A+(1-A)}{2}, \frac{(1-B)+B}{2}\right) = (½,½)$ – a *unique numerical* value.

STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.214

Let L & T denote the length and thickness of the square slab in question.
Because of the proportionality that the question stipulates we can write cost as:
Cost = K*T*L^2, where K is a positive constant
We're asked the value of the cost of the slab that is 3 meters long & 0.1 meters thick.
In other words we're asked the value of the expression – (K*(0.1)*3^2) = 0.9*K.
Therefore the entire situation boils down to getting a *unique* value of the constant K.

STATEMENT (1) alone: mathematically put, this statement translates into:
K*(0.2)*2^2 – K*(0.1)*2^2 = $160 or K = 160/(0.4) = 400 – a *unique numerical* value.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: mathematically put, this statement translates into:
K*(0.1)*3^2 – K*(0.1)*2^2 = $200 or K = 200/(0.5) = 400 – a *unique numerical* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.215

Let's assume Bob produced N items last week, the question requires us to find a *unique* value of the variable N.
I'll be as usual adopting an approach that is aimed at finding multiple solutions to what is asked, trying to prove that a *unique* solution does not exist.
The question stipulates that Bob is paid $\boldsymbol{x}$ dollars per item for the first 36 items and 1.5*$\boldsymbol{x}$ for each additional item in excess of 36.

It may prove beneficial to consider the following in case making in our statement analysis: In choosing a value for the unknown $\boldsymbol{x}$ we'll try to always keep in mind the threshold of 36 items. Therefore, say if the total payment received by bob is given as $480 *(as it is in the first statement)*, then we'll try to choose one value of $\boldsymbol{x}$ such that the threshold (= 36) times $\boldsymbol{x}$ exceeds the value given (i.e. $480) so that we don't have to consider going into the 1.5*$\boldsymbol{x}$ realm, AND another value of $\boldsymbol{x}$ such that the threshold (= 36) times $\boldsymbol{x}$ is less than the value given (i.e. \$480) so that we CAN also consider going into the 1.5***x** realm. This is the crux of the entire solution by making cases and showing that a *unique* value of *N* does not exist.

Proceeding further with the statements, the above discussion hopefully becomes clearer.

STATEMENT (1) alone: This statement says that for all his last week's work Bob received a total payment of \$480. I can write this down mathematically as:
480 = 36***x** + (*N* – 36)*1.5***x** assuming *N* > 36 or 480 = *N****x** assuming *N* < 36. Since the variable **x** can assume multiple values, we can multiple solutions for *N* above.
CASE I: say **x** = 10 and hence 1.5***x** = 15, *(Since 10*36 = 360 < 480, hence for **x** = \$10, we'll have to consider the* 480 = 36***x** + (*N* – 36)*1.5***x** *equation)* then plugging in these values above we get *N* = 36 + 8 = 44.
CASE II: say **x** = 20 and hence 1.5***x** = 30, *(Since 20*36 = 720 > 480, hence for **x** = \$20, we'll have to consider the* 480 = *N****x** *equation)* then plugging in these values above we get *N* = 24. Thus a *unique* value to the question asked in the question stem does not exist (24 & 44 are the two possible solutions).
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement alone says that for all his this week's work Bob received a total payment of \$510. I can again write this down mathematically as:
510 = 36***x** + (*N* – 36)*1.5***x** assuming *N* > 36 or 510 = *N****x** assuming *N* < 36.
Note here that information saying that Bob produced 2 more items this week in comparison to last week's production is irrelevant here since we know nothing of his last week's production considering this statement alone.
Since the variable **x** can assume multiple values, we can again have multiple solutions for *N* above.
CASE I: say **x** = 10 and hence 1.5***x** = 15, *(Since 10*36 = 360 < 510, hence for **x** = \$10, we'll have to consider the* 510 = 36***x** + (*N* – 36)*1.5***x** *equation)* then plugging in these values above we get
N = 36 + 10 = 46.
CASE II: say **x** = 30 and hence 1.5***x** = 45, *(Since 30*36 = 1080 > 510, hence for **x** = \$30, we'll have to consider the* 510 = *N****x** *equation)* then plugging in these values above we get *N* = 17. Thus again a *unique* value to the question asked in the question stem does not exist (17 & 46 are the two possible solutions).
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the statements together the first thing we can do is get a fix on the *amount per item* that Bob was paid for the additional two items that he produced this week in comparison to his production last week. Statement (1) says Bob got \$480 for his production work last week & Statement (2) says Bob got \$510 for his production work this week – a week in which he produces 2 more items than the number of items he produced last week.

We can therefore, infer that the *amount per item* that Bob was paid for the additional two items this week was (\$510 – \$480)/2 = \$15. *PLEASE don't rush into labelling the \$15 as* ***x***. We have to consider both possibilities → Either the \$15 = **x** & in turn 1.5***x** = \$22.5, Or the \$15 = 1.5***x** & in turn **x** = \$10.

We'll consider both possibilities one by one and see if we can rule out any one of them to narrow down to one *unique* answer.
We'll use the following equation borrowed from statement (2) for our cause:
510 = 36***x** + (*N* – 36)*1.5***x** assuming *N* > 36 or 510 = *N****x** assuming *N* < 36.
CASE I: **x** = 15 and 1.5***x** = 22.5, *(Since 15*36 = 540 > 510, hence for **x** = $15, we'll have to consider the* 510 = *N****x** *equation)* then plugging in these values above we get *N* = 34.
CASE II: 1.5***x** = 15 and hence **x** = 10, *(Since 10*36 = 360 < 510, hence for **x** = $10, we'll have to consider the* 510 = 36***x** + (*N* – 36)*1.5***x** *equation)* then plugging in these values above we get *N* = 36 + 10 = 46.
Thus again a *unique* value to the question asked in the question stem does not exist (34 & 46 are the two possible solutions, OR in other words both the possibilities *(Either the $15 = **x** & in turn 1.5***x** = $22.5, Or the $15 = 1.5***x** & in turn **x** = $10.)* are valid).
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.216

The question asks if ***x*** < ***y***?
We'll try to stick to our YES/NO targeted approach by plugging in values/making cases wherever we can.

STATEMENT (1) alone: We're given that ***x*** < (3/2)****y***. A simple plugging in of values derived from the inequality ***x*** < (3/2)****y*** can help resolve this. ***x*** = 2.25 & ***y*** = 2 conform to the inequality given in this statement, however, give a **NO** answer to our main question (Is ***x*** < ***y***?). ***x*** = 1 & ***y*** = 2 on the other hand again conform to the inequality given in this statement as well as give a **YES** answer to our main question (Is ***x*** < ***y***?). A YES/NO situation renders this statement insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given that ***x*y*** > 0 (***x*** & ***y*** *are of the same sign*). A simple plugging in of values derived from the inequality ***x*y*** > 0 can help resolve this. ***x*** = 2 & ***y*** = 1 conform to the inequality given in this statement, however, give a **NO** answer to our main question (Is ***x*** < ***y***?). ***x*** = 4 & ***y*** = 7 on the other hand again conform to the inequality given in this statement as well as give a **YES** answer to our main question (Is ***x*** < ***y***?). A YES/NO situation renders this statement insufficient.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The statements together say that (1) ***x*** < (3/2)****y*** and that (2) ***x*** & ***y*** are of the same sign. We can pick up the same cases that we discussed in the analysis of statement (1) as they also conform to the condition laid out by statement (2).
I'll just re-paste the discussion here, but on the actual exam all you have to do is look back at the individual statement's analysis to see if any one of them also coincidently conforms to other as it does here. If such a case exists we can directly mark E and move on. In other words it would obviously be foolish and a waste of time to try out other cases when such already coincidently exist.

x = 2.25 & ***y*** = 2 (both of the same sign) conform to the inequality given in statement (1), however, give a **NO** answer to our main question (Is ***x*** < *y*?). ***x*** = 1 & ***y*** = 2 (also both of the same sign) on the other hand again conform to the inequality given in statement (1), as well as give a **YES** answer to our main question (Is ***x*** < *y*?). A YES/NO situation finally renders the combined statements insufficient.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

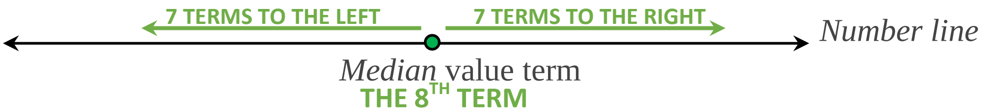
Q.217

The question provides us with a sequence of 15 terms *(or an odd number of terms)* $\{A_1, A_2, A_3, A_4, \ldots, A_{15}\}$. We're also given a relation between the elements of the sequence:
$A_N = A_{(N-1)} + K$, where $2 \leq N \leq 15$ & K is a **non-zero** numeric constant. → The sequence is an **Arithmetic Progression** with a **non-zero** numeric constant.
We're finally asked to provide the EXACT number of terms that have a value > 10.

STATEMENT (1) alone: We're given the starting term $A_1 = 24$, however, since we're unaware of the exact value of *K*, the question asked can have multiple answers. For all we know *K* could be positive giving us all 15 terms greater than 10, or *K* could be = –14 giving us just one term – the first – greater than 10. The existence of multiple answers proves that the statement alone lacks sufficient information to conclusively answer the question.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement says $A_8 = 10$. At first glance the term given may seem confusing and a sure shot insufficient info, however, a closer look reveals that this is all the info we need. There is a reason for giving the 8th term which is that the **8th** term, in an **A.P.** sequence of **15** terms, forms the *Median* value term or the middle most term.



And Since we're given a **non-zero** numeric constant of the **A.P.** series that is added or maybe subtracted, *(forget A_1 = 24 here, that was statement (1) and this statement (2) ALONE)* all the terms of the sequence cannot be equal 10. Hence depending on whether *K* is +ve (an ascending A.P.) or –ve (a descending A.P.), we'll ALWAYS have exactly 7 terms that are less than the 8th term = 10 and exactly 7 terms that are greater than the 8th term = 10. *(Only the position of the greater and lesser terms will change from right to left or left to right depending on how we change the sign of K)* Hence a *unique* answer (= 7).

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.218

The question asks if 4***z** > –6? Or, Is **z** > –3/2?
The number line representation gives a clearer picture of better understanding the statements:

STATEMENT (1) alone: The information can be represented on the number line as follows:

According to the statement ***z*** can lie in either region I or II. This gives us a YES/NO situation about ***z*** lying in region II & beyond definitively.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The information can be represented on the number line as follows:

According to this statement ***z*** lies in region III. This gives us a CONFIRMED YES answer about ***z*** lying to the right of –3/2 Or a CONFIRMED YES to the question Is ***z*** > –3/2?

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

END OF SOLUTIONS

TOP-ONE-PERCENT

SOLUTIONS TO DS COLLECTION 2 – 218Q

RECENT DS COLLECTION 2 – 218Q

BY

SANDEEP GUPTA

DIRECTOR – TOP ONE PERCENT

THE BEST GMAT TRAINER IN INDIA

GMAT: 800 ... minimum score ever: 770

Minimum Quant Score ever: 51

Minimum Verbal Score ever: 45

(ALL 99th percentile scores)

For any queries/complaints/comments in general regarding the content of the material
Contact: manu.nagra2387@gmail.com; +91-8130655002

Q.1

This is one of the most direct questions that one may encounter!
The question asks if $M > K$?
M & K are both numbers in general.

STATEMENT (1) alone: The statement introduces the inequality $3*M > 3*K$ which when multiplied by 1/3 *(a positive quantity)* on both sides straight out gives $M > K$ → a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement introduces the inequality $2*M > 2*K$ which when multiplied by 1/2 *(a positive quantity)* on both sides straight out gives $M > K$ → a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.2

We're given a *positive INTEGER* **K** and asked if **K** is a perfect square?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about such questions.

STATEMENT (1) alone: The statement says that **K** is divisible by 4. In other words we may say that **K** is therefore a multiple of 4, or **K** = $4*m$, where m is a positive integer = {1, 2, 3,…so on}. Now the question to ask ourselves is that, well is every multiple of 4 a perfect square? – Not Exactly! *(as a confirmation values **K** = 16 & **K** = 8 can substantiate this as they give a YES/NO answer to the question asked)* We end up with a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Let the four primes be *a, b, c* & *d*. We may substitute actual values later on. The statement mandates **K** to be of the form **K** = $a^A*b^B*c^C*d^D$, where A, B, C & D are the powers that the primes may be raised to! Bear in mind that for **K** to be a perfect square A, B, C & D must all be *EVEN* positive Integers. Since nothing about the frequency of occurrence (which is basically the power of the primes) of the primes in the product is mentioned, a YES/NO target approach can easily render this statement insufficient. For example – **K** = $a^4*b^2*c^6*d^4$ is a perfect square giving us a **YES** answer, however, **K** = $a^1*b^2*c^1*d^3$ is NOT a perfect square giving us a **NO** answer. We again arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: The statements together say that **K** is a multiple of 4 or that **K** = $4*m$ – Statement (1) and that **K** is of the form **K** = $a^A*b^B*c^C*d^D$. However, even when the two statements are taken together, the only piece of information that we can

SUBSTANTIATE is that one of *a, b, c* & *d* is the prime number 2 and its power in the product is ≥ 2. *(Since 4 = 2^2 and* **K** *is to be divisible by 4)* Hence at most we can re-write **K** as **K** = $2^A*b^B*c^C*d^D$ where $A \geq 2$. Knowing nothing about the POWERS of the rest of the primes and even about whether the power of 2 in the product is even or odd leaves this combined information vulnerable to fail the confirmation test. As an example –
K = $2^4*b^2*c^6*d^4$ is a perfect square giving us a **YES** answer, however, **K** = $2^3*b^2*c^1*d^3$ is NOT a perfect square giving us a **NO** answer. We once again arrive at a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.3

This again is one of the most direct questions that one may encounter!
We're given that both *W* & *Z* are **positive**.
The question asks if $(W/Z) < 1$?
We can reduce this question as to asking if $W < Z$? *(since both are given +ve we ca cross-multiply)*

STATEMENT (1) alone: This statement straight-out gives us a CONFIRMED YES answer by directly saying what is asked in the question stem!
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement introduces the inequality $Z < 4$, however since the statement mentions nothing about the possible values that *W* can take, we can discard this easily via a YES/NO approach (just to be sure). $W = 8$ & $Z = 2$ gives a **NO** answer and $W = 1$ & $Z = 2$ gives a **YES** answer – a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.4

Let's begin by simulating the information mathematically to the extent possible. Let, for this purpose, SP_J, C_J, SP_S & C_S represent the Sale Price of the jacket, the Cost/Original Price of the jacket, the Sale Price of the shirt & the Cost/Original Price of the shirt respectively. Now, the given information may be related as: $SP_J = (1 - \frac{15}{100})*C_J$ or $\mathbf{SP_J = (17/20)*C_J}$ AND $SP_S = (1 - \frac{10}{100})*C_S$ or $\mathbf{SP_S = (9/10)*C_S}$.

The question asks for the specific value of the expression: $(C_J - C_S)$.

STATEMENT (1) alone: The statement mathematically put says that $(SP_J - SP_S) = \$83$. Using this equation we're to relate to the expression $(C_J - C_S)$. Now using the two relations that were derived in the prior to analysing the statements: $\mathbf{SP_J = (17/20)*C_J}$ & $\mathbf{SP_S = (9/10)*C_S}$, we can substitute for SP_J & SP_S in the equation given by this statement to yield:

(17/20)*C_J – (9/10)*C_S = $83 or more simply 17*$C_J$ – 18*C_S = $1660, however, this is a single linear equation in two variables *(C_J & C_S)* and therefore can afford multiple pairs of values of *(C_J & C_S)* as its solutions. All these pairs of solutions will yield a range of values for the expression (C_J – C_S) – no *unique* answer.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the value of the variable C_J = $140. However, this statement alone forms just one piece of the puzzle to solve for the absolute value of the expression: (C_J – C_S). Since nothing in this statement mentions anything about the value of C_S (or for that matter SP_S), it is impossible to arrive at a *unique* value of the expression asked in the question using just the info provided in this statement.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, we'll have 17*C_J – 18*C_S = $1660 – from statement (1) and the absolute value of C_J = $140 – from statement(2). Using these two we can surely arrive at a *unique* value pair of the variables C_J & C_S *(C_J, C_S)*, and hence at a *unique* value of the expression (C_J – C_S).
This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variables required (C_J & C_S) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination.*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.5

We're given *Integers* X, Y & Z and are asked if the expression (X + Y + 2*Z) is Even?
A YES/NO targeted approach by making cases/plugging in values could be a good option of going about this questions.
(For the sum of two integers to be EVEN → either both are even or both are odd, similarly for the sum of two integers to be ODD → the two integers must form an odd – even pair)

STATEMENT (1) alone: This statement spells out that the sum (X + Z) is even. Analysing this info a bit more reveals that we're bound by two possible cases:
CASE I: Both X & Z are even OR CASE II: Both X & Z are odd. However, since the statement mentions nothing about the integer Y, the statement is easily vulnerable to fail the sufficiency test via the YES/NO approach. X even, Y even gives a **YES** answer and X even, Y odd gives a **NO** answer. Therefore a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement spells out that the sum (Y + Z) is even. Analysing this info a bit more reveals that we're bound by two possible cases:
CASE I: Both Y & Z are even OR CASE II: Both Y & Z are odd. However, since the statement mentions nothing about the integer X, the statement is easily vulnerable to fail the sufficiency test via the YES/NO approach. X even, Y even gives a **YES** answer and X odd, Y even gives a **NO** answer. Therefore a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two statement's individual information together we have the following: (X + Z) is EVEN – stipulated by statement (1) and (Y + Z) is EVEN – stipulated by statement (2). Simply adding the two together reveals with confirmation what the answer to the asked question is. Since the sum of two EVEN integers will always be EVEN, therefore (X + Z) + (Y + Z) is definitely EVEN or (X + Y + 2*Z) is definitely EVEN – a confirmed YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.6

We're given that the symbol @ represents one of the three arithmetic operations (addition, subtraction or multiplication, but which one → that's unknown)
We're asked the absolute value of 1 @ 0? *(based on what the symbol could/may represent)*
Since we're supposed to find a definitive/*unique* answer to the enquiry in the question stem, a targeted approach at finding multiple values *(at least two)* should work well here! *It's useless to riddle your minds with what the exact operation represented by the symbol could be. It proves easier to just concentrate on seeing whether a unique solution to the question asked exists.*

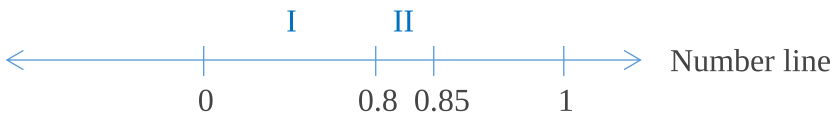
STATEMENT (1) alone: We're given that the operation represented by the symbol @ conforms to the following identity 0 @ 2 = 2. Based on this identity we can rule out *subtraction* as well as *multiplication*. We're therefore left with the symbol @ representing only ADDITION *(this pretty much does the job for us as we've narrowed our search down to a single operation that the symbol represents and since a single operation will always yield a unique answer, we can confidently let go of any further analysis and label this as sufficient).* Only for the sake of mentioning, 1 @ 0 = 1 – a *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given that the operation represented by the symbol @ conforms to the following identity 2 @ 0 = 2. Based on this identity we can rule out only *multiplication* here. We're therefore left with the symbol @ representing either ADDITION or SUBTRACTION *(however here this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what @ represents but with whether 1 @ 0 yields a unique answer).* We'll check for both operations one by one:
ADDITION: 1@ 0 = 1
SUBTRACTION: 1@ 0 = 1
Thus whichever of the two values that the symbol might represent, the answer to the question asked is 1 in both cases, in other words, the enquiry made in the question stem yields a *unique* answer based on the information shared in this statement. This is precisely what we need to label a statement sufficient.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.7

We're given a 1 KG coffee blend that is a mixture of exactly 2 types/brands of coffee *(type I coffee & type II coffee)*. If the 1 KG be made up of X & Y KGs of type I & type II coffee, *(such that X + Y = 1)* then the cost of the blend **C** in dollars per KG is given as:
C = 6.5*X + 8.5*Y
We're asked if the value of the variable X lies in the range such that X < 0.8?
A YES/NO targeted approach should work well for us here.

STATEMENT (1) alone: The statement mentions Y > 0.15, hence in a way all the information that the statement shares is about the variable Y and mentions absolutely nothing about the cost of the blend for which the combined equation in the question stem is given. However, this should not be the criteria for deciding the sufficiency of the statement. Notice that we're also given that the X and Y KGs make up the 1 KG blend → X + Y = 1 or Y = (1 – X). Substituting this back in the inequality given in this statement → (1 – X) > 0.15, or X < 0.85. This can be chalked out on the number line as follows:



The information arrived at thus says that X can lie in either region I or II. This gives us a YES/NO situation about X lying in region II definitively.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement talks in terms of the cost of the blend saying that **C** ≥ 7.30, or 6.5*X + 8.5*Y ≥ 7.30, Substituting Y = (1 – X) as in the previous statement analysis → 6.5*X + 8.5*(1 – X) ≥ 7.30 or rearranging, X ≤ 0.6 → which definitively means that X < 0.8 – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.8

We're given **INTEGERS** *N* & *P* and are asked if *P* is positive.

STATEMENT (1) alone: This statement says *N* + 1 > 0 or *N* > –1 → this means *N* can take on the following values: {0, 1, 2, 3,…so on}. However, note that this is a statement in just one variable, and that too the one other than the one asked. No mention of any information about *P* or a possible link of *P* with *N* makes it pretty easy to see why this statement is insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says that the product of the integers $N*P > 0$, which can be interpreted to say that either both N & P are positive or both N & P are negative. This gives us a YES/NO response as to whether P is positive.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Before we begin it is important not to forget that N & P mentioned here are *INTEGERS*. We'll now combine the two separate pieces of info above to see what we arrive at. Statement (2) says that either both N & P are positive or both N & P are negative and statement (1) lays out the following values *(in ascending order)* that N can take on $\{0, 1, 2, 3,\ldots\text{so on}\}$. Since according to the second statement N cannot be 0, therefore the only values that N can take on are positive thereby saying in turn that the only values that Integer P can take on are also thus positive or $P > 0$ – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).
Note that forgetting to take into consideration the fact that N & P are integers yields the wrong answer E.

Q.9

The language should not be mistaken to represent that of over-lapping sets. Should such a confusion arise, it is important to ask yourselves whether there is a reasonable chance of an overlap of the two sets presented or ask yourselves if a member of group can also be a member of the other – the answer to which makes is clear what is the exact nature of the question you are dealing with.

As far as this question is concerned a student cannot be both a freshman and a sophomore – this is equivalent to saying that a student is both in his first year and second year of college, which is illogical. In other words the three groups presented have no elements in common. Moreover in such a scenario if F, S & J represent the number of Freshman, Sophomores, & Juniors in the club, then $F + S + J$ = Total membership = 105.
We're required to find the value of the variable S.

STATEMENT (1) alone: This statement gives out the following ratio: $\mathbf{(F/S) = (1/2)}$, however, not a single mention of the variable J allows for multiple solutions or values of the variable S to satisfy the conditions laid out by this statement as well as the question stem.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the following ratio: $\mathbf{(F/J) = (1/4)}$, however, not a single mention of the variable S (here) allows for multiple solutions or values of the variable *S(itself)* to satisfy the conditions laid out by this statement as well as the question stem.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Together the two statements can be combined to give out the ratio in which all three exist relative to each other. Together with the information that they *(the three variables F, S & J)* being in a fixed ratio that the above two statements stipulate, the fact that all three add up to 105 as stipulated by the question stem is enough to know that a *unique* value of *S* is obtainable and thus the two together are sufficient. ← *If you've understood till this point you need not go any further to write down any sort of equations and perform any sort of calculations. You may straight away mark C and move on. This right here is the end of the solution to an actual approach on the exam regarding such questions. All DS involves is testing your confident knowledge that a unique/confirmed answer is attainable using the information at your disposal, rather than testing your ability to actually solve for a variable. What follows from here on is for demonstration purposes only.*

(*F/S*) = (1/2) & **(*F/J*) = (1/4)** from the two statements above stipulate that all three are in the ratio – *F* : *S* : *J* = 1 : 2 : 4, in other words the value of the variable *S* is $(2/(1 + 2 + 4))^{th}$ of the total members of the club, or $(2/7)^{th}$ of the total. → *S* = (2/7)*105 = 30 – a *unique* answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.10

Let **P** & **H** represent the number of Paperback & Hardcover books respectively. We're given the individual cost of each as well as the fact that **P** > 10 *(And since **P** & **H** are non-negative integers here, the values that **P** can take on are **P** = {11, 12, 13,…so on})*. We are required to find a *unique/fixed/single-numeric solution* value of the variable **H**.

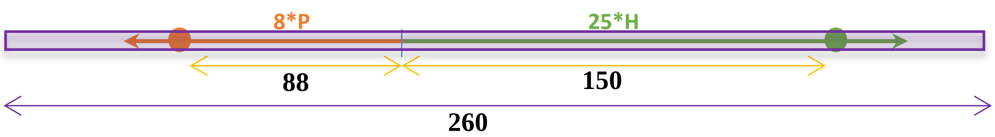
STATEMENT (1) alone: This statement if mathematically put says 25***H** ≥ $150 or in other words **H** ≥ 6. This gives us a range of values that **H** can take on rather than a *unique* value, **H** = {6, 7, 8,…so on}.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the range of the total cost of all the books that Juan bought. Mathematically put this statement says that 25***H** + 8***P** < $260. Let's analyse this inequality a bit further before arriving at inference from our side. The question stem mandates that **P** be > 10 or, **P** ≥ 11 or, 8***P** ≥ 88. *(Although you may tackle this part by substituting **H** = 1 & **H** = 2 and keeping **P** = 11 to show that more than one value of **H** satisfies the conditions laid out by this statement and be done with it, however the explanation that follows forms an understanding of the situation that may be applied in the subsequent analysis of the two statements together to see how a unique value is arrived at)* Now we have with us two inequalities that we'll try and make sense out of. We'll tackle this diagrammatically as follows – think of 25***H** and 8***P** as two pieces of a string/rod (the orange and the green) that join together to form a larger string *(25***H** + 8***P**)*. Let the joined string lay on the number line as shown below:

The Orange dot represents a BARRIER below which or to the left of which the orange arrow cannot go *(minimum length of the orange segment has to be 88)*. The black dot represents

another BARRIER to the right of which the green arrow cannot go. Thus the green segment can have a maximum value *(the orange arrow falls back as far as it can)* 259.99999 – 80 = 179.999999 and a minimum value of 0 *(the green line not be present at all and the orange line may have any length as long as the orange arrow stays to the left of the black dot)*. It is clear from the above depiction that **H** may have multiple values → **H** can be 0, 1, 2 etc and the orange segment can adjust to a certain extent
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing all the bits of information together we have: $8*\mathbf{P} \geq 88$ – question stem, $25*\mathbf{H} \geq 150$ – statement (1) & $25*\mathbf{H} + 8*\mathbf{P} < \$260$ – statement (2). If you've understood the discussion based on the diagram above, then we can say that piecing the information together we've just added another barrier ($25*\mathbf{H} \geq 150$) – this time on the green line. We'll change the above diagram a bit to show a more clearer picture of what the three inequalities above all together mean:



Let the two RODS orange and green be joined back to back as shown. Let these rods be of adjustable lengths with the condition that the orange arrow can never fall to the right of the barrier (the orange dot) and similarly, the green arrow can never fall to the left of the barrier (the green dot). And let this entire setup be placed in a purple uni-dimensional container that has a fixed length of 259.999999.

Under such conditions we're required to test for the number of values of variable **H** (and **H** alone, we're **not bothered** with the number of possible values of **P**) that can exist.

Beginning our analysis we reckon that we'll have to keep the orange to its minimum (88) so as to allow the maximum space for the green to expand. Now **H** = 6 is our first value that can keep the length of the co-joined bar (= 88 + 150 = 238) under 260 and hence inside the box. We'll try **H** = 7 now – the length of the co-joined bar becomes 88 + 175 = 263 so NOT POSSIBLE since the box has only a length of 259.99999, and the co-joined bar length exceeds 260. Therefore, the only possible solution to the scenario considering all the constraints on the variables is **H** = 6 – a *unique* solution.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.11

We're asked the absolute value of a *POSITIVE* Integer *M*!
An approach targeted at finding multiple *(at least more than one)* values of *M*, with the hope that we'll exhaust all possible cases/scenarios before arriving at a conclusion that a *unique* value for the asked quantity exists seems a befitting way of going about this question.

STATEMENT (1) alone: This statement simply says that *M* is of the form $M = 6*K + 3$, where *K* is a non-negative integer, or $K = \{0, 1, 2,…$so on$\}$. Clearly as you vary the value of the integer *K*, you'll arrive at multiple distinct values that *M* can take. Moreover, it should be clear by just reading the statement itself that there can infinite numerals that when divided by 6 will yield a remainder 3.

STATEMENT (1) alone – INSUFFICIENT

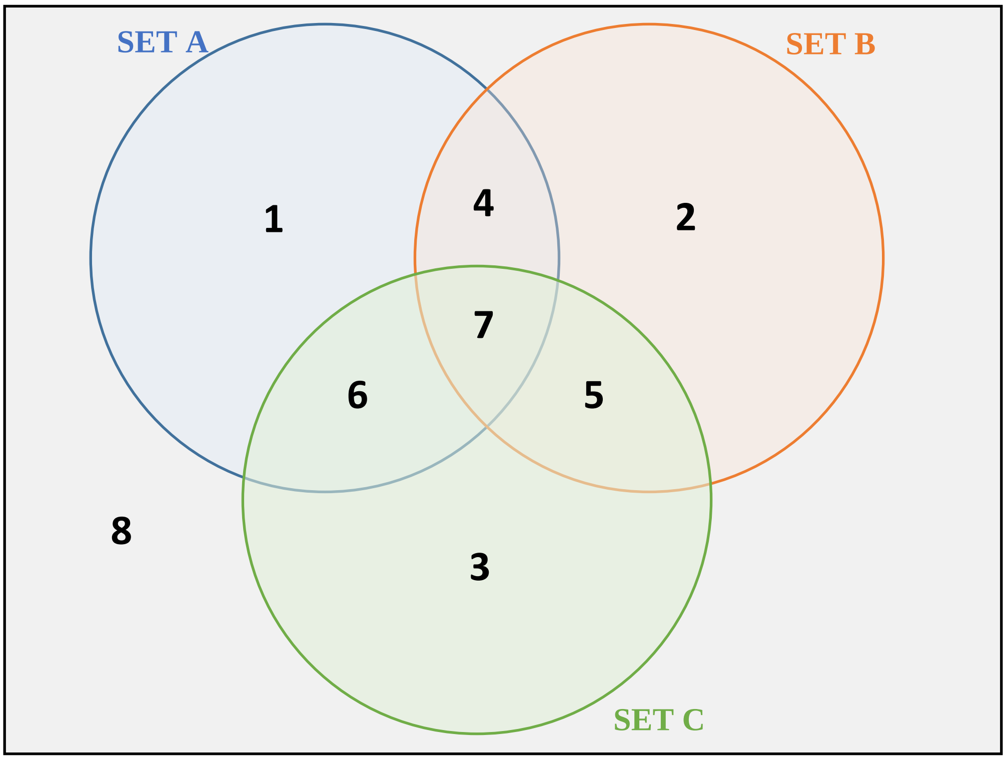
STATEMENT (2) alone: This statement on the contrary says that $15 = M*p + 6$, *(M is the divisor here)* where *p* is a non-negative integer, or $p = \{0, 1, 2,…$so on$\}$. Now if *M* were greater than 15 then 15 divided by *M* would yield a remainder 15, however, the statement says that the remainder is 6. Therefore the one thing we know is that the *POSITIVE* integer *M* is < 15. Now if $15 = M*p + 6$, then this means $9 = M*p$ or that 9 is a multiple of *M* and alternatively that *M* is a factor of 9. *M* can therefore take on values = {1, 3 & 9}. Now since the divisor must always be greater than the remainder = 6, the only value that fits is $M = 9$ – a *unique* value answer

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.12

The question introduces three **variable sets** with the possibility/certainty of an overlap. Such language is typical of three variable sets questions and these questions, unlike the two variable sets questions, are best tackled by chalking out the information on a VENN DIAGRAM as follows:



The above diagram shows all the 8 *(mutually exclusive)* possible regions/divisions/allotments/slots that can exist in the event that three sets have elements that may be/can be common to more than one of those sets. Just for the sake of revision I'll mention what each numeral stands for:

1. Elements belonging **Only** to SET **A**.
2. Elements belonging **Only** to SET **B**.
3. Elements belonging **Only** to SET **C**.
4. Elements common to SET **A** & SET **B**, but not SET **C**.
5. Elements common to SET **B** & SET **C**, but not SET **A**.
6. Elements common to SET **C** & SET **A**, but not SET **B**.
7. Elements common to **all three** sets SET **A**, SET **B** & SET **C**.
8. Elements common to **neither** of the sets SET **A**, SET **B** & SET **C**.

(1) + (4) + (7) + (6) = All elements in SET **A**.
(2) + (4) + (7) + (5) = All elements in SET **B**.
(3) + (6) + (7) + (5) = All elements in SET **C**.

The following are crucial to solving questions on the GMAT:

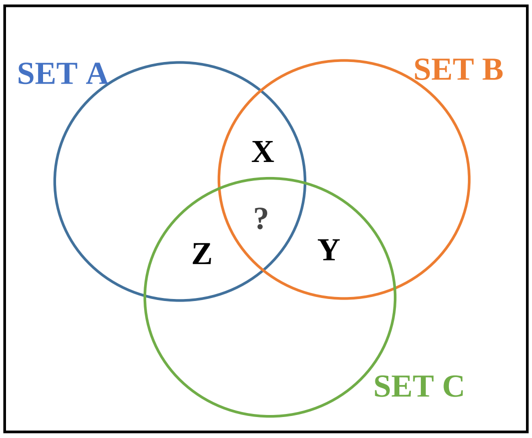
(4) + (5) + (6) = All elements common to exactly 2 SETS.
Grand Total of all elements = (1) + (2) + (3) + (4) + (5) + (6) + (7) + (8) Or,

Grand Total of all elements – (8) = (1) + (2) + (3) + (4) + (5) + (6) + (7)
SET **A** + SET **B** + SET **C** = (1) + (2) + (3) + 2*{(4) + (5) + (6)} + 3*{(7)}

Subtracting the above from the one below:
{SET **A** + SET **B** + SET **C**} – {GRAND TOTAL – (8)} = {(4) + (5) + (6)} + 2*{(7)} Or,
{SET **A** + SET **B** + SET **C**} – {TOTAL – **neither**} = {**only/exactly 2**} + 2*{**all three**}
&
SET **A** + SET **B** + SET **C** = {**only/exactly 1**} + 2*{**only/exactly 2**} + 3*{**all three**}

The two highlighted results are the most handy & most commonly tested results when it comes to tackling 3 SET problems on the GMAT. *(along with the rest of the portion presented)*

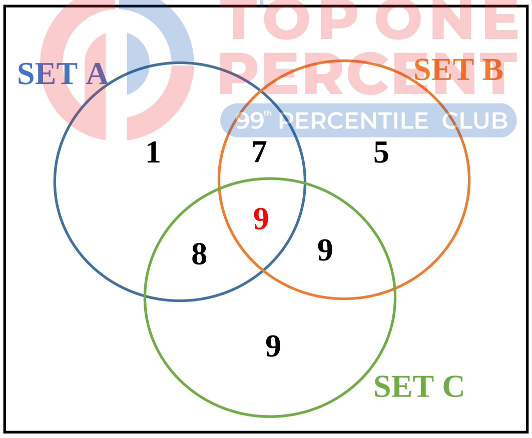
Returning to the question,
Using the information given only in the question we can begin by creating our own diagram and filling in the information and placing a '**?**' sign at the place that we're required to find.



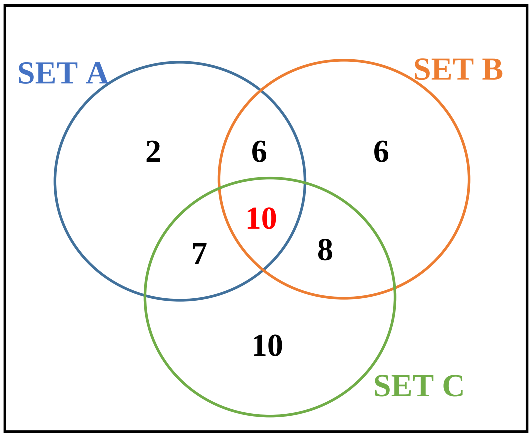
If, **X** = Number of element in SETS A & B but not C, **Y** = Number of element in SETS B & C but not A & **Z** = Number of element in SETS A & C but not B, then we're given the following information in the diagram as per the question:
X + (?) = 16, **Y + (?)** = 18 & **Z + (?)** = 17. This now is a question about finding the unique value of the number of elements in the region marked by the **?**.

STATEMENT (1) alone: This statement straight out gives us the value of what is required to be found. It directly says that 9 of the 16 elements that are a part of both SET A & SET B are also a part of SET C. This directly says that 9 elements are common to all three sets (**?** = 9). A *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says out the total number of elements that SETS A, B & C have. We must remember that our aim is to prove that a *unique* value does not exist. That here can be done by the process of taking different values of the number of elements common to all three SETS and see if they are balanced out/supported by the rest of the values given by the question and the statement for the various regions in the diagram. We'll start with 9 as we know from the previous statement analysis that 9 will definitely fit the model. We'll then start deviating from 9 in the appropriate direction. Keeping in mind **X + (?)** = 16, **Y + (?)** = 18 & **Z + (?)** = 17.
One possibility is:



Another possibility is:



The two possibilities presented above are enough to substantiate that a *unique* value of the number of elements in all three SETs does NOT exist. *(Note that had we gone below 9 say 8 to try as a figure for all three elements then such an arrangement would not be possible, as the total number of elements in SET A would exceed 25 in such an arrangement defying the info given in the question stem)*

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.13

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table as follows:

	SET **A**	SET $\overline{\textbf{A}}$	TOTAL
SET **B**	No. of elements common to both	No. of elements in B but not in A	Total of SET B **(SUM of left 2)**
SET $\overline{\textbf{B}}$	No. of elements in A but not in B	No. of elements in neither A nor B	Total of everything not of B **(SUM of left 2)**
TOTAL	Total of SET A **(SUM of above 2)**	Total of everything not of A **(SUM of above 2)**	ENTIRE TOTAL

ADDITION

ADDITION

SET $\overline{\textbf{A}}$ & SET $\overline{\textbf{B}}$ represent the complements of SET A and SET B which is nothing but the set of elements not belonging to SET A and SET B respectively.

__**Note that:**__ No. of elements(SET **A)** + No. of elements(SET $\overline{\textbf{A}}$**)** = **Entire Total. ;** same for B.

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that we require a percentage value as an answer not necessarily a numerical value!

	Teach Language Arts	Do Not teach Language Arts	TOTAL
Teachers	**?**		60%
Non-Teachers			40%
TOTAL			100%

STATEMENT (1) alone: The information further fills in the table as follows:

	Teach Language Arts	Do Not teach Language Arts	TOTAL
Teachers	**?**		60% = 120
Non-Teachers			40% = 80
TOTAL			100% = 200

This information just gives a numerical value to the 100% figure, or in other words just says out some additional info for the already filled out cells as shown. There is thus little that we can do to estimate the value (in percentage) of the '**?**' cell. In other words, the '**?**' cell can still be filled with multiple values. *No unique value.*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The additional information fills in the original table as follows:

	Teach Language Arts	Do Not teach Language Arts	TOTAL
Teachers	**?**	72	60%
Non-Teachers			40%
TOTAL			100%

Although the information fills out two of the three cells in a row, however, bear in mind that mathematical calculations are always performed on *similar* quantities. It is absolutely absurd here to subtract a numerical value (72) from a percentage value (60%). Since we don't know what the 60% represents in terms of a numerical value we are therefore still clueless as to what the *unique* value of the demanded cell could be. *No unique value.*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Teach Language Arts	Do Not teach Language Arts	TOTAL
Teachers	**?**	72	60% = 120
Non-Teachers			40% = 80
TOTAL			100% = 200

I would almost always strongly advise against performing any unnecessary calculations on the GMAT DS questions. These questions are a lot more about gauging the sufficiency of the information provided and less about actually solving for the value asked. Since the above table makes it clear enough that a *unique* value is easily attainable, *(by simply performing the*

following calculation: ***?*** *= {100 – (72/120)*100}%)* all we need is one glance at the table to mark C and move.
Unique solution obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.14

We're given that Jane walked a total of 4 miles and are hinted in the question stem itself that she doesn't travel all this distance with the same/constant velocity. If we say that V_1 & V_2 are the average speeds and T_1 & T_2 are the time taken for the former and the latter two miles of the 4 mile distance, then we're asked the value of $V_1 = (2/ T_1)$.

<u>STATEMENT (1) alone</u>: This statement gives out an overall figure. It says that the total time taken for the journey is (4/3.2) hrs, or that $\boldsymbol{T_1 + T_2 = 1.25}$ **hrs**. However, this is a sum equation in which both T_1 & T_2 are unknown and because of this the variable T_1 and therefore, V_1 can assume multiple values. No *unique* value obtained.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement alone mathematically put says that $\boldsymbol{T_2 - T_1 = 0.25}$ **hrs**. This yet again is a single equation in two variables T_1 & T_2 and because of this the variable T_1 and therefore, V_1 can assume multiple values. No *unique* value obtained.
STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the two statements together we obtain a set of two equations in two variables (T_1 & T_2) → $\boldsymbol{T_1 + T_2 = 1.25}$ **hrs** & $\boldsymbol{T_2 - T_1 = 0.25}$. Needless to say that this right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable asked (*T_1 and hence of V_1*) is enough to mark option C and move on. THE CALCULATIONS that follow are for demonstration purpose only and are a complete waste of time on the exam should you understand that a unique value is obtainable.*
The set of equations $\boldsymbol{T_1 + T_2 = 1.25}$ **hrs** & $\boldsymbol{T_2 - T_1 = 0.25}$ can be solved to yield $T_1 = 0.50$ hrs & $T_2 = 0.75$ hrs. V_1 thus comes out to be $= (2/ T_1) = (2/0.5) = 4$ miles per hour – a *unique* solution.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.15

The question asks if $\boldsymbol{x*y} + \boldsymbol{x*z} = 0$? Or, if $\boldsymbol{x*(y + z)} = 0$? At the back of our minds we can figure out when such a scenario would be possible → **Either** $x = 0$, **Or** $(y + z) = 0$, **Or** both.

<u>STATEMENT (1) alone</u>: This statement directly says out one of the sufficient conditions as derived in the question stem by which we get ourselves a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement again directly says out the other one of the sufficient conditions as derived in the question stem by which we get ourselves a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.16

The question asks if |**K**| = 2? A simplification of what is asked always tends to help our cause. The question is equivalent to asking Is **K** = ±2? Or, in other words, Is **K =** either 2 or –2. *(All we're doing here is opening up the MOD to see what all values can **K** take, all of which a value 2 once their MOD is taken. Such values are only two – ±2)*

STATEMENT (1) alone: The statement says out a quadratic relation → $\mathbf{K}^2 = 4$, solving which you'll arrive at **K** = ±2. This is a direct answer to the question raised in the question stem. *(The mod of both the values **K** = ±2, gives you a definitive answer saying that |**K**| = 2)* A CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This is yet another statement that straight out says the direct answer to the question asked. The statement says that **K** = |–2|. Simplify this further to write **K** = |–2| = 2. *(The MOD function always gives you the absolute (+ve) value of the quantity whose, MOD you're taking.)* Once we arrive at **K** = 2, we've also arrived at |**K**| = |2| = 2, which again is a direct definitive answer to the question raised. A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.17

The question may be simplified as to asking that – *out of seven days on which a certain store sold **distinct** number of copies of a certain book and a total of 90 books during the entire week, did the store, on the day on which it sold the 2nd highest number of books – Friday, sell a number that was > 11 or ≥ 12?*

A YES/NO situation simulation should be our target!

STATEMENT (1) alone: *Kindly avoid mistaking (subconsciously) Thursday to be the dad that sells the third highest number of books just because it happens to fall right before Saturday and Friday – the two days on which the highest and the second highest number of copies are sold. Nothing of this sort is mentioned anywhere in the question.* Under the conditions laid out by the question stem we've got a hierarchy set up only between two days of the week (Saturday & Friday) along with the fact that these days are above the rest 5 days (in terms of the number of books sold). The statement stipulates a value for Thursday only. *(about which the only info that I can gather is that it less than both Friday and Saturday in terms of the number of the books sold)*

Creating a **YES** situation is relatively a lot simpler. We'll allot the number of books he sold on Saturday to be 45, **Friday 20** and the number sold on the rest of the five days (for which no sort of order is mentioned) to be **8** *(this is specified by this very statement to be the number of books sold on Thursday so can't change that number)*, and split the remaining 90 – (45 + 20 + 8) = 17 among the remaining 4 days as 7, 6, 3 & 1.

A **NO** situation can easily be created by means of picking up on where we left off just above. By this what I mean is since the only day whose value – in terms of the number of the books sold on that day – is restricted is Thursday (=8). So all we really need to do is keep the five days (all except Saturday and Friday) exactly the same as in the case above → **8** (on Thursday), 7, 6, 3 & 1 and redistribute the values only among the days Saturday (highest) and Friday (2^{nd} highest) such that all values are distinct. So all we need is to keep **11** for **Friday** and adjust the 9 (= **20 – 11,** the amount by which we brought down friday) with the day that sold the highest Saturday = 45 + 9 = 54. In other words I get Saturday 54, **Friday 11**, Thursday **8** *(this is specified by this very statement to be the number of books sold on Thursday so can't change that number)*, and the remaining 4 days as 7, 6, 3 & 1.
This confirms a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement stipulates a value for the day selling the highest number of books (i.e. Saturday) = 38. Now before we dive in to make our YES/NO situations, it might pay off a little to analyse/infer all that we can from this info combined with what is mentioned in the question stem. 38 (i.e. number sold on Saturday) according to the conditions laid out by the question stem is supposed to be the highest value out of all that add up to a SUM of 90. Let's keep **Friday** (the second highest in terms of the number sold) aside for the moment and look into the rest of the 5 days. In the event that we want to create a **NO** situation, the max value **Friday** can have is 11 → this further stipulates that all the remaining 5 day values be less than 11 as well as distinct. Let's see the what maximum SUM of these 5 days (only) comes out to be. If I say Monday is 10 (< 11) the next day to have the maximum value would have to settle for 9…an so on. The Maximum SUM for these 5 days (only) then comes out to be = 10 + 9 + 8 + 7 + 6 = 40. Thus the minimum value that **Friday** will have to take on to take SUM all the way up to 90 will have to be at least = 90 – (40 + 38) = 12. In other words you would never be able to create a NO situation – Friday sale is less than 12 – given the conditions laid out by this question. The minimum value that Friday can take on itself is a **YES** situation. This thus gives us a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.18

The question stem becomes relatively clearer once the wording *(that might seem a bit awkward)* is reduced to the form that can be mathematically put. Two numbers being on the opposite sides of 0 on the number line is the same thing as saying one of the numbers is positive and the other negative. Mathematically put this says – Is X*Y < 0?
Now the other thing to take note of is the fact that X & Y are *NON-ZERO* Integers.

STATEMENT (1) alone: The information mathematically put says X + Y = 0. Such a scenario arouses two and only two possible cases: **Either** X = Y = 0 **or** X = –Y. The question stem clearly rules out the possibility of the former case *(X = Y = 0)* as the X & Y are mentioned to be non-zero integers. Therefore the only case that applies is that X = –Y where X & Y sort of form the reflection of each other about the point 0 in the number line.

Therefore X*Y certainly < 0 or we get a CONFIRMED YES answer to the question raised.
STATEMENT (1) alone – SUFFICIENT

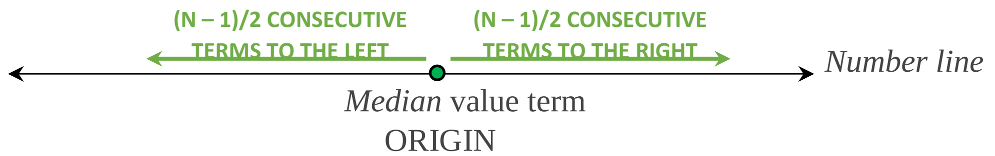
STATEMENT (2) alone: The information mathematically put straight out gives the answer to the reduced or mathematically put form of the question stem. The question raised in the question stem is – Is X*Y < 0? And the direct answer is provided by this very statement saying that yes indeed X*Y is < 0. Again a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.19

We're given SETS S & T with 5 & 7 consecutive integers respectively. We're asked whether the median of the two sets are equal?
A YES/NO scenario with a thorough run through or consideration of all cases possible seems like a fair enough approach to follow here.

STATEMENT (1) alone: This statement gives out the median value of the SET S, however makes no mention of the SET T. T thus has a range of possibilities one out of which will yield a YES answer and the rest a NO answer. We will thus have with us a YES/NO scenario.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says that the SUM of the elements in both SETS is equal. In other words the SUM of 5 consecutive integers is equal to the sum of 7 consecutive integers. Notice here that the number of elements in each of the SETS is ODD. This is a pretty powerful inference as this can help us to a great extent in making cases.
CASE I: An ODD number of Integers can evenly be distributed about the point 0 on the number line such that all the *positive integers* to the right of the origin have an exact reflection of the same value that lies to the left of 0 and hence cancels out that particular value. If the SET contains *N* elements where *N* is odd, then the picture looks like:



This case thus generates a YES answer situation.

CASE II: In general the following is the technique via which one can create a set of ODD consecutive integers. Since we need to create 5 and 7 consecutive integer terms with the same SUM, we first require that we choose a number such that it is divisible by both 5 and 7, in other words the LCM of 5 & 7 = 35. Now to generate 7 consecutive terms we'll first divide the number 35 by 7 giving us 5 so that 35 may be written as: $5 + 5 + 5 + \mathbf{5} + 5 + 5 + 5$. Now keeping the red 5 as centre simply subtract 1, 2 & 3 from the nearest, second nearest and the third nearest 5's to the left of the red 5 and add then add the subtracted 1, 2 & 3 to the nearest, second nearest and the third nearest 5's on the right side if the red 5 to get $35 = 2 + 3 + 4 + \mathbf{5} + 6 + 7 + 8$ or SET T = {2, 3, 4, **5**, 6, 7, 8}. Following on the exact same lines SET S = {5, 6, **7**, 8, 9}. It ca be clearly seen that both the SETS containing elements that SUM up to the same value have different medians. This case generates a NO situation giving an overall YES/NO situation.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together simply removes the CASE II possibility in the analysis of statement (2) and leaves us with a narrow down on CASE I as the only possibility. CASE I in the statement (2) analysis gave a YES answer and since this is the only possibility that can be considered given the conditions laid out by both statements together, this gives us a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

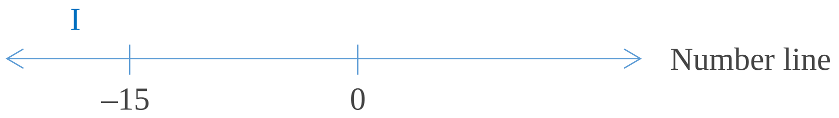
Q.20

The question gives out an inequality relation $\rightarrow -2^*\boldsymbol{x} > 3^*\boldsymbol{y}$ and asks if $\boldsymbol{x} < 0$?
A YES/NO targeted approach seems a good fit to proceed onwards.

STATEMENT (1) alone: The statement lays down the condition that $\boldsymbol{y} > 0 \rightarrow 3^*\boldsymbol{y} > 0$, or using the inequality in the question stem $-2^*\boldsymbol{x} > 3\boldsymbol{y} > 0 \rightarrow -2^*\boldsymbol{x} > 0$ or, $\boldsymbol{x} < 0$ – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given a linear equation in $\boldsymbol{x}$ & $\boldsymbol{y}$, which gives us a good opportunity to substitute for $\boldsymbol{y}$ in the inequality given in the question stem. The statement says that: $2^*\boldsymbol{x} + 5^*\boldsymbol{y} - 20 = 0 \rightarrow \boldsymbol{y} = 4 - (2/5)^*\boldsymbol{x}$. Substituting in the inequality $-2^*\boldsymbol{x} > 12 - (6/5)^*\boldsymbol{x} \rightarrow (4/5)^*\boldsymbol{x} < -12$ or $\boldsymbol{x} < -15$. The statement diagrammatically implies that:



The information arrived at thus says that $\boldsymbol{x}$ can lie only in region I. This gives us a CONFIRMED YES answer about $\boldsymbol{x}$ lying to the left of 0 definitively.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.21

We're given an *integer* **N** and we're asked if **N** is odd?
A YES/NO targeted approach seems well suited for the question above!

STATEMENT (1) alone: The statement in a way implies that **N** is a multiple of 3. Now by simply knowing for a fact that odd as well as even multiples of 3 exist, it is substantially clear how insufficient this statement is. Even mathematically **N** can be written as **N** = 3**K*, where *K* is any integer. Now if *K* is even, **N** is even and if *K* is odd, **N** is odd. A clear YES/NO case.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We'll take the situation case by case as it comes! The statement may be reiterated as saying that 2***N** has twice as many factors as **N**. *(If a positive integer divides a number P say, then that positive integer is a factor of P)* Let for our convenience sake **N** be such that **N** = a^M x b^N x c^Q, where *a, b* & *c* are all prime numbers, and M, N & Q their powers.

- → Before we proceed any further, I'll just repast a **Note** on how to find the **number** of factors of any positive integer *K* just to brush up our concepts!
  1. The integer *K* is first of all broken down to the product of distinct prime numbers raised to their respective powers. So Let $K = (m^A)*(n^B)*(p^C)$, where *m, n* & *p* are prime numbers that raised to their respective powers – A, B & C – are multiplied together to yield *K*.
  2. Then the total number of factors (inclusive of 1 & *K*) of *K* will be (A + 1)*(B + 1)*(C + 1), where A, B & C are positive integers. *(hence, (A + 1), (B + 1) & (C + 1) will at least be equal to 2)*

Coming back to the question, **N** can now be said to have a total number of (M + 1)*(N + 1)*(Q + 1) factors. Now here is where we begin with the case making process: Our approach here is that give the MODEL laid out by the statement (2) alone, do both ODD and EVEN values fit the MODEL, or does the MODEL narrow it down to one out of the two.
CASE I(assuming **N** is ODD): Given that **N** = a^M x b^N x c^Q is an odd integer, we can infer that neither of the three primes (*a*, *b* & *c*) have a value = 2. In that case 2***N** will have to be written in its broken down form as 2***N** = 2^1 x a^M x b^N x c^Q. Therefore the total number of factors here becomes = (1 + 1)*(M + 1)*(N + 1)*(Q + 1) = 2*(M + 1)*(N + 1)*(Q + 1), or twice the number of factors of the integer **N**. Our CASE I: **N** is ODD fits the MODEL.
CASE II(assuming **N** is EVEN): Given that **N** = a^M x b^N x c^Q is an even integer, we can infer that one of the three primes (*a*, *b* & *c*) **must** have a value = 2, let's assume *a* = 2. In that case 2***N** will have to be written in its broken down form as 2***N** = $a^{(M+1)}$ x b^N x c^Q. Therefore the total number of factors here becomes = (M + 1 + 1)*(N + 1)*(Q + 1)
= (M + 2)*(N + 1)*(Q + 1). For the sake of confirmation, let us see when (M + 2)*(N + 1)*(Q + 1) will be = 2*(M + 1)*(N + 1)*(Q + 1)
Solving (M + 2)*(N + 1)*(Q + 1) = 2*(M + 1)*(N + 1)*(Q + 1) → M + 2 = 2*M + 2 or M = 0, which is not possible because for *a* to have a value of at least 2^1 M must be ≥ 1. Therefore (M + 2)*(N + 1)*(Q + 1) can never be = 2*(M + 1)*(N + 1)*(Q + 1)
Simply put Our CASE II: **N** is EVEN does NOT fit the MODEL.
Only one possibility fitting our model implies that **N** is definitely ODD. CONFRIMED YES
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.22

This one puts up an inequality question → Is $(1/P) > \{R/(R^2 + 2)\}$. We'll try and simplify this expression down to a comfortable term to work with. *Kindly remember that it almost always results in a blunder when simply cross-multiply unknowns (in terms of +ve or –ve) across inequalities.* We can however take it all to one side and try and form a joint expression as follows: Is $(1/P) - \{R/(R^2 + 2)\} > 0$? Or Is $(R^2 + 2 - P*R)/\{P*(R^2 + 1)\} > 0$?
Or Is $\{R*(R - P) + 2\}/\{P*(R^2 + 2)\} > 0$? We'll take on each of the two statements separately and see if we can arrive at a definitive answer.

STATEMENT (1) alone: The statement says that P = R. Now substituting P = R into the expression on the left of the inequality – $\{R*(R - P) + 2\}/\{P*(R^2 + 2)\} > 0$? The left hand side reduces to $2/\{P*(R^2 + 2)\}$. This is a fraction whose Numerator = 2 is +ve, however its denominator $P*(R^2 + 2)$ is all dependent on whether the value of P is +ve or –ve. Since nothing in the question stem and in the statement stipulates a definitive sign polarity to either P or R, the statement lacks information to arrive at anything concrete regarding what is asked in the question stem.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This one says R > 0. Since nothing about P is known, we don't know whether (R – P) is +ve or –ve and in turn whether $R*(R - P) + 2$ or the numerator is positive or negative. We also have a massive doubt cast over whether the denominator $P*(R^2 + 2)$ is positive or negative. Clearly the information at hand is miles away from being sufficient to answer our query definitively.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Picking up from the analysis in statement (1), we had reduced the expression to the left of the inequality – $\{R*(R - P) + 2\}/\{P*(R^2 + 2)\} > 0$ down to $2/\{P*(R^2 + 2)\}$. Further since P = R we can re-write it completely in terms of R → $2/\{R*(R^2 + 2)\}$. Now we have a fraction whose Numerator = 2 is +ve, and its denominator $R*(R^2 + 2)$, given that R > 0 in statement (2), is hence also positive. This implies that the entire fraction $2/\{R*(R^2 + 2)\}$ is therefore positive, giving us a definitive answer or a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.23

We're given a 4 x 4 table (16 cells) with each cell filled with a variable. Till this point there is no mention of any sort of relation between the variables or of any sort of behaviour to which the cells conform to.

q	q	q	q
q	r	s	t
q	u	v	w
q	x	y	z

We're asked whether Z = 20*Q?

<u>STATEMENT (1) alone</u>: This statement simply gives out the value of Q with absolutely no mention of any sort of relation of Q with the other variables mentioned in the table or of any sort of behaviour to which the cells might conform. My point is that, it shouldn't take more than a couple of seconds to figure out how insufficient this statement is.

STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: The statement gives a general behaviour or a pattern or a rule by which each of the cells not containing the values Q abide. I totally agree given this a question that appears on your exam, it would prompt you to try out the behaviour mentioned to see how exactly the cells fill up before being sure of your answer. My point here is that this statement does for our assurance sake require a wee bit of working. We'll try to fill up the table by the behaviour mentioned in the statement to see what we arrive at.

q	q	q	q
q	r	s	t
q	u	v	w
q	x	y	z

Q	Q	Q	Q
Q	2*Q	3*Q	4*Q
Q	3*Q	6*Q	10*Q
Q	4*Q	10*Q	20*Q

Filling out the table according to the rule specified in the statement we see that the cell that originally occupied a value of Z occupies a value = 20*Q in the new table. Therefore we can pretty much infer that Z = 20*Q – giving us a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.24

We're given a pool of 13 members on a committee comprising 5 Men & 8 Women. We're asked to find the fraction of the remaining members that were Men given that one member left (bringing down the total members in the pool to 12).

<u>STATEMENT (1) alone</u>: This is a direct give away of the answer that we're looking for in the question stem. If I know the fraction of the remaining members in the pool that are Women, I can definitely say that the fraction of Men in the pool will be 1 – (7/12) = 5/12. Moreover I can even further infer *(Although not required)* that the leaving member was a Woman. ACONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This yet again is another direct give away of what is asked in the question stem. If the leaving member is a woman this pretty much all the information I need to find the ratio of Men among the remaining pool. (5/(13 – 1)) = 5/12 – a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.25

We're given two ***positive*** *numbers* (not necessarily integers) ***x*** & ***y***. We're asked whether ***x*** = 1?

A YES/NO targeted approach is how we'll go about this.

STATEMENT (1) alone: We're given ***x***/***y*** = 1. Having no sort of information on ***y***, we can easily create a **YES** case with ***y*** = 1 and a **NO** case with numerous other values of ***y*** *(say* ***y*** *= 2)*. A YES/NO situation confirms the insufficiency.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This case like the one above is not so different. We're given ***x********y*** = 1. Again having no sort of information on ***y***, we can easily create a **YES** case with ***y*** = 1 or a **NO** case with numerous other values of ***y*** *(say* ***y*** *= 2)*. A YES/NO situation confirms the insufficiency.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Let's write down the two equations that we can garner from the two statements above: ***x***/***y*** = 1 & ***x********y*** = 1. Using ***x*** = ***y*** from the first equation and substituting in the second one we get $x^2 = 1$. Or ***x*** = ±1. However we should not be so hasty in declaring the scenario insufficient. *(you see it is exactly these very instances that the GMAT tests your concentration on)* Do bear in mind the fact that the question stem stipulates the number ***x*** to be a positive number. Hence the only acceptable value that ***x*** can take on here is +1 – a *unique* answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.26

We're given integers X & Y and are asked whether the value of X*(Y + 1) is even?

A YES/NO targeted approach keeping in mind the information at hand seems a good option.

STATEMENT (1) alone: We're given that X & Y are prime. *(Note this as a general rule that any question that even mentions the anything about anything to do with PRIMES will 8 out 10 times test your knowledge (directly or indirectly) of the fact that there is one even prime = 2. The existence of the even prime number (2) somehow seems quite fascinating to the GMAC society. Therefore as soon as you see the word prime in a question be on guard by keeping the number 2 in the back of your mind.)* Now creating a **YES** CASE here is easy → simply

choose two odd prime numbers – 5 & 31 as X & Y say. The (Y + 1) term will always turn out to be even in such a case. There does exist here however, an exceptional case of Y taking on the only even prime number value = 2, and X being odd as usual. This yields a **NO** answer. We thus have a YES/NO situation here.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement by only giving out a restriction on the value of the integer Y does very little to substantiate anything close to concrete as far as the answer to the question stem is concerned. It is not even required here to go into the process of case making to see a YES/NO situation. We can look at the statement and already be sure of its insufficiency. (X = 5, Y = 8 & X = 4, Y = 3 give conflicting answers).
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together, we can say that X & Y are primes with Y > 7 i.e. Y can take on {11, 13, 17,…so on}. In a way since Y cannot be the integer 2, Y will ALWAYS be ODD → (Y + 1) will thus ALWAYS be EVEN. Thus regardless of what the value of X is, we've already established that the product X*(Y + 1) will always be EVEN – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.27

We're given a SET S and that's all we're given. We're asked if at least one even number is a member of the SET S?
I'll be taking up each of the pieces of information in the statements with the YES/NO targeted approach at the back of my mind.
For the sake of my own convenience I'll assume my SET S to be $\{X_1, X_2, X_3\}$

STATEMENT (1) alone: All this statement stops me from is admitting any prime numbers in my SET S. However, the following two cases {9, 15, 21} and {9, 15, 20} clearly and most easily shows me a YES/NO scenario.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement stops me from is admitting any multiples of 4 in my SET S. However, again the following two cases {9, 15, 21} and {9, 15, 18} clearly and most easily shows me a YES/NO scenario again.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info in the two statements together, I am now required to stop any **primes** (– statement (1)) & any **multiples of 4** (– statement (2)) from entering my SET S. However, even the above restrictions prove inefficient in narrowing down to a definite answer to the question asked. The same two cases presented in the analysis in statement (2) – {9, 15, 21} and {9, 15, 18} – coincidently fit here as well to highlight the insufficiency of the data once again.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.28

According to the question stem since each manufacturer paid the same amount (= ***x***) in dollars per scene. The manufacturers of the products A, B, C & D can be said to have paid amounts in the ratio 21 : 7 : 4 : 3 or in terms of actual amounts paid 21****x***, 7****x***, 4****x*** & 3****x*** respectively. As per the question stem we're required to find a *unique* value of 3****x*** or simply a *unique* value of ***x***.

STATEMENT (1) alone: This statement mathematically put with the help of the analysis in the question stem part says: 21****x*** + 7****x*** = 560,000, which is a linear equation in one variable ***x*** that can accordingly be solved for a *unique* value of ***x***. The one glance at the above mathematical equation should be as far as you should go in the analysis of this statement to prove its sufficiency. Any further time spent in convincing yourself of the sufficiency of the statement by actually solving for ***x*** and thereby 3****x*** is a COMPLETE WASTE of time.
*For the complete sake of demonstration **x** comes out to be 20,000 and thus 3***x** = 60,000.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement mathematically put with the help of the analysis in the question stem part says: 7****x*** – 4****x*** = 60,000, which is again a linear equation in one variable ***x*** that can accordingly be solved for a *unique* value of ***x***. Going by the logic explained above in the statement (1) analysis, reading the statement should be all that is required know the sufficiency of this statement. Any further time spent in convincing yourself of the sufficiency of the statement by actually solving for ***x*** and thereby 3****x*** is a COMPLETE WASTE of time.
*For the complete sake of demonstration **x** comes out to be 20,000 and thus 3***x** = 60,000.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.29

We're given a *POSITIVE* integer **N** and are asked if it is ODD?
A subtle YES/NO targeted approach suits best for approaching this question.

STATEMENT (1) alone: This is the most direct/straight out DS statement given ever. In fact it is too easy to be truly out there. This is the exact definition of an ODD number. Alternatively, if one were even unaware of the above fact, it is pretty easy to see that since 2**K*, where *K* is any integer, is even 2**K* + 1 is definitely ODD – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This presents slightly tweaked information. Again as discussed in the analysis in statement (1), 2***N** + 1 is the general form to represent an ODD integer. We say that 2***N** + 1 which will be ODD for all integer values of the integer **N.** This is where the entire crux to attacking this statement lies. Here in this statement to satisfy the conditions laid out by the statement ALL values of **N** are applicable. This includes both EVEN & ODD values. In other words Regardless of the fact that **N** is ODD or EVEN the value of 2***N** + 1

will always be ODD. Therefore this statement does absolutely nothing to help us get a fix on whether **N** is ODD or EVEN.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.30

We're given that **N** is an **integer**. We're asked whether (**N**/7) is an integer? Now for (**N**/7) to be an integer, we require that **N** be a multiple of 7, or **N** be of the form **N** = 7**K*, where *K* is any integer. Therefore we can put the question as asking whether **N** is a multiple of 7?
A subtle YES/NO targeted approach suits best for approaching this question.

STATEMENT (1) alone: The statement says that (3***N**/7) is an integer. This is to be taken in conjunction with the fact that **N** is also an integer as stipulated in the question stem. Now we'll look at the scenario at hand theoretically rather than using the plug (in values) and observe approach. If **N** is an integer then for (3***N**/7) *(an expression in which 3 & 7 have no common factors except 1 – or 7 will never ever divide 3 completely – the part that will be completely divisible by 7 in order to get rid of it in the denominator will always come from **N**)*
to be an integer **N** must be completely divisible by 7 or in other words, **N** must DEFINITELY be a multiple of 7 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement analysis draws on the exact same lines as above. The statement says that (5***N**/7) is an integer. This is to be taken in conjunction with the fact that **N** is also an integer as stipulated in the question stem. Now again looking at the scenario at hand theoretically rather than using the plug (in values) and observe approach, if **N** is an integer then for (5***N**/7) *(an expression in which 5 & 7 have no common factors except 1 – or 7 will never ever divide 5 completely – the part that will be completely divisible by 7 in order to get rid of it in the denominator will always come from **N**)*
to be an integer **N** must be completely divisible by 7 or in other words, **N** must DEFINITELY be a multiple of 7 – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.31

We'll completely simulate the entire situation mathematically. We'll allow X_1, X_2 & X_3 to represent the DIFFERENT (X_1, X_2 & X_3 are distinct) lengths of the three pieces of the wire. Then we may write $X_1 + X_2 + X_3 = 27$. If X_1, X_2 & X_3 are such that $X_1 < X_2 < X_3$. Then we're required to find the *unique* value of the variable X_3.

STATEMENT (1) alone: The statement if mathematically put says: $X_3 = 2*X_1$. Substituting this back in the main equation $X_1 + X_2 + X_3 = 27 \rightarrow 3*X_1 + X_2 = 27$. Our task now reduces to checking whether multiple sets of values of X_1 & X_2 exist such that $X_2 > X_1$. Not a lot of effort should be required to find such values that can be plugged in to satisfy the equation $3*X_1 + X_2 = 27$ as well as the inequality $X_2 > X_1$. One such example is $X_1 = 6$, $X_2 = 9$ & $X_3 = 12$. Since these are lengths of pieces of a string we're dealing with we need not stick to integers. Another such example is $X_1 = 6.5$, $X_2 = 7.5$ & $X_3 = 13$. Two values for X_3 (12 & 13) are enough to prove our point that a *unique* value of X_3 does not exist. *(Note that when dealing with finding solutions or values that simultaneously satisfy an equation – $3*X_1 + X_2 = 27$ – and an inequality – $X_2 > X_1$ – if the variables X_1 & X_2 are not necessarily required to be integers then multiple sets of values of the two variables will always exist. If therefore you are comfortable with this piece of knowledge, then you need not even plug in values as is done in the statement above. You can directly comment on the sufficiency saying that the statement is insufficient)*

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone is a direct give away. It has to our great benefit given us the value of $X_1 + X_2 = 15$ directly. We can easily plug this back into the main equation $X_1 + X_2 + X_3 = 27$ giving us $X_3 = 27 – 15 = 12$ – a *unique* value answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.32

We're given that **N** is a *POSITIVE INTEGER*. We're asked whether **N** is divisible by 3? Or in other words we're asked whether **N** is a multiple of 3?

A subtle YES/NO targeted approach seems a decent enough approach option for this question.

STATEMENT (1) alone: The statement says that ($\mathbf{N}^2$/36) is an integer. For this to be true $\mathbf{N}^2$ must **be** completely **divisible** by 36 or in other words $\mathbf{N}^2$ must be a **multiple** of 36. **NOTICE** that here we're looking at $\mathbf{N}^2$ as a **multiple** of 36. Therefore $\mathbf{N}^2$ must be of the type where we can write it as $\mathbf{N}^2 = 6*6*K^2$, where K is an integer. This implies that **N** is of the form where it may be written as **N** = 6*K. **N** is therefore a multiple of 6 and hence is positively divisible by 3 – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says that (144/$\mathbf{N}^2$) is an integer. For this to be true $\mathbf{N}^2$ must completely **divide** 144 or in other words $\mathbf{N}^2$ must be a **factor** of 144. **NOTICE** that here we're looking at $\mathbf{N}^2$ as a **factor** of 144. Therefore $\mathbf{N}^2$ (= 12^2) can have the following values {1, 4, 9, 16, 36, 144}. It can clearly be seen that picking out 1, 4 & 16 from the SET of values of $\mathbf{N}^2$ (**N** thus = {1, 2, 4}) gives a **NO** answer and picking out 9, 36 & 144 from the SET of values of $\mathbf{N}^2$ (**N** thus = {3, 6, 12}) gives a **YES** answer to the question raised in the question stem – a YES/NO situation.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.33

We're given three numbers ***a***, ***b*** & ***c*** such that all three are *POSITIVE*.
We're asked: Is $a*(b - c) = 0$?
Just to keep in the back of our minds, the above $a*(b - c) = 0$ is possible when either $a = 0$ or $b = c$, or both.

STATEMENT (1) alone: This statement if rearranged to bring the c's one side and the b's on the other side of the '=' sign gives us → $2*b = 2*c$, or $b = c$ – which is one of the sufficient conditions to make the product $a*(b - c) = 0$. In other words, the rearrangement of the terms gives us a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement when rearranged by cross-multiplication across the '=' sign gives us $b^2 = c^2$, which can be further reduced as to saying $b = \pm c$. However, since the question stem states that all the three ***a***, ***b*** & ***c*** are *POSITIVE*, the relation that can hold here is $b = c$. *(you see it is exactly these very instances that the GMAT tests your concentration on)* This is exactly where we ended up in the statement (1) analysis. $b = c$ is a sufficient condition to make the product $a*(b - c) = 0$. In other words, the rearrangement of the terms gives us a CONFIRMED YES answer again.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.34

We're given two **positive** integers P & Q and are asked whether they're both greater than some number *N*.
A subtle YES/NO targeted approach seems a decent enough approach option for this question.

STATEMENT (1) alone: The statement says that the difference between the two integers is greater than *N* or mathematically that $P - Q > N$. Now depending on how far the integers lie from each other, the *N* integer can be accordingly adjusted to form the two conflicting cases. For Instance I can choose a large difference say (P = 18 & Q = 5) 18 – 5 = 13 and have *N* as say 10. Then conforming to the conditions laid out by the statement this case gives me a **NO** answer. Similarly, I can choose a smaller difference say (P = 18 & Q = 15) 18 – 15 = 3 and have *N* as say 5. Then conforming to the conditions laid out by the statement this case gives me a **YES** answer. I thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement has to offer is information on P & Q alone. Absolutely no info on *N* and only mentioning Q > P or, $P - Q < 0$, therefore makes it quite easy to see through to the insufficiency of this statement. I suggest it is a waste of time to try and make the YES/NO scenario to try to convince yourself of the obvious.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info in the two statements together, I now have that **POSITIVE** *(don't forget this piece of info in the question stem)* conform to the following two properties: **P – Q > *N*** – statement (1) & **P – Q < 0** – statement (2). I can sort of combine the two inequalities to simply write: ***N*** < **P – Q** < **0**. Or more importantly that $N < 0$, or that N is negative. This right here is all we need. We've got P & Q as two positive integers *(lying to the right of 0 on the number line)* and N a negative number *(lying to the left of 0 on the number line)*. It is pretty easy to infer that thus P & Q do indeed both turn out to be greater than the number N – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.35

We're asked the value of the product of two numbers X & Y.

Again all we're really concerned with here is whether a *unique* value of $X*Y$ exists.

STATEMENT (1) alone: We're given that $Y = X + 1$. Or $Y - X = 1$. This is a difference equation (single equation in two variables) that can take on scores of values of both X & Y, all of which will give multiple values of the product $X*Y$. *(take $X = 4$, $Y = 5$ & $X = 7$, $Y = 8$ if you're still not convinced!)*

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Here we're given $Y = X^2 + 1$. This again is a difference equation (single equation in two variables, although quadratic) that can take on scores of values of both X & Y, all of which will give multiple values of the product $X*Y$. *(take $X = 2$, $Y = 5$ & $X = 3$, $Y = 10$ if you're still not convinced!)*

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of info in the two statements together, we'll have $Y = X + 1$ – statement (1) & $Y = X^2 + 1$ – statement (2). I can subtract the equation given by statement (2) from the one given by statement (1) to get $X^2 - X = 0$ or $X*(X - 1) = 0$. Which means that X is either = 0 or 1.

I usually advise against calculations but only beyond the point where you're sure that a unique value will exist, because we were unsure whether $Y = X + 1$ & $Y = X^2 + 1$ would together yield a unique value for X (one reason being that we're dealing with a quadratic equation here) we went in for the calculations to find out.

This gives two corresponding sets of values of (X, Y) that simultaneously satisfy both the conditions laid out by the two statements – (0, 1) & (1, 2) – Both these sets of values of (X, Y) thereby give two values of the product $X*Y$ – 0 & 2. Since a *unique* value for what is asked in the question stem cannot be reached, the info above lacks sufficiency to arrive at anything concrete.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

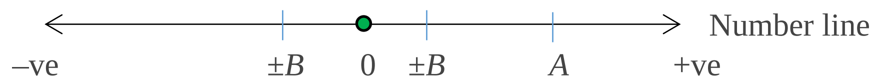
Q.36

We're given the following relation to which a single variable conforms to A*$\mathbf{X}$ + B = 0, where A & B are constants and **X** is a variable. However, since this is a single equation in one variable, we can re-write **X** as **X** = (–B/A). Now we're asked whether **X** is > 0? Based our little work that we did above this is synonymous to asking whether (–B/A) > 0?
Having said that, I guess a subtle YES/NO targeted approach seems like a decent way forward.

<u>STATEMENT (1) alone</u>: The statement dictates an inequality to which the constants A & B conform: $\boldsymbol{A + B > 0}$. However this information alone takes little effort to be discarded. We'll see this via making cases. A = –2 & B = 3 gives me a **YES** answer and A = 2 & B = 3 gives me a **NO** answer. Therefore with little effort we easily arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: The statement dictates another inequality to which the constants A & B conform: $\boldsymbol{A - B > 0}$. However this information alone too takes little effort to be discarded. We'll see this via making cases. A = 2 & B = –3 gives me a **YES** answer and A = 2 & B = 1 gives me a **NO** answer. Therefore with little effort again we easily arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of info in the two statements together, we can say that we've two sets of conditions to which both the constants A & B simultaneously conform. $\boldsymbol{A + B > 0}$ – from statement (1) & $\boldsymbol{A - B > 0}$ – from statement (2). These above ($\boldsymbol{A + B > 0}$ & $\boldsymbol{A - B > 0}$) are two positive quantities that obviously when added together will also yield a positive quantity. Adding gives me 2*A > 0 or A > 0. Unfortunately the combination does not tell us anything whatsoever about the sign polarity of the variable B. At most what we can derive from the two statements together is that A > –B & A > B which may be diagrammatically represented on the number line as follows:



I've deliberately used the ± symbol because of the uncertainty of the sign polarity of the variable B. If B is positive the B lies to the right of 0 and –B lies to the left and vice versa. In other it is clear that we still cannot get a fix on the sign of the variable B. And that is it is impossible to get a fix on the sign of (–B/A). *(If there's still the least bit of doubt, try A = 7 & B = –3 and A = 7 & B = 3 to get your YES/NO situation)*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.37

The question stem is another way of asking whether **INTEGERS** Z & F are positive.

We'll approach this question with the same subtle YES/NO targeted approach taking into consideration each statement one by one.

STATEMENT (1) alone: The statement mathematically put says Z*F > 0. This means a two possible case scenario for such a relation to happen. Either Z & F are (1) both +ve or (2) both –ve. Case (1) gives me a **YES** answer whereas case (2) gives me a **NO** answer. An easy arrival at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says Z + F > 0. This again can have multiple cases and it takes less effort to simply plug in values to create a YES/NO situation. A **YES** is pretty straight forward considering the fact that any two positive integers will do the job. We can use Z = 5 and F = –4 to get a **NO** case. This confirms our YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

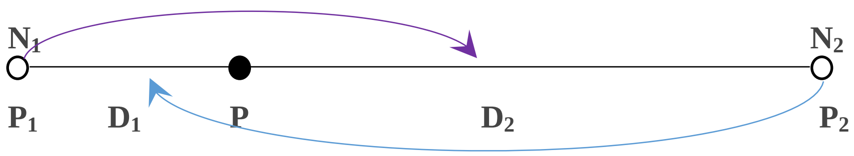
STATEMENT (1) & (2) together: Considering the two pieces of info together, we'll first pick up from our analysis of statement (1) info. We had 2 possibilities laid out by the conditions in statement (1) alone. They were: Either Z & F are Case (**a**) both +ve or Case (**b**) both –ve. Now we'll consider the second statement for it has to say – Z + F > 0. Since the sum of both negative INTEGERS is always –ve, we can rule out Case (**b**) and are therefore left with only case (**a**). In other words we've narrowed our option down to just one which is that both Z & F are +ve, which is exactly what is asked in the question stem and thus renders a CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.38

The language contained in the question stem and the statements makes this is a perfect case scenario to view things via the *Combined mean/percentage/percentage increase* interpretation result:

$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



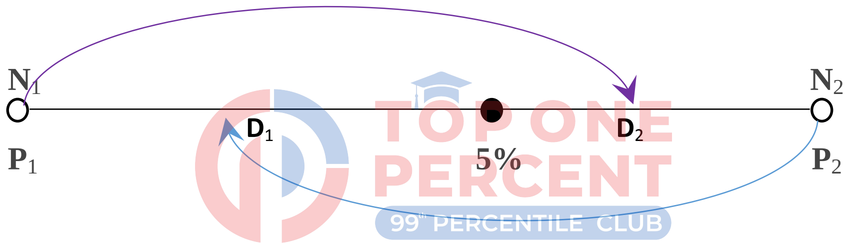
Where,
N_1 = Sample size of SET 1 – *the number of part time students enrolled in college T.*
N_2 = Sample size of SET 2 – *the number of full time students enrolled in college T.*
P_1 = *Percentage increase from 99 to 2000 in the number of part time students enrolled.*
P_2 = *Percentage increase from 99 to 2000 in the number of full time students enrolled.*
P = *Total Percentage increase from 99 to 2000 in the number of all students enrolled.*

$\mathbf{D_1} = (\mathbf{P} - \mathbf{P_1})$ = Deviation distance of $\mathbf{P_1}$ from the combined percentage increase of the two SETS
$\mathbf{D_2} = (\mathbf{P_2} - \mathbf{P})$ = Deviation distance of $\mathbf{P_2}$ from the combined percentage increase of the two SETS

Now returning back to the question:
The question stem requires us to find a *unique* value of the variable $\mathbf{P_2}$.

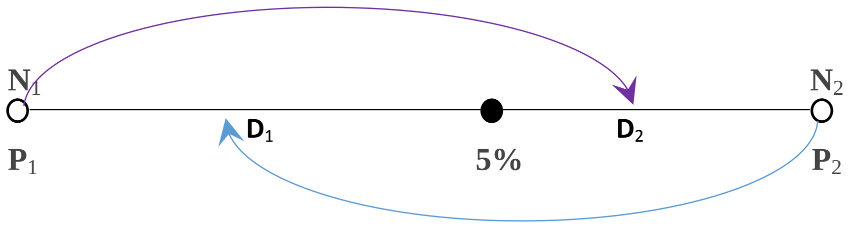
STATEMENT (1) alone: We're in a way given the numerical value of the increase in the number of full time students enrolled in college T. Since we have no idea of the initial number (the ones enrolled in the fall of 1999) of full time students enrolled in college T, we cannot calculate the percentage $\mathbf{P_2}$. Mathematically put we're required to find $\mathbf{P_2}$ which can be written as: $\mathbf{P_2}$ = 100*{(No. in the fall 00) – (No. in the fall99)}/(No. in the fall99). Now we're given the value of the numerator (No. in the fall 00) – (No. in the fall99) = 50 so $\mathbf{P_2}$ reduces to $\mathbf{P_2}$ = 100*50/(No. in the fall99). The unknown denominator renders this information insufficient.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The information if diagrammatically put appears as:



This is all that the information given in this statement can do to fill up the diagram above. Since all we know is just one variable from the numerous different variables above in the diagram, we can be sure of the insufficiency of the statement info.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the information shared in the two statements together, the least we can do is repeat the diagram that we drew while analysing statement (2):



In which all we know is the 5% figure and write down the formula by which we came close to figuring out the value of the variable $\mathbf{P_2}$: $\mathbf{P_2}$ = 100*50/(No. in the fall99). A closer look at the two pieces of information side by side makes it clear that neither of the two pieces either complement each other supply any sort of information that might be of some use to the other. They just lie there as two non-combinable pieces of information. Therefore we're no better

off combining the two pieces of info together than we were considering the statements individually.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.39

We're given **INTEGERS** C & D and are asked if C is EVEN?
We'll proceed with our subtle approach of making cases targeted at a YES/NO situation attainment.

STATEMENT (1) alone: The statement says the product C*(D + 1) is EVEN, which can give me the following three cases as listed below;

1. Either **C is EVEN** & (D + 1) is ODD → D is EVEN.
2. Or (D + 1) is EVEN → D is ODD & **C is ODD**
3. Or both C & (D + 1) are EVEN.

Cases (1) & (2) alone confirm a YES/NO situation regarding whether C is EVEN.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says the product (C + 2)*(D + 4) is EVEN, which can again give me the following three cases as listed below;

1. Either (C + 2) is EVEN → **C is EVEN** & (D + 4) is ODD → D is ODD.
2. Or (D + 4) is EVEN → D is EVEN & (C + 2) is ODD → **C is ODD**
3. Or both (C + 2) & (D + 4) are EVEN.

Here too cases (1) & (2) alone confirm a YES/NO situation regarding whether C is EVEN.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Statements (1) & (2) in conjunction supply us with the following information: C*(D + 1) is EVEN and (C + 2)*(D + 4) is also EVEN.

➔ *A quick note: For questions on the GMAT in which you arrive at a juncture where you're given two even number forms, a useful result/operation in such a scenario that works well in most of such question is that EVEN ± EVEN = EVEN. Depending on best you can reduce the two given EVEN expression, you may add or subtract.*

Now, the difference of two even numbers will always generate an even number. Therefore, (C + 2)*(D + 4) – C*(D + 1) = EVEN, or simplifying the left hand side gives us:
3*C + 2*(D + 4) = EVEN, Now 2*(D + 4) is even, and since the sum of an ODD and an EVEN number can never be EVEN, therefore 3*C must be EVEN, 3 being ODD → C must be EVEN – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.40

We're given a SET S = {1, 5, –2, 8, N}. We're then asked if N is such that 0 < N < 7?

Since the statements involve the use of the *median* concept to analyse this DS problem it is always a good idea to first arrange the known values/elements of the SET in ascending order. So we'll write it out as shown below with the unknown(s) kind of hovering above the known values:

N

–2 1 5 8

We'll proceed with our subtle approach of making cases targeted at a YES/NO situation attainment.

<u>STATEMENT (1) alone</u>: The statement says that the median of the 5(ODD) values is less 5. Since the number of elements in the set is ODD, therefore the *median* has to be a value that is physically present in the set. Now according to the conditions of this statement, I can have N as the *median* by giving the variable N any value between 1(inclusive) & 5, say for instance N = 4 → *median* = 4 < 5 and gives me a **YES** answer to the main question raised. However, I can also have a value of N beyond the numeral –2 towards the left, i.e. less than –2, say for instance N = –4. The *median* in this case is 1 which still is less than 5, however the value of N now being –4, gives a **NO** answer to the main question raised.
I thus somehow eventually do end up arriving at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement says that the *median* of the 5(ODD) values is greater than 1. Since the number of elements in the set is ODD, therefore the *median* has to be a value that is physically present in the set. Now according to the conditions of this statement, I can have N as the *median* by giving the variable N any value between 1 & 5(inclusive), say for instance N = 4 again → *median* = 4 > 1 and gives me a **YES** answer to the main question raised. However, I can also have a value of N beyond the numeral 8 towards the right, i.e. greater than 8, say for instance N = 14. The *median* in this case is 5 which still is greater than 1, however the value of N now being 14, gives a **NO** answer to the main question raised.
I thus somehow again eventually do end up arriving at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: The two statement when taken together stipulate that the median of the set of 5(ODD) values is such that 1 < *median* < 5. Since we're dealing with a SET that contains an ODD number of elements, therefore the *median* has to be a numeral that is physically present in the SET. Now since 1 < *median* < 5, therefore the only numeral that can be charged with the responsibility of being the median is the unknown N, since no other given(known) number falls between 1 & 5. This implies *median* = N and therefore 1 < N < 5, or in other words N definitely lies between 0 & 7, thus yielding a CONFIRMED YES answer to the question raised.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.41

Let the number of hours worked by John last Thursday (when the number of hours worked by Larry = 0) be **J** & let the number of hours worked by Larry last Friday (when the number of hours worked by John = 0) be **L**. Now we're give one equation in two variables (**J** & **L**) as **J + L =** 7. The question asks for a *unique* value of the expression (3***J**), or in a way for a *unique* value of the variable **J**.

STATEMENT (1) alone: Given the information and our bit of analysis of the question stem, we can write the information given in this statement mathematically as: 3***J +** 4***L** = 25, this statement in conjunction with the one drawn out in the question stem: **J + L =** 7 gives us a set of two equations in two variables which can be solved for a *unique* set of values of both the variables **J** & **L**.

*This right here is the end of the analysis of this statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (**J**) is enough to label this statement sufficient and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.*

J + L = 7 & 3***J +** 4***L** = 25 can be simultaneously solved to give **J** = 3 and **L** = 4. Therefore the value of the expression (3***J**) comes out to be = 3*3 = 9 – a *unique* value answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says:
(Chairs Assembled)$_{Larry}$ > (Chairs Assembled)$_{John}$, or one may write this out mathematically as: (4***L**) > (3***J**). We can pick out different values of **J** & **L** that might conform to the inequality and hence end up giving us a non-unique scenario. It's actually pretty easy, try out **L** = 4(for which **J** = 3) or 5(for which **J** = 2), they'll both respect the inequality laid out by this statement, however will yield different values for the expression 3***J** (9 & 6 respectively). Two values for the variable whose value we're required to find in the question stem is enough to substantiate that a *unique* value does not exist, and thus the insufficiency.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.42

The question stem here straight out asks the value of the expression 3*N – 4, where N is some numeric variable.

But remember that all we're really bothered with is whether a *unique* value of the expression exists (which will only exist if a *unique* value of N exists), or in other words whether a *unique* value of N exists.

STATEMENT (1) alone: The statement says → 6*N – 10 = 30, It's quite easy to see that this is just a linear equation in one variable which can thus be solved for a *unique* value of the variable N and can thus relate to a *unique* value of the expression 3*N – 4. Personally I think it is a complete waste of time trying to solve for N and hence actually finding out the value of the expression asked. We're being tested on sufficiency remember. Once we're confident of the *uniqueness* we can label it sufficient and move on.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement again gives out a linear equation in one variable N → (N/3) = (20/9), It's again equally easy to see that this too can be solved for a *unique* value of the variable N and can thus relate to a *unique* value of the expression 3*N – 4. I repeat that personally I think it is a complete waste of time trying to solve for N and hence actually finding out the value of the expression asked. We're being tested on sufficiency remember. Once we're confident of the *uniqueness* we can label it sufficient and move on.

STATEMENT (2) alone – SUFFICIENT

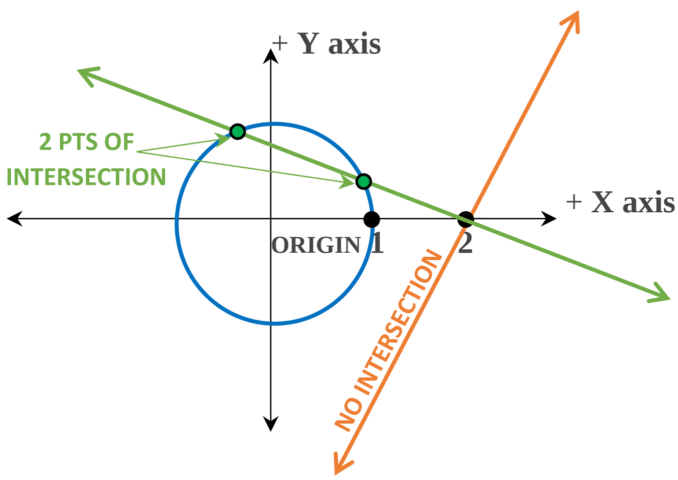
ANSWER – (D).

Q.43

The question stem gives us a circle **C** (apparently whose location and size is fixed and given out in the question stem) and a line **K** (variable till this point). We're asked if the two intersect anywhere on the XY plane.

We'll proceed with our subtle approach of making cases targeted at a YES/NO situation attainment. (the kind of approach for most geometry DS questions)

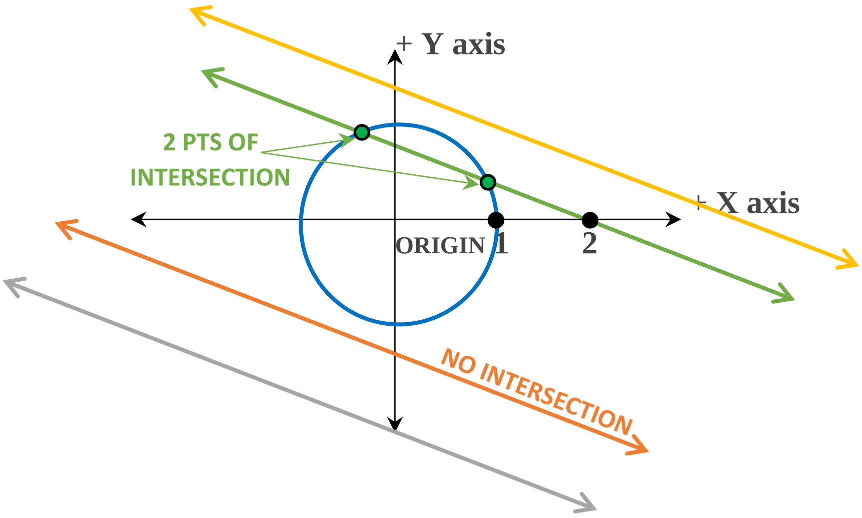
STATEMENT (1) alone: The statement says that the X – Intercept of the line **K** is greater than 1 (meaning the X – intercept is probably something like 2, 3, 4.5 etc.). 1 also happens to be the radius of the circle (centred at origin) given. From this point on I'm going to take the whole possible case making game to the diagrammatic analysis level for the convenience it offers. Here are the two cases presented diagrammatically:



Both the lines above are taken to have an X – Intercept = 2 which is > 1. The above diagrammatic cases make it abundantly clear that given the conditions laid out by this statement alone and the question stem a clear case of YES(the green line)/NO(the orange line) exists.

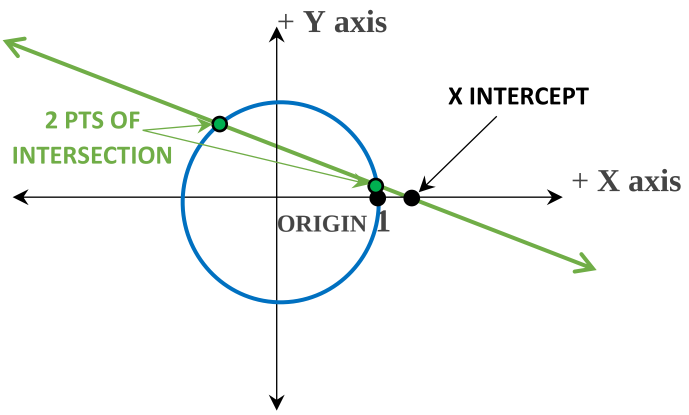
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement simply limits the line in terms of just one property which is its slope. The statement affixes the slope of the line to be (–1/10). The numerous cases possible are drawn out (diagrammatically) below:

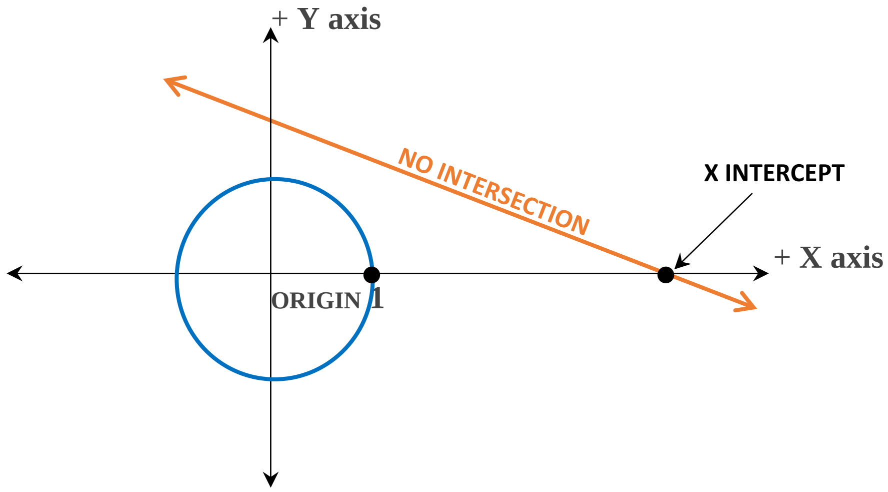


Barring the green line here, none of the other lines (all parallel with the same slope (–1/10)) none of the lines intersect the circle. The diagram gives us a picture of the uncertainty that persists while answering the question raised up top. A clear YES/NO situation thus exists.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Together the two statements stipulate or compel the line within the following bounds: A fixed slope of (–1/10) – statement(2) and an X-Intercept > 1 – Statement (1). Here's how we'll proceed to make our YES & NO scenarios (if they're possible that is):
A **YES** scenario may be made by positioning the line as close as possible to the circle (say with an X – Intercept of 1.1 or 1.2) in order to make sure that the moment the line goes above the X – axis it bumps right into the circle up ahead, diagrammatically this case may be represented as:



A **NO** scenario on the other hand may be made by positioning the line as far as possible to the circle (say with an X – Intercept of 25 and beyond) in order to make the line miss bumping into the circle as it travels above the X – axis at a fixed slope of (–1/10), diagrammatically this case may be represented as:



Thus clearly even with all the data/restrictions clubbed together we're able to squeeze out a YES/NO scenario, confirming the insufficiency of the info.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.44

We'll begin by assigning variables. Let **X** be the total number of people who received the survey. We are to find a *unique* value of the variable **X**.

STATEMENT (1) alone: The statement mathematically put says that (6/10)***X** people in number actually responded to the survey that was received by **X** number of people. But this statement alone seems to introduce yet another branch/variable to the question. We have with us (6/10)***X**, however, we do not have anything to equate this to, which is why this is statement alone is insufficient in answering what is asked in the question stem.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement on the other hand gives us a numerical value (= 42) for the expression we formed in the analysis of statement (1). However, this statement alone seems to introduce a numerical value of something that has not been talked about so far in the question. Here we have with us the value 42, however, we do not have any variable expression to equate this to, which is why this is statement alone too is insufficient in answering what is asked in the question stem.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Combining the two statements together we seem to get both the pieces to the puzzle. Statement (1) gives us the expression for the number of people that responded = (6/10)***X** and statement (2) gives us the numerical value for the same (= 42). One need not go any further to solve for the actual value of the variable **X** if one understands that a *unique* value is obtainable. We can simply, based on this understanding, mark C and move on. However for demonstration purposes only we can write (6/10)***X** = 42, or **X** = 70 – a *unique* value answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.45

The question is not so difficult provided you read the question stem CAREFULLY! The word at least here changes the whole focal point of the question. We're given two *INTEGERS* **X** & **Z** and we're asked if either one (which one doesn't matter) or both are EVEN?

Any statement that delivers us with a CONFIRMED YES or a CONFIRMED NO answer does the job for us.

STATEMENT (1) alone: The statement says (**X** + **Z**) is ODD. Now if you observe closely, this is pretty direct info in answering the question raised up top. For the SUM of two *integers* to be ODD one of them has to be EVEN and the other ODD. You can never have two ODD or two EVEN numbers adding up to an ODD SUM. Therefore one of the two *integers* (**X** & **Z**) has to be EVEN and the other ODD. In other words, at least one of the two *integers* (**X** & **Z**) is definitely EVEN – a CONFIRMED YES.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says (**X** – **Z**) is ODD. Now again, if you observe closely, this is pretty direct info in answering the question raised up top. For the DIFFERENCE of two *integers* to be ODD one of them has to be EVEN and the other ODD. You can never have two ODD or two EVEN numbers being subtracted to yield an ODD DIFFERENCE. Therefore one of the two *integers* (**X** & **Z**) has to be EVEN and the other ODD. In other words, at least one of the two *integers* (**X** & **Z**) is definitely EVEN – a CONFIRMED YES.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.46

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.13).*

Using the information given only in the question we can begin by creating our table and filling in the information and placing a '**?**' sign at the place that we're required to find.

Also note that here we require a numerical value as an answer not a percentage value!

	Own a CAR	Do NOT own a CAR	TOTAL
Own a TV			
Do NOT own a TV		**?**	
TOTAL			3000

We're required to the **number** of people that own neither a car nor a TV.

STATEMENT (1) alone: The additional information in this statement fills in the original table as follows:

	Own a CAR	Do NOT own a CAR	TOTAL
Own a TV			
Do NOT own a TV		**?**	
TOTAL	2980	20	3000

Although through the information shared by this statement and the question stem we know that the total that do not own a car (i.e. the total of the two highlighted cells) adds up to 20, we do not know how the value 20 is distributed among the highlighted cells making multiple values possible for the **?** cell – no *unique* value.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The additional information in this statement fills in the original table as follows:

	Own a CAR	Do NOT own a CAR	TOTAL
Own a TV	2970		
Do NOT own a TV		**?**	
TOTAL			3000

This is clearly far too less information to arrive at a fixed value for the cell required. No *unique* value. There can be multiple values that can be possible for the required cell.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

INTENTIONALLY BLANK

	Own a CAR	Do NOT own a CAR	TOTAL
Own a TV	2970		
Do NOT own a TV	10	**?**	
TOTAL	2980	20	3000

Even considering the two statements together this is the best we can do to fill out the table completely. However, we still do not know how the value 20 is distributed among the highlighted cells making multiple values possible for the **?** cell. 20 can be broken into multiple possible sets of two values (10 + 10 & 15 + 5 etc.) that add up to 20 and the rest of the unfilled cells will adjust accordingly – no *unique* value.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.47

We're given two positive integers X & Y and are told that the two form a fraction of the sort (X/Y). We're asked to get a fix on the value of Y or find a *unique* value of Y. We'll try to follow the approach that has us targeted at finding multiple that can exist. Our aim using this strategy is to exhaust all possible cases before arriving at a supposedly *unique* value of what is asked.

STATEMENT (1) alone: This statement says that the least common denominator of the fractions (X/Y) & (1/3) is 6. In other words this is synonymous to saying that the LCM of 3 & Y is 6. This implies that the integer Y is a factor of 6 such that it is not a factor of 3 (if it's also a factor of 3 then the LCM turns out to be 3 instead of 6). This gives us the following values that Y can take on {2, 6}. Since two possible values of the variable Y satisfy the conditions laid out by this statement, a *unique* value for the integer Y does not exist.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone should be outright clear in the degree of insufficiency it carries. All we're given is X = 1. Since there is absolutely no relation Y bears with the Integer Y, Y here can take on all integer values – clearly no *unique* value.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together the situation reduces down to the following: The statement (1), with the info from statement (2) (X = 1), now reads: The least common denominator of (1/Y) & (1/3) is 6 or the LCM of 3 & Y is 6, which is exactly what we arrived at in our analysis in statement (1). Therefore even by clubbing the additional info provided by statement (2), our situation is not one bit improved from what it was in statement (1) analysis. We're still looking for values of Y for which the LCM of 3 & Y turns out to be 6. As deduced in statement (1), two such values can exist {2, 6}, and therefore even combining the two equations together cannot yield a *unique* value answer.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.48

Let the *number* of plain and seeded rolls on the counter be **P** & **S** respectively. We're required to find a *unique* value of the expression (**P** + **S**).

STATEMENT (1) alone: This statement mathematically put says: (**S**/**P**) = (1/5). A ratio only always represents the fractional composition of the constituent quantities. An easy plug and note confirms the insufficiency of this statement. **S** = 1 & **P** = 5 gives me (**P** + **S**) = 6, whereas **S** = 2 & **P** = 10 gives me (**P** + **S**) = 12. Two values are enough to convince yourself that at least a *unique* value of what is asked does not exist.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says **P – S =** 16. This is a difference equation that can take on multiple values of **P** & **S** each of which will yield a different value for the expression (**P** + **S**). *(For the sake of convincing yourselves you may try **P** = 17 & **S** = 1 or **P** = 18 & **S** = 2)*

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements considered together give us a system of two linear equations – (**S**/**P**) = (1/5) from statement (1) and **P – S =** 16 from statement (2) – in two variables **P** & **S** which can definitely be solved for a set of *unique* value of each of the two variables **P** & **S**. This will thereby yield a *unique* value of the expression (**P** + **S**).

*This right here is the end of the analysis of the collective statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the expression required (**P** + **S**) is enough to mark C as the option for this problem and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.*

We can solve the two equations mentioned above to get **S** = 4 & **P** = 20 thereby giving us a *unique* value of the expression (**P** + **S**) = 24.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.49

The question deals with accurately tracking the decimal place marked out by the question stem.

A quick recap of decimal representation may come in handy here.

A decimal may be represented as:

0.THTT... and so on, where:

T → the tenths digit of the decimal.

H → the hundredths digit of the decimal.

T → the thousandths digit of the decimal.

T → the ten thousandths digit of the decimal.

STATEMENT (1) alone: Multiplying the decimal d by 10 → the **hundredths digit** becomes the **tenths digit** of the decimal 10*d (i.e. the first one to the right of 0). And this is exactly what is given out by this statement to be equal to 7. This is spot on information about the decimal digit that we're tracking. Thus 7 is the **hundredths digit** of the decimal d and is hence greater than 5 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Dividing the decimal d by 10 → the **hundredths digit** becomes the **thousandths digit** of the decimal (d/10) (i.e. the third one to the right of 0). And this is exactly what is given out by this statement to be equal to 7. This again is spot on information about the decimal digit that we're tracking. Thus 7 is the **hundredths digit** of the decimal d and is hence greater than 5 – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.50

According to the question stem we're supposed to find a *unique* value of the expression 2*(X + Y). We can pretty much say in a way that we're required to find the *unique* set of values for each of the two variables X & Y.

STATEMENT (1) alone: This statement at the first glance should be clear that it is insufficient. This is a linear equation in two variables (X & Y) and can therefore generate a score of paired values of (X & Y) that will satisfy the equation. All those infinite pairs of (X, Y) will have a different value for the expression whose value is asked in the question stem – therefore no *unique* value based on just this statement.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement too at the first glance should be clear that it is insufficient. This is again a linear equation in two variables (X & Y) and can therefore generate a score of paired values of (X & Y) that will satisfy the equation. All those infinite pairs of (X, Y) will have a different value for the expression whose value is asked in the question stem – therefore no *unique* value based on just this statement.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements considered together give us a system of two linear equations – 3*X + 5*Y = 60 from statement (1) and 5*X + 3*Y = 68 from statement (2) – in two variables X & Y which can definitely be solved for a set of *unique* value of each of the two variables X & Y. This will thereby yield a *unique* value of the expression 2*(X + Y).

This right here is the end of the analysis of the collective statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the expression required 2(X + Y) is enough to mark C as the option for this problem and*

move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.
Looking at the two statements we can see a shortcut to arrive at the value of the expression asked in the question stem. If we add the two equations from the two statements together we get: 8*(X + Y) = 128 → 2*(X + Y) = 32 – a *unique* value answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.51

If you're fretting over the fact that the question stem carries a whole lot of information that at the very first glance looks un-linkable and is thus a difficult scenario to get a complete picture of, then it's best to take the info as and when it comes and concentrate/aim at getting a YES/NO situation or a multiple value scenario for the question asked.

All we can infer from the question stem is that Martin pays a tip that is in value twice the amount of the *tens digit* of the dollar amount of his bill (His bill for this criteria to qualify is thus between \$10 and \$99). We're asked if the calculated tip via the method above comes out to be greater than 15% of the actual amount of the bill?
I would say this again is a classic case to try out our subtle YES/NO targeted approach *(with the aim of exhausting all possibilities or cases possible)*

STATEMENT (1) alone: The statement gives us a range between which Martin's bill could have been! More specifically the statement says \$15 < Bill amount < \$50. If we want to test out two possible cases that might render us a YES/NO situation, then for a statement such as this one in that it employs a range of values between which the billing amount can be, then one reasonable idea is to try out the two extremes. *(Remember however that since the statement does NOT say inclusive we cannot assume \$15 & \$50 values to be a part of this discussion)*

CASE I (Bill amount = \$16): Tip evaluated by Martin = 2*(1) = \$2 & 15% of the bill value amounts to (15/100)*16 = \$2.40. Since Tip evaluated by Martin = \$2 < 15% of the bill amount = \$2.40 → CASE I gives a **NO** answer.

CASE II (Bill amount = \$49): Tip evaluated by Martin = 2*(4) = \$8 & 15% of the bill value amounts to (15/100)*49 = \$7.35. Since Tip evaluated by Martin = \$8 > 15% of the bill amount = \$7.35 → CASE II gives a **YES** answer.
We thus arrive at a YES/NO situation/scenario.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement says that the Tip calculated by Martin *(according to his rule given in the question stem)* = \$8. If we observe closely with the help of a little back calculation to see how he must have arrived at the value \$8, we'll see that the billing amount conforms to the following range: 40 ≤ billing amount < 50. We again get a range within which the billing amount lies. Now note that in this particular scenario, the tip calculated by martin in any case that we might make up will always be \$8. Also take note of the fact that since 15% of a larger quantity will be larger than 15% of a smaller quantity, *(In other words 15% of a value is an increasing function of the value itself, the higher the value the higher its*

15%) all we really need to do here again is check at the two extremes in above range given in this statement and they will pretty much speak for all the values that lie between them.

CASE I (Bill amount = $40): Tip evaluated by Martin = $8 & 15% of the bill value amounts to (15/100)*40 = $6. Since Tip evaluated by Martin = $8 > 15% of the bill amount = $6 → CASE I gives a **YES** answer.

CASE II (Bill amount = $50): Tip evaluated by Martin = $8 & 15% of the bill value amounts to (15/100)*50 = $7.5. Since Tip evaluated by Martin = $8 > 15% of the bill amount = $7.5 → CASE II again gives a **YES** answer.

The reason I took the other extreme as 50 even though 50 as a value is non-inclusive in this scenario is that my calculations become a lot easier (as compared to considering 49.9999999) and for the fact that there will always be some values (infinite actually) that will lie between my chosen value 49.999999 and 50, by taking 50 itself I'm taking into consideration the 15% of all those values as well (since 15% of 50 will be greater than the 15% of all these values).

I hence get a CONFIRMED YES situation above since there is no means by which I may create a NO situation given what the statement stipulates.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.52

We'll try to first mathematically translate our data as much as possible. We're given the following expression for the cost incurred to a manufacturer: **C** = K*$\boldsymbol{x}$ + T, where K & T are some unknown constants and the variable $\boldsymbol{x}$ denotes the number of units produced per month. We're also given the Sale Price of one unit of the product as SP = K + 60, where K is the same constant as introduced above. We're required to find the manufacturer's gross profit on 1000 units of its product. The expression of gross profit may be written as:
Gross Profit = Revenue – Costs; Revenue = SP*(number of units sold)
Gross Profit = (K + 60)*1000 – (K*1000 + T) = 60,000 – T.
We're therefore required to find the *unique* value of the expression 60,000 – T or a *unique* value of the variable T. Therefore, the entire solution of the above problem boils down to obtaining a *unique* value of the variable T.

STATEMENT (1) alone: The statement if mathematically put can be represented as (K + 60)*1000 = $150,000. Before even attempting to go forth and solve this equation, it is important to take note of the fact that this is a linear equation in one variable, and that too the variable that is irrelevant to our solution. One can figure that all we get is a value of K, and with no information to link this value of K obtained with the value of the variable T, this information is of little use to us.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says:
(K*1000 + T) – (K*500 + T) = 45,000, or K*500 = 45,000. Once again this is a linear equation in one variable, and that too the variable that is irrelevant to our solution. Again all

that we get is a value of *K*, and with no information to link this value of *K* obtained with the value of the variable *T*, this information is of little use to us.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same relationship or the same thing and there is nothing new that may be achieved by combining them in any way possible (certainly not the value of the variable *T*). They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.53

We're given that the symbol @ represents one of the four arithmetic operations (which one → that's unknown)
We're asked if the following identity holds for the above symbol:
(5 @ 6) @ 2 = 5 @ (6 @ 2)?
Since we're supposed to find a definitive answer to the enquiry in the question stem, a YES/NO targeted approach should work well here!
It's useless to riddle your minds with what the operation represented by the symbol could be. It proves easier to just concentrate on generating a YES/NO scenario and be done with the statement.
Let LHS & RHS stand for *Left Hand Side* & *Right Hand Side* respectively.
An identity is said to be true for all numbers if LHS = RHS of the identity/relationship for all numbers on the number line.

STATEMENT (1) alone: We're given that the operation represented by the symbol @ conforms to the following equation identity 5 @ 6 = 6 @ 5. Based on this identity we can rule out *subtraction* and *division*. We're therefore left with the symbol @ representing either ADDITION or MULTIPLICATION *(however this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what @ represents but with whether @ satisfies the identity (5 @ 6) @ 2 = 5 @ (6 @ 2))*. We'll check for both one by one:
ADDITION: LHS = (5 + 6) + 2 = 13, RHS = 5 + (6 + 2) = 13 → LHS = RHS – a **YES** answer.
MULTIPLICATION: LHS = (5 x 6) x 2 = 60, RHS = 5 x (6 x 2) = 60 → LHS = RHS – a **YES** answer again.
Thus whichever of the two operations (ADDITION or MULTIPLICATION) the symbol @ represents, we get a CONFIRMED YES answer as to whether @ satisfies the identity given in the question stem.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given that the operation represented by the symbol @ conforms to the following identity 2 @ 0 = 2. Based on this identity we can rule out *multiplication* and *division*. We're therefore left with the symbol @ representing either

ADDITION or SUBTRACTION *(however again this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what @ represents but with whether @ satisfies the identity (5 @ 6) @ 2 = 5 @ (6 @ 2))*. We'll check for both one by one:
ADDITION: LHS = (5 + 6) + 2 = 13, RHS = 5 + (6 + 2) = 13 → LHS = RHS – a **YES** answer.
SUBTRACTION: LHS = (5 – 6) – 2 = –3, RHS = 5 – (6 – 2) = –1 → LHS ≠ RHS – a **NO** answer.
Thus the information that the symbol @ represents either ADDITION or SUBTRACTION is not enough to substantially answer whether the identity given in the question stem is valid or not. *(We need a bit more info as to which one of the two operations ADDITION or SUBTRACTION does the symbol @ specifically represent)*. In other words we arrive at a YES/NO situation regarding the enquiry in the question stem.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.54

We're given an *INTEGER* **Y** of the form such that **Y** = **X** + |**X**|, we're then asked if **Y** = 0?

We'll just brush up a little on our knowledge on MODS before we proceed any further. If "**Taking the MOD"** as it is called, be defined as an operation that attaches two straight bars | | on either side of the quantity whose MOD we're taking, then such an operation returns to us the Absolute or the POSITIVE value of whosoever's MOD I have taken. Hence if I say taking the MOD of 2 → |2| = 2, or taking the MOD of –9 → |–9| = –(–9) = +9. Therefore, similarly the MOD of an UNKNOWN **X** is defined as follows:

$$|\mathbf{X}| = \begin{cases} -\mathbf{X} & \text{for all values of } \mathbf{X} \text{ that are } \textbf{\textit{negative}} \text{ for instance } -9, -3, -2.5\ldots\text{so on} \\ \mathbf{X} & \text{for all values of } \mathbf{X} \text{ that are } \textbf{\textit{positive}} \text{ for instance } 1, 5, 8.5\ldots\text{so on} \end{cases}$$

We'll proceed with our subtle approach of making cases targeted at a YES/NO situation attainment. The making case approach here would target furnishing values of **Y** other than 0.

<u>STATEMENT (1) alone</u>: The statement gives me range of the values that numeral **X** can take on! Because we are to make a comment on the value of **Y**, we need the equation that relates the two → **Y** = **X** + |**X**|. *You may argue before proceeding further that how can a range on one variable give me a fixed value (= 0) for the other variable, however, in questions involving more complex than usual operators such as the MOD operator, it is always beneficial to simplify the expression as far as possible before making any definitive comment.* Now the statement stipulates that **X** < 0, or that **X** is ***negative***. If we know that an unknown **X** is negative then, according to the definition of the MOD above |**X**| = –**X**. Hence given the value range of **X** (called domain usually), the value of **Y** simplifies to **Y** = **X** + (–**X**) = 0 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement gives me range of the values that *INTEGER* **Y** can take on! Since this statement only stipulates the values that the unknown **Y** can take on thereby in a way saying that the numeral **X** may take on any value possible, it makes sense to simplify the above main function to see what exactly are the values that **Y** can take on in general without considering the stipulations by this statement alone. We'll use the above definition of MOD of **X** to simplify the expression.

$$|X| = \begin{cases} -X & \text{for all values of } X \text{ that are } \textbf{\textit{negative}} \text{ for instance } -9, -3, -2.5\ldots \text{so on} \\ X & \text{for all values of } X \text{ that are } \textbf{\textit{positive}} \text{ for instance } 1, 5, 8.5\ldots \text{so on} \end{cases}$$

Therefore we may write that

$$Y = X + |X| = \begin{cases} X + (-X) & \text{for all values of } X \text{ that are } \textbf{\textit{negative}} \ (X < 0) \\ X + X & \text{for all values of } X \text{ that are } \textbf{\textit{positive}} \ (X \geq 0) \end{cases}$$

Or,

$$Y = X + |X| = \begin{cases} 0 & \text{for all values of } X \text{ that are } \textbf{\textit{negative}} \ (X < 0) \\ 2^*X & \text{for all values of } X \text{ that are } \textbf{\textit{positive}} \ (X \geq 0) \end{cases}$$

By the above reduced definition of the variable **Y**, **Y** can only take on non-negative *INTEGER* values i.e. **Y** = {0, 1, 2, 3,…so on} ← *these are the values that the question stem stipulates.* Now according to the statement info **Y** < 1. Combining the two pieces together we see that the only value **Y** can take on, from the set of values available, is just one and that is 0. Thus **Y** = 0 – a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.55

We're given a *POSITIVE integer* **N**. We're asked if **N** is odd?
As usual we'll proceed with our subtle approach of making cases targeted at a YES/NO situation attainment.

(Note this as a general rule that any question that even mentions the anything about anything to do with PRIMES will 8 out 10 times test your knowledge (directly or indirectly) of the fact that there is one even prime = 2. The existence of the even prime number (2) somehow seems quite fascinating to the GMAC society. Therefore as soon as you see the word prime in a question be on guard by keeping the number 2 in the back of your mind.)

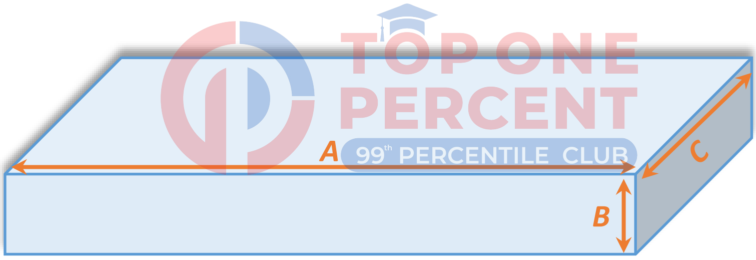
STATEMENT (1) alone: The statement says that (**N** + 4) is a prime number. Note here that **N** is a *POSITIVE integer*, in other words **N** ≥ 1 → (**N** + 4) ≥ 5. All I wanted to make sure using

this little analysis was that the value of the prime number (**N** + 4) can never be the value 2, the only value for which **N** can turn out to be EVEN. Now that (**N** + 4) is a prime number which is greater than or equal to 5 implies that (**N** + 4) is definitely ODD. Since the sum of two EVEN numbers can never be ODD and given that 4 is EVEN stipulates **N** to be ODD definitively – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that (**N** + 3) is NOT a prime number. It seems pretty easy here to create a YES/NO situation since out of the long list of composite numbers we can definitely pick out one ODD and one EVEN integer. (**N** + 3) can be equal to 30 for which **N** turns out to be 27 (an ODD integer) giving me a **YES** answer, likewise (**N** + 3) can be equal to 25 for which **N** turns out to be 22 (an EVEN integer) giving me a **NO** answer. We therefore arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.56

Let the rectangle shown below be the rectangle R with the shown dimensions:



Thus in a way we're asked for the *unique* value of the expression 2*(***A*B*** + ***B*C*** + ***C*A***).

STATEMENT (1) alone: The statement mathematically put says that one of ***A*B***, ***B*C*** or ***C*A*** has a numerical value of 48 but which one is not specified. Diagrammatically this means that you fix any one of the face – let's say the top face ***C*A*** to have a value of 48. This fixation however, would have no fix on the value the third dimension of the rectangular solid can take (in this case the side B). The third side, the one not included in the face that has a numerical value of 48, will therefore always be free to take on any value thereby rendering multiple values of the overall expression 2*(***A*B*** + ***B*C*** + ***C*A***) or of the total surface area of the rectangular solid.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement mathematically put says that one of ***A***, ***B*** or ***C*** has a numerical value of 3 but which one is again not specified. In other words we've just fixed one side of the rectangular solid (say ***A***), but ***B*** & ***C*** are free to take on any values they so desire, thus again rendering multiple values of the expression 2*(***A*B*** + ***B*C*** + ***C*A***) or of the total surface area of the rectangular solid.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: both statements considered together say that one of ***A*B***, ***B*C*** or ***C*A*** has a numerical value of 48 & that one of ***A***, ***B*** or ***C*** has a numerical value of 3. Since neither the face having a value of 48 nor the side having a value of 3 is fixed we can again generate multiple values of the expression asked in the question stem or of the total surface area. Two of such cases are presented which are enough to highlight the insufficiency of the information from the combined statements together.

CASE I: The side 3 (say ***A***) is one of the side of the face that has a value of 48 (say ***A*B***). → the other side (***B***) has a value of 16. However nothing further gives even a close approximation to the values that the third side (***C***) can take on. The multiple values of the side (***C***) alone should be enough to underscore the insufficiency of the info. But even if we were to consider the other case (CASE II) first we would not have to go further to any more cases as shown below.

CASE II: The side 3 (say ***A***) this time is NOT one of the sides of the face that has a value of 48 (say ***B*C***). → Now all we know is that the product of the sides ***B*** & ***C*** is 48 but we don't know their individual values which could exist in multiple sets. *(**B** = 3 & **C** = 16 or **B** = 6 & **C** = 8)* The multiple sets that do exist in this case analysis can again confirm the insufficiency of the data by considering this case alone.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.57

We're given a list of certain *INTEGERS* all of which are *DIFFERENT*.

The reason I try and highlight these little points of info (integers, different/distinct) is that they are the key getting most of the DS questions in which they are mentioned correct. It is a good practice to make a habit of taking note of these subtle yet impactful words that can form the difference most of the times between a right and a wrong answer on the exam.

We're asked if the product of all the integers on the list is POSITIVE?

We'll take on the statements one by one with a targeted YES/NO approach to the question raised above.

Also let for consideration purposes the list L be *(in ascending order of the integers)* of the sort L = {A, B, C, D, E, F,…, X}

STATEMENT (1) alone: This statement mathematically says that A*X > 0, this can here on have two interpretations: **Either** the greatest and the smallest *integers* in the list are both positive **or** are both *negative*.

If we consider the case where both the **greatest** and the **least** *integers* are positive then, we've got a list in which all the *integers* are positive, since the in between *integers* are positive as well. This yields a positive product thereby giving us a **YES** answer.

However, if we consider the case where both the **greatest** and the **least** *integers* are negative then, we've got a list in which all the *integers* are negative (since the in between integers will also be negative), since nothing in the question stem or the statement says anything about the number of integers in the list, an ODD number of integers (all negative) in

the list would mean, that the product is negative thereby giving us a **NO** answer. This gives us a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement on its own stipulates that the total number of integers in the list is EVEN, however, no information on how many of those EVEN integers are positive and how many ODD renders the information insufficient. We could have for instance 1 negative and 7 positive *integers* to give a **NO** answer or 2 negative and 6 positive *integers* to give a **YES** answer. Moreover we might even have 0 as one of the elements giving a product = 0. More or less it is easy to see in this scenario how a YES/NO situation may be attained.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: In conjunction the two statements stipulate the following conditions on the list L: The number of integers in the list L is even – statement (2) & All the integers in the list L are **either** all *positive* **or** all *negative*.

The all *positive* case is easy to see that it will definitely yield a positive product thereby giving us a **YES** answer to the question up top.

The all *negative* case takes in conjunction with the fact that there are EVEN number of elements in the list L will lead us to the result that no matter how many the number of elements in the list L, as long as the number of elements is EVEN the product of all the *negative* integers will always be positive – thereby again giving us a **YES** answer.
This gives us a CONFIRMED YES situation.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.58

Let the price (i.e. the price that the store charges) of an Individual chair be **I** and the price of a pack of 6 chairs be **P**. The question stem says that **P** < (6***I**). The question requires us to find a *unique* value of the variable **P**.
An approach targeted at finding multiple *(at least more than one)* values of **P**, with the hope that we'll exhaust all possible cases/scenarios before arriving at a conclusion that a *unique* value for the asked quantity exists seems a befitting way of going about this question.

STATEMENT (1) alone: The statement mathematically put says the following:
P = (1 – (10/100))*(6***I**) or simplifying **P** = (27/5)***I**. However, we arrive here at a linear equation in two variables that can therefore render **multiple** values of the variable **P**. *(for each and every new value of **I** that we input into the equation we'll get a new distinct value of the variable **P**)* This clearly speaks of the insufficiency of the statement.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says the following:
P = (5***I**) + 20 However this again is a linear equation in two variables that can therefore render **multiple** values of the variable **P**. *(for each and every new value of **I** that we input into*

*the equation we'll get a new distinct value of the variable **P**)* This again clearly speaks of the insufficiency of the statement.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, we'll have **P** = (27/5)***I** – from statement (1) and **P** = (5***I**) + 20 – from statement(2). Using these two we can surely arrive at a *unique* value of the pair of variables **P** & **J** (***P***, ***J***), and hence at a *unique* value of the variable **P**.

This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (**P**) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination. The calculations that are shown below are for demonstration purposes only;*

Substituting **P** = (27/5)***I** in **P** = (5***I**) + 20 gives us (27/5)***I** = (5***I**) + 20, or **I** = 50 and hence **P** = 270 – a *unique* value.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

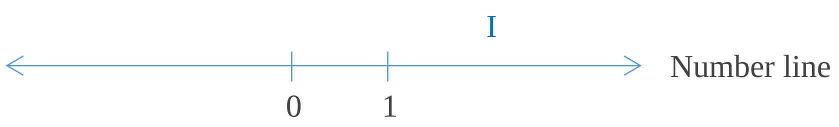
Q.59

We're given a numeral K such that K can have any value on the number save for three specific values {–1, 0, 1}. We're asked if (1/K) is > 0? A closer look at (1/K) reveals that since the numerator 1 is already positive, for (1/K) to be positive, it would imply that K is also positive or K > 0. Therefore the question in effect asks us is K > 0?

A YES/NO targeted approach should work well for us here.

STATEMENT (1) alone: The statement throws us the following inequality:

1/(K – 1) > 0; A closer look at this inequality reveals that since the numerator 1 is already positive, for 1/(K – 1) to be positive, it would imply that (K – 1) is also positive or (K – 1) > 0 or K > 1. Therefore, the statement diagrammatically put says:



The information deduced above says that K lies in region I. This gives us a CONFRIMED YES answer to whether K lies to the right of 0 on the number line (Is K > 0?).

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement throws us the following inequality:

1/(K + 1) > 0; A closer look at this inequality too reveals that since the numerator 1 is already positive, for 1/(K + 1) to be positive, it would imply that (K + 1) is also positive or (K + 1) > 0 or K > –1. Therefore, the statement diagrammatically put says:

The information deduced above says that K can lie in either region II or region III. This gives us a YES/NO answer to whether K lies in the region III definitively(Is K > 0?).

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.60

Before we begin this question let's take a relook into what the definition of a prime number has to say: A **prime** is a number that has exactly 2 distinct factors – 1 & the number itself. Therefore a **composite** number K (a number that is not prime) is a number for which there is at least one integer P, such that 1 < P < K, that is a factor of the integer K. This is exactly what the question stem stipulates. In other words, all the question is asking is:
Is K a **composite** number? Or Is K definitively **composite**?

STATEMENT (1) alone: This statement says that K > 4!. The statement thus gives out a range of values that the integer K, and that too a range beyond a certain value on the number line – 4!. There are obviously prime numbers (31, 37, etc.) as well as composite numbers (45, 50, etc.) greater than 4!. Hence K can take on either a composite value or a prime value given the range to which K is confined to. A clear YES/NO scenario.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says that 13! + 2 ≤ K ≤ 13! + 13. This statement too thus gives out a range of values that the integer K can take on. Getting a **YES** answer to our question up top is easy, we can simply consider the first number 13! + 2 which can be written as 2*((13!/2) + 2) and is hence composite, since 13! being the product of the first 13 positive integers will contain 2 in its product, we can out 2 common to show that 2 is a factor of 13! + 2 thereby making it composite. For a NO case we have to find a prime number in the range of values that K can take on in this statement.

Notice that the range of the integer K is such that it can take on values of the sort 13! + X, where 2 ≤ X ≤ 13, since the product of the first 13 positive integers (13!) contains each of the values in its product that X can take on (2 ≤ X ≤ 13), therefore any value of K may be written as K = 13! + X = X*((13!/X) + 1), where for 2 ≤ X ≤ 13 (13!/X) is an integer. *((13!/X) is simply the product of the first 13 integers save for X)* Thus if K can be written in the form K = X*((13!/X) + 1), where 2 ≤ X ≤ 13, then K is definitely composite or in other words there is no prime number (NO case) that exists within the range stipulated to K by this statement. Thus a CONFIRMED YES answer.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.61

The question stem introduces a *positive INTEGER* **N** which when divided by the number 25 yields a remainder 13. The mathematical way to represent the information above is to say let **N** = 25**K* + 13, where *K* is a non-negative integer such that *K* = {0, 1, 2,…so on}. We're asked to find a *unique* value of the *INTEGER* **N**.
An approach targeted at finding multiple *(at least more than one)* values of **P**, with the hope that we'll exhaust all possible cases/scenarios before arriving at a conclusion that a *unique* value for the asked quantity exists seems a befitting way of going about this question.

<u>STATEMENT (1) alone</u>: The statement says that the range of values that the integer **N** can take on is given by **N** < 100. Considering the form of **N** that we developed in the question stem – **N** = 25**K* + 13, where *K* = {0, 1, 2,…so on}, we see that substituting *K* = 0, 1, 2 & 3, all give values which are less than 100 and give a remainder 13 when divided by 25. Thus multiple values conform to the conditions laid out both the question stem and the first statement.
STATEMENT (1) alone - INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement introduces and thus stipulates another conformity requirement in addition to the one already stipulated by the question stem. The statement says that in addition to giving a remainder 13 when divided by 25, **N** also yields a remainder 3 when divided by 20. Thus mathematically we've got the integer **N** conforming to or bound by two separate criterion → **N** = 25**K* + 13 & **N** = 20**P* + 3, where *K* & *P* are non-negative integers. Before we proceed any further with this information, it might prove useful to give the following note a read:

- ➔ *For an integer **A** (say) that can be written in two different forms of the type (i.e. the same integer just conforms to two separate relations simultaneously) **A** = p*X + q & **A** = u*Y + v, where p, q, u & v are constants & X & Y are integer variables that may take on values such as {0, 1, 2, 3,…so on}.(The above equations in words mean that **A** when divided by p leaves a remainder q & that **A** when divided by u leaves a remainder v) It always proves useful to generate a single COMBINED form that may represent **A** such that the representation makes sure that both the two different relations implied by the equations **A** = p*X + q & **A** = u*Y + v are simultaneously satisfied. Thus the two are incorporated into one single form. Follow the following simple steps:*
    1. *Take the LCM of p & u, let it be L*
    2. *Begin substituting the values of integers X & Y starting from the least non-negative integer value 0. Our aim is to find the least possible values of both X & Y such that p*X + q equals u*Y + v.*
    3. *Let the value of p*X + q = u*Y + v = C in the case that both the two are equal for the minimum possible values of both X & Y (X & Y don't have to be the same but the value of the expression they generate p*X + q & u*Y + v has to be). C should always be < L*
    4. *The combined or incorporated form then is **A** = L*Q + C where Q can take on different integer values and L & C are constants.*

Using the steps above we'll try to find a combined form for the integer **N**. The LCM of 25 and 20 is 100 = L. Notice that $P = 3$ & $K = 2$, give out the same values of the integer **N** = 63 which becomes our C. Therefore, the combined expression for representing **N** may be written as **N** = 100*I + 63, where I is a non-negative integer; $I = \{0, 1, 2,\ldots \text{so on}\}$. But even here it can be seen that as the value of the Integer I is varied an infinite number of values of **N** are generated.

STATEMENT (2) alone - INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of information in the two statements together, we get that **N** is of the form **N** = 100*I + 63, where I is a non-negative integer; $I = \{0, 1, 2,\ldots \text{so on}\}$ – from combining statement (2) with the info in the question stem, and **N** < 100 – from statement(1). The two statements considered together leave us only choice of the value of the integer I; $I = 0$, giving **N = 63**. In other words there is only one *unique* value of the integer **N** such that the conditions laid out by the question stem and the statements are all satisfied together at once.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.62

We're given a variable **Y** that is fixed in terms of the values that it can take on → **Y** ≥ 0. We're asked for a *unique* value for another variable **X**.

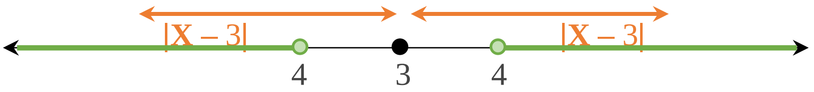
These are again one of those questions where the moment we find at least two values of the variable, whose *unique* value we're asked to find, we can discount the information at hand to say that the information is insufficient. We thus target our approach, from the very beginning, to finding more than one value of the variable asked, so that should the case actually be that a *unique* value of the asked variable actually exists, we can arrive at that result after having exhausted all the possible cases.

Before we begin we'll just quickly run ourselves through the link between MOD functions and what they *(MOD functions of the form* $|X - a|$*)* represent on the number line in general. An expression of the sort |**X** – A|, where A is a constant on the number line, (a line representing all the real number values that variable **X** can take on) represents the absolute value or the ***distance between*** the unknown **X** and a fixed point A on the number line as shown below:

By the above diagram, the point I wish to make is that regardless of which side of A the unknown **X** is on the moment we take the MOD of their difference we switch over to talking in terms of the absolute (positive) value of the ***distance between*** **X** & A. In other words since the distance between two points on the number line can never be negative, the expression |**X** – A| will always assume a positive value.

Having said that we'll now move on to the statements:

STATEMENT (1) alone: This statement gives out the following inequality: $|\mathbf{X} - 3| \geq \mathbf{Y}$; also remember that we've got a range stipulated on the variable **Y**. We'll try and see if this range helps us narrow down the value of the unknown **X** to a *unique* value. The range condition says $\mathbf{Y} \geq 0 \rightarrow \mathbf{Y}$ can take on values such as {0, 1, 2.5, 3.34,..., 50, 89…etc.}. These are all non-negative values which can each be substituted back into the inequality to get a multiple range of values of **X**. Taking **Y** = 1 will be more than enough to show the scores of values that I can generate. I can re-write the inequality as $|\mathbf{X} - 3| \geq 1$; quite frankly all this really means is that on the number line the unknown **X** is at a farther distance than 1 unit from the point that represents the value 3. Diagrammatically, this means that **X** can take on all the values represented by the **green** region on the number line below.



Number line

For all values on the green region of the number line above the distance or the value of $|\mathbf{X} - 3|$ will be ≥ 1 , and clearly these are scores of values.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement too gives out another inequality: $|\mathbf{X} - 3| \leq -\mathbf{Y}$; also remember that we've got a range stipulated on the variable **Y**. We'll try and see if this range helps us narrow down the value of the unknown **X** to a *unique* value. The range condition says $\mathbf{Y} \geq 0$ or that $-\mathbf{Y} \leq 0$ *(multiplying by –1 on both sides of an inequality switches the inequality sign around)* → –**Y** can take on values such as {0, –1, –2.5, –3.34,..., –50, –89…etc.}. These are all non-positive values which (–**Y**) can take on. Together with this we have the information $|\mathbf{X} - 3| \leq -\mathbf{Y}$, which seems to be saying that the ***distance between*** **X** & the numeral 3 on the number line is less than or equal to all the following values – {0, –1, –2.5, –3.34,..., –50, –89…etc.}. Now saying that the distance between (say my house and my office) two points on the number line is less than or equal to a negative number is completely absurd. The only option that makes any sense here is to say that the ***distance between*** **X** & 3 is equal to (not even less than) to the only one non-negative value in the set which is 0, because that is the only case that checks out as valid. The ***distance between*** **X** & 3 being 0 means that **X** & 3 are the same points or **X** = 3 – a *unique* value obtained.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.63

We're given M such that M is *positive, odd & an Integer*. We're then asked the average of a SET S (say) of integers, such that the number of elements in SET S is M. Well simply put we're asked the average of an ODD number of *integers*. This again is a question that seeks for a *unique* value of what is asked (average).

STATEMENT (1) alone: This statement stipulates that the integers in the list are bound by a conformity which is that they are **consecutive** multiples of 3. In other words the elements of the list are of the form 3**K*, where *K* takes on consecutive integer values {1, 2, 3,…so on}. Now the only information that I have to complement this is that the number of elements in

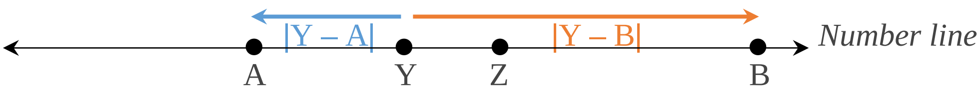
the SET is ODD. However, unless I know which **consecutive** multiples of 3 are contained in the list, it is hard for me to get a fix on the value of the average of the SET. To exemplify {3, 6, 9} has an average of 6, whereas {3, 6, 9, 12, 15} has an average value of 9. *Note however, that since the integers in the list are in Arithmetic Progression (A.P.) (elements separated by fixed distances), the average of ODD (M) number of such elements will always be* $\{(M + 1)/2\}^{th}$ *integer in the list where all the integers are arranged in ascending order of magnitude.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says that the *median* (middle value) of the SET of ODD (M) integers is 33. However no other information about the other elements in the SET renders this statement vulnerable to fail the sufficiency test quite easily. {1, 33, 34} will have a different average value from the average of the set {32, 33, 34} (both with *median* = 33 though).
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, we get that the *median* of a SET of ODD (M) integers in A.P. (they're all **consecutive** integers of 3) is 33. Since for a list of integers in A.P. *(elements separated by fixed distances. In the case being considered the distance is 3)*, the *median* = *mean* = middle most value or in this case $((M + 1)/2)^{th}$ value, therefore the SET in this case can be anything and any ODD number of element as long as we have a fix on the *median* of the set we will also know what the average of that SET is, since *median* = *mean*.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

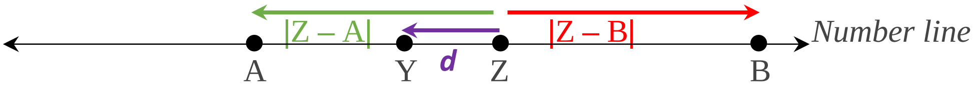
Q.64

If we draw out the information given in the question stem on the number line it might look something like:

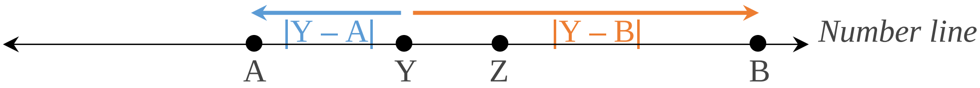


The algebraic form to work with (Is |Y – A| < |Y – B|) can be a bit of a tussle, which is why we'll interpret the question diagrammatically asking (synonymously) Is the **blue** arrow shorter in length than the **orange** arrow?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about such questions.

STATEMENT (1) alone: This statement fixates the distances of A & B relative to the point representing the value of Z. Let, for our purpose of analysis of this statement, the distance between Y & Z be ***d*** as shown
Or diagrammatically:
The statement says that the **green** arrow is lesser in length that the **red** arrow.

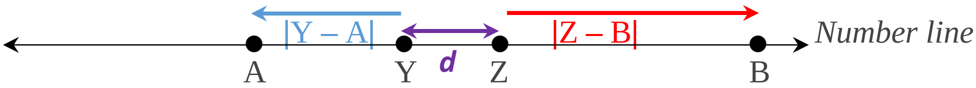


Now the current epicentre (from where the distances to various places are being measured) is the point Z. Since the question stipulates that the point Y lies to the left of the point Z, if we were to shift our epicentre from the point Z to the point Y (with which the question stem is concerned), we would have to do the following: Subtract from the **green** arrow (smaller in length one) the positive quantity ***d***, thereby making it further smaller in length and Add to the **red** arrow (larger one in length) a positive quantity ***d***, thereby making it even more large.
In simpler words the **purple** length is subtracted from the already smaller length and added to the already larger length.
Thus for the diagram shown below:

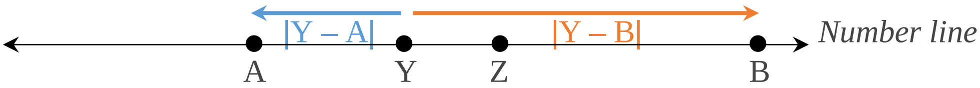


We can definitively say that the **blue** arrow shorter in length than the **orange** arrow – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement fixates the distances of A & B relative to the point representing the value of Y & Z respectively. Let again, for our purpose of analysis of this statement, the distance between Y & Z be ***d*** as shown
Or diagrammatically:
The statement says that the **blue** arrow is lesser in length that the **red** arrow.



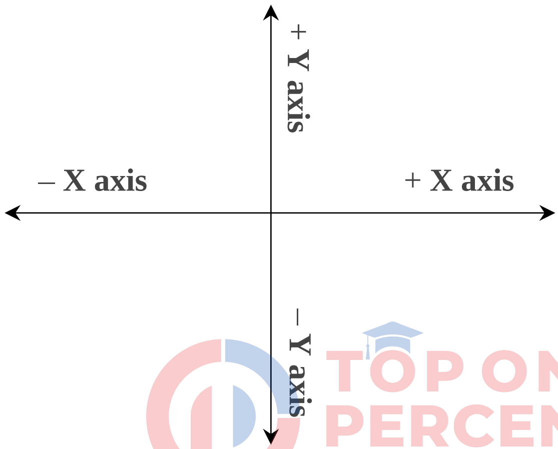
Since the question stipulates that the point Y lies to the left of the point Z, if we were to shift our epicentre to the point Y (with which the question stem is concerned), we would have to do the following: Keep the **blue** as it is and Add to the **red** arrow (already larger in length) a positive quantity ***d***, thereby making it even more large.
In simpler words to measure the distance of B from Y (|Z – B|) we need to add to the already greater arrow the **purple** length while the blue length remains the same.
Thus for the diagram shown below:



We can definitively say that the **blue** arrow shorter in length than the **orange** arrow – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.65

We're given ***a*** & ***b*** as two non-zero numbers. On a Co-ordinate (XY) plane we're given that the points → (–***a, b***) & (–***b, a***) lie in the same quadrant! Before proceeding further with the question stem let's just sort of look into the what exactly the above information means mathematically. For two points (X_1, Y_1) & (X_2, Y_2) to lie in the same quadrant of the XY plane shown below:



X_1 & X_2 must bear the same sign and Y_1 & Y_2 must also bear the same sign. Therefore, –***a*** & –***b*** must bear the same sign and ***b*** & ***a*** must also bear the same sign. In other words we're given that ***a*** & ***b*** are of the same sign (either both positive or both negative). We're asked whether a third coordinate point with co-ordinates (–X, Y) also shares the same quadrant?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about such questions.

STATEMENT (1) alone: This statement if interpreted from its mathematical form says → X & Y are either both positive or both negative. From the analysis in the question stem we arrived at a similar situation for ***a*** & ***b*** saying that ***a*** & ***b*** are either both positive or both negative. However, the lack of knowledge of the inter-relation between ***a*** & ***b*** and X & Y is what renders this statement vulnerable to fail the sufficiency test. We can plug in simple values to create a YES/NO case scenario. ***a*** = 1 & ***b*** = 2 along with X = 4 & Y = 5 gives me a **YES** answer to the question up top, however ***a*** = 1 & ***b*** = 2 along with X = –4 & Y = –5 gives me a **NO** answer to the same question. I thus arrive at a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement if interpreted from its mathematical form says → X & ***a*** are of the same sign that is either both positive or both negative. From the analysis in the question stem we arrived at the fact that ***a*** & ***b*** are either both positive or both negative.

However, this time the lack of knowledge of the inter-relation between X & Y is what renders this statement vulnerable to fail the sufficiency test. We don't know with certainty that X & Y are also of the same sign. We can plug in simple values to create a YES/NO case scenario. ***a*** = 1 & ***b*** = 2 along with X = 4 & Y = 5 gives me a **YES** answer to the question up top, however ***a*** = 1 & ***b*** = 2 along with X = 4 & Y = –5 gives me a **NO** answer to the same question. I thus again arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, I now sort of get the complete picture that I require to get a fix on the whole scenario. According to statement (1) → X & Y are of the same sign, and according to statement (2) → ***a*** & X are of the same sign and finally according to the question stem we've got that ***a*** & ***b*** are of the same sign. Thus in a sense what I arrive at is that X, Y, ***a*** & ***b*** are all of the same sign. They're either all four of them positive or all four of them negative. Conversely, we can also see that X & ***a*** are of the same sign which would mean –X & –***a*** are essentially of the same sign. Y & ***b*** are also of the same sign → (–***a***, ***b***) & (–X, Y) will lie in the same quadrant or that → (–***a***, ***b***), (–***b***, ***a***) & (–X, Y) will all lie in the same quadrant – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.66

We're given a *positive integer* Q < 17. We're required to find the **remainder** (*unique* value) when 17 is divided by the *positive integer* Q.

STATEMENT (1) alone: All this statement, in conjunction with the question stem (Q < 17), does is give out a range of values that the integer Q can take on. My value for the divisor Q is now confined to the following range: 10 < Q < 17, or **Q = {11, 12,…, 16}**. Picking out the first two values itself (11 & 12) confirms that at least two distinct values (6 & 5 respectively) of the **remainder** exist. This is enough to substantiate that a *unique* value thus does NOT exist.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: We're given a form to which the value of Q conforms to → Q = 2^K, where K is such that K = {1, 2,…so on}. Keeping in mind what the question stem stipulates Q < 17, the values that Q can take on under this scenario are **Q = {2, 4, 8, 16}.** The pattern that we notice here in the above set is that all the values that precede 16 are actually factors of 16 itself. In other words each of the values (the factors) can be multiplied with a positive integer to reach the value 16 ← after all that is precisely what a factor is! Therefore all of the values will yield the same **remainder** as 16 does. If you're least bit comfortable with the concept explained above, then it won't take more than a couple of seconds to try out each of the values to see a common value of the **remainder** = 1 – a *unique* value.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.67

Let the number of cups of flour be represented by the variable **F** & the number of cups of sugar be represented by the variable **S** that are required in a certain cake recipe. The question stem then requires us to seek a *unique* value of the expression (**F/S**)!

STATEMENT (1) alone: This statement if mathematically put says the following:
F = (250/100)***S** *(Note here that this statement says 250%* ***of*** *the number of cups of sugar and not 250%* ***greater****)* Or, that **F/S = (**5/2) – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement if mathematically put says the following:
F = **S +** (3/2) or **F – S =** (3/2). Note that this is a difference equation or a single linear equation in two variables (**F** & **S**) which can thus yield an infinite number of value pairs of the form (**F**, **S**). Each of these value pairs will end up giving different values of the ratio. *(Take for instance* ***F*** *= 5/2 &* ***S*** *= 1 giving us* ***F/S*** *= 5/2 &* ***F*** *= 7/2 &* ***S*** *= 2 giving us* ***F/S*** *= 7/4)*. Thus in this scenario a *unique* value for the ratio is unattainable.
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.68

Let's try and remember as a rule that dealing with profit questions we keep the following relation in the back of our minds ready to be applied whenever needed:
Gross Profit = Total Revenues – Total Costs
With that in mind we're asked the value of the following ratio by the question stem:
(Gross Profit/Total Revenue)
(Note that "X is what percent of Y first requires that you find the value of the ratio X/Y after which all you have to do is multiply this ratio with 100)
We're seeking a *unique* value of the ratio above.

STATEMENT (1) alone: Mathematically the statement translates into the following:
Gross Profit = (1/3)*(Total Costs) – If the statement right at this point seems insufficient for it contains a completely new variable (Total Costs) as opposed to the required – Total Revenue, then I suggest you're missing out on the unwritten info namely:
Gross Profit = Total Revenues – Total Costs
Thus in effect we've got two equations to deduce our results from. One way is to substitute for the unwanted in the above equation. Therefore, we'll substitute Total Costs = 3*(Gross Profit) in Gross Profit = Total Revenues – Total Costs to get
(Gross Profit/Total Revenue) = 1/4 – a *unique* value. *You're welcome to skip all the calculation part as long as you're confident of a unique solution seeing the two pieces of info in this statement. The earlier you realize the sufficiency the more time you save.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: Mathematically this statement translates into the following:
Total Costs = (3/4)*(Total Revenue) – We're pretty much put in a similar situation as in the above statement. Together with Gross Profit = Total Revenues – Total Costs we can substitute for the unwanted in the above equation. Therefore, we'll substitute Total Costs = (3/4)*(Total Revenue) in Gross Profit = Total Revenues – Total Costs to get
(Gross Profit/Total Revenue) = 1/4 – a *unique* value. *Again, you're welcome to skip all the calculation part as long as you're confident of a unique solution seeing the two pieces of info in this statement. The earlier you realize the sufficiency the more time you save.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.69

Be careful here not to mistake 'ONE KIND' for 'ONE QUANTITY'. The 'ONE KIND' here implies that all individual pieces of that kind cost the same. Having said that, we've got a lot of variables to establish before we can begin with this question. Let C & D be the price of ONE cupcake and ONE doughnut respectively and let **X** & **Y** be the number of cupcakes and the number of doughnuts purchased for the $6 amount. We may now write:

X*C + **Y***D = $6.

We're required to seek a *unique* value of the variable **Y**.

STATEMENT (1) alone: Mathematically the statement translates into the following:
2*D + $0.1 = 3*C or, 3*C – 2*D = 0.1, however this here is a linear equation in two variables (C & D) and can thus furnish infinite value pairs of the sort (C, D). The infinite pair value possibility is enough to see that we're nowhere even near getting a *unique* value of the variable **Y**. *If you're still not convinced use a very basic value say C= D=0.1 that satisfies the equation given out by this statement. Putting these values up in the equation of the question stem gets us to the point **X** + **Y** = 60, which can alone be enough to understand the immense number of solutions for the variable **Y** that we'll arrive at.*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically this statement translates into the following:
(C + D)/2 = $0.35 or, C + D = $0.7, however again this here is a linear equation in two variables (C & D) and can thus furnish infinite value pairs of the sort (C, D). The infinite pair value possibility is enough to see that we're nowhere even near getting a *unique* value of the variable **Y**. *If you're still not convinced use a very basic value say C=0.4, D=0.3 that satisfies the equation given out by this statement. Putting these values up in the equation of the question stem gets us to the point 4***X** + 3***Y** = 60, which can alone be enough to understand the immense number of solutions for the variable **Y** that we'll arrive at.*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, I now sort of get two equations in two variables C & D → 3*C – 2*D = 0.1 – from statement (1) and C + D = $0.7 – from statement (2). We can surely solve these two above to get *unique* values not of **X** & **Y** but of C & D. Solving will get you C = \$0.3 and D = \$0.4, substituting these values up top in the equation in the question stem, we'll still arrive at 3***X** + 4***Y** = 60. However this at best is again a single linear relation in two variables **X** & **Y** which can furnish multiple sets of values for the pair (**X**, **Y**) even though **X** & **Y** can only take on INTEGER values for they are number of cupcakes and doughnuts respectively. *(**X** = 16, **Y** = 3 & **X** = 12, **Y** = 6 are two such possible pairs of solutions to the equation)* Therefore a *unique* value is unattainable.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.70

The following result comes in real handy for this question:
For an odd number of *consecutive* integers the average is simply the middle integer. Hence for ***n*** *consecutive* integers (***n*** *odd*) the average is the $\{(n + 1)/2\}^{th}$ integer from either the right or the left of the series.

STATEMENT (1) alone: This statement says that 'the average of the first **nine** integers is **7**'. Applying the above result we can know that **7** must be $\{(nine + 1)/2\}^{th}$ or the 5^{th} integer from either the left or the right and hence get a fix on the series. This right here should be enough to substantiate that the statement is sufficient and we need not go any further, but I'll still go a bit further for demonstration purposes. We can write down the first **nine** *consecutive* integers by writing 4 consecutive integers on either side of 7 *(Since **7** is the 5^{th} integer from either the left or the right).* The series may then be written as {3, 4, 5, 6, **7**, 8, 9, 10, 11}. Once we know the first nine integers all we have to do is add 12 & 13 to the list to get the eleven consecutive integers.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that 'the average of the last **nine** integers is **9**'. Applying the same above result we can know that **9** must be $\{(nine + 1)/2\}^{th}$ or the 5^{th} integer from either the left or the right and hence get a fix on the series. This again right here should be enough to substantiate that the statement is sufficient and we need not go any further, but I'll still go a bit further for demonstration purposes. We can write down the last **nine** *consecutive* integers by writing 4 consecutive integers on either side of 9 *(Since **9** is the 5^{th} integer from either the left or the right).* The series may then be written as {5, 6, 7, 8, **9**, 10, 11, 12, 13}. Once we know the last nine integers all we have to do is add 3 & 4 at the beginning of the list to get the eleven consecutive integers.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.71

This question is pretty straight forward & direct & is probably one of the easiest of the questions in this data set!

We're to seek the *unique* value of the greatest integer possible that has a value less than some numeral **T**.

STATEMENT (1) alone: The statement straight out gives a *unique* value of the numeral **T** thereby in effect stipulating a *unique* value of what is asked in the question stem. This pretty much does it regarding the sufficiency of this statement. *Calculating the actual value of the greatest integer to show yourself that a unique value exists is a complete waste of time on the exam. Whatever proceeds from here on is for demonstration purposes only.*
We're given **T** = 9/4 = 2.25 and therefore we know that greatest integer less than 2.25 will only be one and that is the integer 2 – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement too straight out gives a *unique* value of the numeral **T** thereby in effect stipulating a *unique* value of what is asked in the question stem. This pretty much does it regarding the sufficiency of this statement too. *Calculating the actual value of the greatest integer to show yourself that a unique value exists is a complete waste of time on the exam. Whatever proceeds from here on is for demonstration purposes only.*
We're given **T** = $(–3/2)^2$ = 9/4 = 2.25 and therefore we know that greatest integer less than 2.25 will only be one and that is the integer 2 – a *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.72

Although the language of the question does seem to give off a scent of two **variable sets** with the possibility/certainty of an overlap, a closer look at the question along with its statements *(something that you sometimes are required to do, especially in cases where the question stem alone seems pretty ambiguous)* reveals that all we've got to do is follow the information that we encounter to see if we can somehow reach at a *unique* value of the variable that we're required to find. The question is NOT one of overlapping SETS.

Having said that, we're required to find the number of female voters who voted FOR the resolution K.

STATEMENT (1) alone: According to this statement (3/4)*1800 = 1350 Democrats and (2/3)*3000 = 2000 Republicans voted FOR the resolution. We thus have a total of 1350 + 2000 VOTERS (male and female) voting FOR the resolution, however we're clueless as to how this total SUM of FAVOURABLE voters is split up between the number of Men and Women voting for the resolution.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement (1/3)*D + (1/2)*R were females who voted FOR the resolution K, where D & R are the number of Democrats and Republicans that voted FOR the resolution K. *Note that in the question we're given the total number (Voted FOR + voted AGAINST) of democrats and republicans.* Not knowing the values of the

variables D & R here puts us in a spot where we're nowhere near a *unique* value of the number of females that voted for the resolution.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
D = 1350 & R = 2000 – as per statement (1) &
Female voters in FAVOUR of the resolution = (1/3)*D + (1/2)*R – as per statement (2).
It is quite clear from the two statements above that statement (1) provides the values that when fitted into the expression in statement (2) gives us the value of what we're looking for. Thus, Female voters in FAVOUR of the resolution = (1/3)*1350 + (1/2)*2000 = 450 + 1000 = 1450 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.73

We're given that N is a *positive integer* and are asked whether the following expression: $N^3 - N$ is divisible by 4.
Before we proceed further with the statements, it does make sense to devote a bit more time to the expression: $N^3 - N$ which may be split up as $N*(N^2 - 1)$ or
(N – 1)*N*(N + 1) which for N being a positive integer is a multiplication expression of three consecutive Integers.

STATEMENT (1) alone: This statement simply says that N is odd. If N = (2*k + 1), where k is a non–negative integer {0, 1, 2,…so on}, then (N – 1) is = 2*k & (N + 1) is = 2*k + 2 = 2*(k + 1). The expression (N – 1)*N*(N + 1) may now be written as
$(N - 1)*N*(N + 1) = 2*k*2*(k + 1)*(2*k + 1) = 2^2*\{k*(k + 1)\}*(2*k + 1)$, thus
$(N - 1)*N*(N + 1) = 4*J$, where J (= $\{k*(k + 1)\}*(2*k + 1)$) is an integer, thus
$N^3 - N = 4*J \rightarrow N^3 - N$ is a multiple of 4 and is hence divisible by 4 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: According to this statement $N^2 + N$ or N*(N + 1) is divisible by 6. Now N can either be ODD = 15 *say* for which the expression $N^3 - N$ = (N – 1)*N*(N + 1) = 14*15*16 = 2^2*7*15*8. The expression being divisible by 4 gives us a **YES** answer to the question. However, N can also be EVEN = 6 *say* for which the expression $N^3 - N$ = (N – 1)*N*(N + 1) = 5*6*7 = 2*3*5*7. The expression NOT being divisible by 4 gives us a **NO** answer to the question. We thus get us a YES/NO scenario.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.74

The expression in the question may be rearranged as to ask: Is {(X – Y)/(X + Y)} – 1 > 0? OR Is –2*Y/(X + Y) > 0? OR Is Y/(X + Y) < 0? *(Multiplying with a negative quantity across an inequality sign leads to reversal of the inequality sign)*

STATEMENT (1) alone: According to this statement X > 0. However we do not know the sign of the variable Y. We may have X = 5, Y = –1 giving us a **YES** answer to the question OR we may have X = 5, Y = 1 giving us a **NO** answer to the question. We thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement Y < 0 . However we do not know the sign of the variable X. We may have X = 5, Y = –1 giving us a **YES** answer to the question OR we may have X = –5, Y = –1 giving us a **NO** answer to the question. We thus arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the two statements together we have:
X > 0 & Y < 0. Although the numerator of the expression Y/(X + Y) is definitely negative, we cannot assume the same surety about the denominator. We may have X = 5, Y = –4 giving us a **YES** answer to the question OR we may have X = 3, Y = –4 giving us a **NO** answer to the question. We thus still arrive at a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.75

Let the total amount of cars expected to be sold for the 30 – day period be N. Then the question only requires us to seek a *unique* value of the product (X*N).

STATEMENT (1) alone: This statement gives out the value of N = 500. However, we're still unaware of the value of the second variable in the product X.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement the value of the following product is given: (N + 60)*X = 28,000. However, this is a single linear equation in two variables (N & X) and can thus generate multiple values of the variable pair (N, X) that will each satisfy the above equation. Each of those value pairs of (N, X) will yield different values of the product asked for in the question.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the information in the two statements together we have:
N = 500 – as per statement (1) &
(N + 60)*X = 28,000 – as per statement (2).

Using the above two equations we can obtain the value of the variable X as well, X = 50.
Thus the total expected donation is N*X = 500*50 = 25,000 – a *unique* value answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.76

Let the number of shares of stock in Ruth's portfolio be **S** and let the number shares of bonds in his portfolio be **B**. We're then asked whether the variable **S** increased in value over a certain period of time?

STATEMENT (1) alone: According to the statement, over the time period the ratio **S**/(**S** + **B**) increased. Now a fraction may increase in either of the following two scenarios: The Numerator increases by a greater percentage than the denominator does OR the denominator decreases by a greater percentage than the numerator does.
Therefore EITHER **S** increased at a greater percentage than did the sum (**S** + **B**) – giving us a **YES** answer – OR **S** remaining CONSTANT, **B** decreased in value – giving us a **NO** answer. We thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement the value of the sun (**S** + **B**) increased during the time period. However, **S** & **B** could have both increased – giving us a **YES** answer to the question – OR **S** remaining CONSTANT, only **B** could have increased in value – giving us a **NO** answer. We thus arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the information in the two statements together we have:
Over the time period the ratio **S**/(**S** + **B**) increased in value – as per statement (1) &
Over the time period the sum (**S** + **B**) increased in value – as per statement (2).
In short the two statements above say that an increase in the value of the ratio **S**/(**S** + **B**) was accompanied by an increase in the value of the denominator. This can only and only happen if the numerator (= **S**) also increased *(rather the numerator increased at a higher percentage than the denominator did)* – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.77

We're asked to confirm whether |X| = Y – Z?
Note that for the above to hold true, the right hand side of the equation must be positive.

STATEMENT (1) alone: According to this statement X + Y = Z or X = (Z – Y). Now everything depends on the sign polarity of the expression (Z – Y). If (Z – Y) is positive then, |X| = Z – Y, giving us a **NO** answer to the question, but if (Z – Y) is negative then it implies that (Y – Z) is positive, and since the MOD of a number is always positive |X| would become equal to |X| = Y – Z, giving us a **YES** answer to the question. We thus arrive at a YES/NO situation.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says that X is negative. However, no mention of the variables Y or Z or their relation to the variable X renders this statement inadequate to confirm our query.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
X = (Z – Y) – as per statement (1) &
X is negative – as per statement (2).
X is negative implies that (Z – Y) is negative. Therefore as we take MOD on both sides of the equation given in statement (1), we get:
|X| = |(Z – Y)| = – (Z – Y) = (Y – Z). *(For a negative number M the MOD of M, |M| = –M)*
We thus get a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.78

We're asked to confirm whether $-3*X^N$ is positive, given that N is an integer.

STATEMENT (1) alone: According to this statement X is negative. However, we must know how many times (= N) the integer X is multiplied with itself to be able to know whether X^N is positive or negative. For an EVEN N X^N becomes positive in value giving a **NO** answer to the question and for an ODD N X^N becomes negative in value giving a **YES** answer to the question. We thus arrive at a YES/NO situation again.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement N is ODD. However, whether X^N is positive or negative all depends on whether X is positive or negative and we have no such information on the variable X.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
X is negative – as per statement (1) &
N is ODD – as per statement (2).
The two together definitively stipulate that X^N *(the negative quantity multiplied an ODD number of times with itself)* is negative and thus the expression $-3*X^N$ is positive – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.79

We're asked to narrow down to the *unique* value of the integer N, which is given to be the square of an integer.

STATEMENT (1) alone: According to this statement N is even. N can thus assume the following values between 2 & 100 – N = {4, 16, 36, 64,…so on}. Clearly we've got more than ONE value that N can take on.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement, N in addition to being a perfect square is also a perfect cube. Here's how we will proceed with our little investigation. N being a positive integer between 2 & 100, its cube root is also a positive integer. We'll therefore start picking out positive integers (beginning with the lowest) and cubing them such that the cube of the picked out integer lies between 2 & 100 (both exclusive). We'll then see which of the cubes are perfect squares as well. The one(s) that is/are will be our answer(s). Note that since 5^3 = 125, we need not go beyond 5. Therefore our test subjects are just the first 4 positive integers.
1^3 = 1 – discarded since 1 does not lie between 2 & 100
2^3 = 8 – discarded since 8 is not a perfect square
3^3 = 27 – discarded since 27 is not a perfect square
4^3 = 64 – ACCEPTED since $\sqrt{64}$ = 8.
Thus N = 64 – a *unique* value answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.80

We're given *POSITIVE* **integers** X & Y such that they're inter-related via the equation X = 8*Y + 12. We're asked to seek the *unique* GCD of the integers X & Y.

STATEMENT (1) alone: According to this statement X = 12*U, where U is a positive integer. Substituting in X = 8*Y + 12, we get 12*U = 8*Y + 12. Thus 8*Y = 12*U – 12 or 8*Y = 12*(U – 1), where U is an integer greater than 1 *(since Y is a positive integer)*. Thus we may write Y as Y = (3/2)*(U – 1), where U is a positive ODD integer greater than 1. We can plug in the first few couple of values to see what we have. U = 3 → X = 36, Y = 3, with a GCD of **3**. U = 5 → X = 60, Y = 6, with a GCD of **6**. Two different values of the GCD are enough to prove that the statement is inadequate for us to reach a *unique* solution to the question.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: according to this statement Y = 12*Z, where Z is a positive integer. Substituting this value in X = 8*Y +12, we get X = 8*12*Z + 12 = 12*(8*Z + 1). Thus we've got: X = 12*(8*Z + 1) & Y = 12*Z. Let's take a look at the integers Z & (8*Z + 1) for a while. For Z = 1 the GCD of Z & (8*Z + 1) is 1. For Z > 1, Z is definitely a factor of 8*Z, which also means that ever factor of Z is also a factor of 8*Z. Since any two consecutive numbers (8*Z & (8*Z + 1)) do not have any common factors except 1, Z and all its factors can never be factors of 8*Z + 1. In other words, Z & (8*Z + 1) have no factors in common except for 1 no matter what value the integer Z takes on. Thus the only common factor between 12*(8*Z + 1) (= X) & 12*Z (= Y) is 12, which thus becomes GCD of X & Y – a *unique* answer obtained.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.81

We're introduced with two variables R (the price of a single roll) & D (the price of a single doughnut). We're required to seek the *unique* value of the variable R.

STATEMENT (1) alone: Mathematically put this statement says 8*R + 6*D = $5. However this is a SINGLE linear equation in TWO variables and thus generates multiple values of the pair (R, D) that will each satisfy the equation in this statement.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Mathematically put this statement says 16*R + 12*D = $10 or 8*R + 6*D = $5. Which is nothing but the same statement given out by the first statement. Basically this statement is saying the exact same thing as the first statement.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Notice how the two statements above have us arrive at the exact same equation each time. In other words we can infer what one statement has to say from the other statement. Therefore, there is nothing new that may be achieved by combining them in any way possible. They're both just two different ways of saying the same thing.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.82

We're asked if the numeral **X** is > 0?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this questions.

STATEMENT (1) alone: The statement gives out the following mathematical inequality **X*****Y** > 0. Which in other words means that either both **X** and **Y** are positive or both **X** and **Y** are negative. In simpler terms **X** and **Y** are both of the same sign. However, this statement alone could easily mean that either the numeral **X** is positive or is negative. Pretty easy to arrive at a YES/NO situation.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement on its own says that the SUM of the numerals **X** and **Y** is positive. It is however, still pretty easy to create a YES/NO case scenario in this situation. **X** could be positive with **Y** positive as well, or **X** could be negative with say a value of = –1, and **Y** be a quantity that is positive as well greater than the quantity **X** on magnitude say **Y =** 5 so that the inequality given out in this statement – **X + Y** > 0 – is satisfied. Thus we again arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we'll say out the conditions laid out by both statements in words: The first statement says that **X** & **Y** are of the same sign – they're either both positive or both negative! The second statement says that the SUM of the two numerals **X** & **Y** must be positive. Since now the SUM of two negative numerals can never ever come out to be positive, the only case that we're left with that simultaneously satisfies the conditions laid out by both statements is → both **X** & **Y** are positive → **X** is positive – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.83

This question is a time distance question for which the formula that we can keep at the back of our minds is *Distance = Speed x Time.*
Given a distance value of 400 KM, we're asked the time it took the car to travel this distance. In other words we're required to seek a *unique* value of the time it took to cover the distance mentioned.

STATEMENT (1) alone: This statement on its own is pretty easy to see how insufficient it is in the sense that all it tells us is what happened in the first 200 KM and leaves us absolutely clueless about what could have happened in the remaining 200 KM.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We'll try and represent this information in terms of mathematical relations for the sake of our convenience: Let **V** be the average speed of the car for its 400 KM journey and let **T** be time it took to travel the 400KM distance *(**T** is what we're required to find a unique value for)* based on the speed distance relation mentioned up top we may write **T** as **T** = (400/**V**) – this is the expression whose unique value we're required to find! We'll try and mathematically write out the information in this statement:
(400/**V**) – (400/(**V** + 20)) = 1 → 400*20/(**V***(**V** + 20)) = 1 – before proceeding with the actual solving of this solving of this question it makes sense to take note that the above is a single quadratic equation in one variable which can yield a total of two possible values of the variable **V**, therefore it might make sense to go forth and solve to see how many viable options remain after solving the quadratic equation. The equation may be solved to yield **V** = 80 or **V** = –100. Since for speeds we'll look at only positive values the only fitting option that we're left with is **V** = 80, or **T** = (400/80) = 5 hours – a *unique* value obtained. *A look at the quadratic equation in **V**, gives the following $V^2 + 20*V - 8000 = 0$. The –ve sign on the 8000 tells us that the roots of the equation will be a +ve, –ve pair since –8000 forms nothing but*

the product of the two roots. This is enough to tell us that the quadratic will yield only one +ve solution and hence will yield only one unique value of the quantity ***T****. With the following understanding the solving part turns out to be redundant.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.84

Let there be X 200 sq feet, Y 300 sq feet & Z 350 sq feet offices on the first floor of the building. Clearly since the number of offices can't be a fraction, X, Y & Z are non-negative integers. We're required to find the value of the sum (X + Y + Z).

STATEMENT (1) alone: According to this statement 200*X + 300*Y + 350*Z = 9500. However, this is a SINGLE linear equation in three variables (X, Y & Z) and can thus have multiple values of triplet (X, Y, Z) that will satisfy the equation in this statement, yet will give different multiple values of the SUM expression (X + Y + Z).
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement Z = 10. However this being all we know about the office space on the first floor, is too little for us to arrive at anything substantially conclusive regarding the total number of offices on the first floor.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: We may use the information in the 2^{nd} statement (Z = 10) in the first one to get a reduced equation of the sort: 200*X + 300*Y = 9500 – 3500 = 6000. Or 2*X + 3*Y = 60. However, even the reduced form is nothing but a SINGLE linear equation in two (if not three) variables and is thus inadequate to get a fix in the individual *unique* values of the variables X or Y, or of the SUM (X + Y + Z).
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.85

We're asked to check for the divisibility of N by 12.

STATEMENT (1) alone: According to this statement (N/6) = *K*, where *K* is an integer. This implies that N = 6**K*, where *K* is an integer. Now for *K* = 1 we get a **NO** answer to the query in the main question, however for a *K* = 2 we get a **YES** answer to the query in the main question. We thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement (N/4) = *I*, where *I* is an integer. This implies that N = 4**I*, where *I* is an integer. Now for *I* = 1 we get a **NO** answer to the query in the main question, however for a *I* = 3 we get a **YES** answer to the query in the main question. We thus arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: According to the two statements together, N may be written in the following forms N = 6*K & N = 4*I. In the essence of it the two forms of representation of N simply mean that N is divisible by both 6 and 4. Therefore, N must be divisible by the LCM of 6 (= 2 x 3) & 4 (= 2 x 2) which is 12. Thus N = 12*M, where M is an integer – a CONFIRMED YES.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.86

The question introduces two **variable sets** with the possibility/certainty of an overlap. Such language is typical of two variable sets questions and these questions are best tackled by chalking out the information on a table *(further reference – solution to Q.13).*

Using the information given only in the question we can begin by creating our table and filling in the information that we currently have.

	Have Brown hair	Do NOT have Brown hair	TOTAL
Boys			
Girls			
TOTAL	**X**		100

If **X** be the percentage of children that have brown hair then we're required to confirm whether **X** is > 50?

STATEMENT (1) alone: The additional information in this statement fills in the original table as follows:

Let Y be the percentage of girls in the group.

	Have Brown hair	Do NOT have Brown hair	TOTAL
Boys	(70/100)*Y%		Y%
Girls			(100 – Y)%
TOTAL	**X%**		100%

The above table misses out on the absolute value of the percentage Y and hence allows for multiple values of the two shaded cells above. The two shaded cells will thus add up to give multiple values of the variable **X** allowing for an easy YES/NO situation regarding the main question asked up top.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The additional information in this statement fills in the original table as follows:

	Have Brown hair	Do NOT have Brown hair	TOTAL
Boys			
Girls	30%		
TOTAL	**X%**		100%

The shaded cell above may have a value of *say* 10%, which when added to 30% gives us a **NO** answer to the main question. The shaded cell may also have a value of *say* 25% which then gives us a **YES** answer to the main question up top. We thus have a clear YES/NO situation.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Both the statements together fill in the table completely as follows:

	Have Brown hair	Do NOT have Brown hair	TOTAL
Boys	(70/100)*Y%		Y%
Girls	30%		(100 – Y)%
TOTAL	**X%**		100%

Even considering the two statements together this is the best we can do to fill out the table completely. We still do not know how the value of the variable Y. Y could be 10% *say* giving us an **X** value of 37% → a **NO** answer OR Y could be 30% *say* giving us an **X** value of 51% → a **YES** answer. We thus again arrive at a YES/NO situation.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.87

For *N* to be a multiple of 15 (= 5 x 3) implies that 15 (= 5 x 3) is a factor of *N*.

STATEMENT (1) alone: According to this statement we may write *N* as *N* = 20**K*, where *K* is an integer. Thus *N* = 2 x 2 x 5 x *K*. This tells us that **5 is a factor if *N*** but since for *N* to be a multiple of 15, 3 must also be a factor of *N*, the entire answer to the main question up top depends on the value of the integer *K*. If *say* the integer *K* equals 2 in which case *N* = 40, then we get a **NO** answer to the main question up top. However, if *K* equals 3 *say* in which case *N* = 60, then we get a **YES** answer to our question up top. We thus arrive at a YES/NO situation.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement (N + 6) = 3*I, where I is an integer. We may write N = 3*I – 6 = 3*I – 3*2 = 3*(I – 2) = 3*M, where M is an integer. This tells us that **3 is a factor of *N***. However being unsure of whether 5 is a factor of N or not gives us conflicting answers (YES/NO) to the main question up top as shown in the statement (1) analysis.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements put together stipulate that:
5 is a factor if *N* – as per statement (1) &
3 is a factor if *N* – as per statement (2).
This implies that 3*5 is also a factor of N *(If A and B are integers such that A & B are both factors of the integer K say, then A*B is also a factor of the integer K)* OR that 15 is a factor of the integer N – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.88

Since (X + Y) is given to be non-zero, we may simplify the expression (A*X + A*Y)/(X + Y) to write {A*(X + Y)}/(X + Y) = A. We're thus required to seek a *unique* value of the variable A and A alone.

STATEMENT (1) alone: Since the expression as shown above simplifies to one that involves only the variable A and A alone. Since the values of X & Y given here cannot in any way lead us to a *unique* value of the variable A, this statement is absolutely irrelevant to our discussion.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement straight out gives us the value of the variable A = 6. This is what we're looking for and get it in the form of a direct answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.89

The question requires us to seek a *unique* value of the ratio (P/R).

STATEMENT (1) alone: According to this statement (P/3*R) = (5/9) or we may write *(by cross-multiplying 3 to the other side)* that (P/R) = (5/3) – a *unique* value answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: According to this statement P + R = 16. Note that this is a SUM equation which is always least helpful in deriving a *unique* ratio of the variables involved. I

may choose P = 14, R = 2 to get a ratio (P/R) = (14/2) = 7 OR I may choose P = 12, R = 4 to get a ratio (P/R) = (12/4) = 3 – thus no *unique* value obtained.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.90

For two *real* numbers **A** & **B**, this question requires us to seek a *unique* value of the expression ($\mathbf{A}^4 - \mathbf{B}^4$). Now before we proceed forth with our statements, it might prove beneficial to take a closer look at the expression asked in the question stem! Using the formula $X^2 - Y^2 = (X - Y)*(X + Y)$, where X & Y are any real numbers in the number line, we may break down the expression ($\mathbf{A}^4 - \mathbf{B}^4$) as follows:

$(\mathbf{A}^4 - \mathbf{B}^4) = (\mathbf{A}^2 + \mathbf{B}^2)*(\mathbf{A}^2 - \mathbf{B}^2) = (\mathbf{A}^2 + \mathbf{B}^2)*(\mathbf{A} + \mathbf{B})*(\mathbf{A} - \mathbf{B})$

Therefore, in order to get a *unique* value of the expression asked in the question, we know that, **either** we know the individual values of both |**A**| & |**B**|, *(I say MOD because note how the expression contains terms **A** & **B** double squared or raised to the power 4. The double squaring or raising to the power 4 will do away with any –ve sign that either of **A** or **B** might have. Therefore all we're really interested in is the absolute value of the numerals **A** & **B** which nothing but the MOD of their respective values.)* **or** we somehow directly know the individual *unique* values of the three terms ($\mathbf{A}^2 + \mathbf{B}^2$), (**A** + **B**) & (**A** – **B**), which we can then multiply to get to the *unique* value of the expression ($\mathbf{A}^4 - \mathbf{B}^4$).
Having said that, we'll now proceed with the statements.

STATEMENT (1) alone: This statement gives out the value of ($\mathbf{A}^2 - \mathbf{B}^2$) which is nothing but a multiplication of (**A** + **B**) & (**A** – **B**). In other words we're given the following: ($\mathbf{A}^2 - \mathbf{B}^2$) = (**A** + **B**)*(**A** – **B**) = 16. However, this piece of information alone leaves us with multiple options for the value of the expression ($\mathbf{A}^2 + \mathbf{B}^2$). Look at it this way, all we know is the value of ($\mathbf{A}^2 - \mathbf{B}^2$) = 16 which is a difference equation and can thus generate multiple pairs in terms of value of the sort ($\mathbf{A}^2$, $\mathbf{B}^2$) which will each satisfy the equation ($\mathbf{A}^2 - \mathbf{B}^2$) = 16, however, will yield different values of the summation expression ($\mathbf{A}^2 + \mathbf{B}^2$) and will eventually yield different values of the expression ($\mathbf{A}^4 - \mathbf{B}^4$). *(Take for example ($\mathbf{A}^2$, $\mathbf{B}^2$) as (16, 0) conforming to ($\mathbf{A}^2 - \mathbf{B}^2$) = 16 as stipulated by this statement. This gives us an ($\mathbf{A}^2 + \mathbf{B}^2$) value of 16 and thus an ($\mathbf{A}^4 - \mathbf{B}^4$) value of 16*16 = 256. Another example might be ($\mathbf{A}^2$, $\mathbf{B}^2$) = (18, 2) again conforming to ($\mathbf{A}^2 - \mathbf{B}^2$) = 16 as stipulated by this statement. This gives us an ($\mathbf{A}^2 + \mathbf{B}^2$) value of 20 and thus an ($\mathbf{A}^4 - \mathbf{B}^4$) value of 16*20 = 320.)*
We thus cannot obtain a *unique* value of the expression using this piece of information alone.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives us the value of the sum (A + B) = 8. Again not only is this just one of the elements in the product of the three terms ($\mathbf{A}^2 + \mathbf{B}^2$), (**A** + **B**) & (**A** – **B**) that *(the product I mean)* leads up to the expression ($\mathbf{A}^4 - \mathbf{B}^4$), but also alone this statement info again can generate multiple values of the variables **A** & **B** that will end up giving multiple answers to what the value of the expression ($\mathbf{A}^4 - \mathbf{B}^4$) is. *(Take for example (**A** = 4, **B** = 4) conforming to (**A** + **B**) = 8 as stipulated by this statement. This gives us an ($\mathbf{A}^4 - \mathbf{B}^4$) value of $4^4 - 4^4$ = 0. Another example might be (**A** = 8, **B** = 0) again conforming to*

(A + B) = 8 as stipulated by this statement. This gives us an ($A^4 – B^4$) value of $8^4 – 0^4$ = 4096)
We thus cannot obtain a *unique* value of the expression using this piece of information alone.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the two pieces of information given in the two statements together, we've got the numerals **A** & **B** conforming to the following:
($A^2 – B^2$) = 16 – according to statement (1), &
($A + B$) = 8 – according to statement (2)
Note here that ($A^2 – B^2$) may be expanded to be written in the form of a product as was done in statement (1) analysis as follows: ($A^2 – B^2$) = ($A + B$)*($A – B$) = 16. Using the statement (2) info we can substitute the value of the term ($A + B$) = 8 in the above to get
8*($A – B$) = 16 or that ($A – B$) = 2. Note now how we've ended up with two LINEAR equations
($A + B$) = 8 – according to statement (2) &
($A – B$) = 2 – as derived from using the 2 statements together
which may be seen as a system/SET of two LINEAR equations that can be solved for a *unique* value of the each of the two variables involved (**A** & **B**). The *unique* values of the individual variables thus guarantee a *unique* value of the expression asked for in the question stem.

This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variables required (**A** & **B**) and thus of the expression ($A^4 – B^4$) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination and are for demonstration purposes only.*
We may solve the two linear equations in variables (**A** & **B**) to get **A** = 5 & **B** = 3, in turn getting the value of $A^4 – B^4 = 5^4 – 3^4 = 544$ – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.91

Let's try and mathematically quote what this statement requires us to confirm!

However, before proceeding further with the question and its statements, we'll just brush up our knowledge of the formula that allows us to calculate distances on an XY or Co-ordinate plane. The Formula states that if (X_1, Y_1) & (X_2, Y_2) be two points on the XY or Co-ordinate plane then the distance between the points *(which is nothing but the length of the line segment that joins the two points)* is given as the SQUARE ROOT of the SUM of the SQUARED DIFFERENCES between the X & the Y co-ordinates of the two points.
Mathematically if **D** represents the distance of between the points (X_1, Y_1) & (X_2, Y_2), then **D** may be written out as $D = \sqrt{(X_1 – X_2)^2 + (Y_1 – Y_2)^2}$.

Coming back to the question, we're given two points in the rectangular co-ordinate plane, namely (R, S) & (U, V). We're asked to confirm whether they're equidistant from the ORIGIN which is the point (0, 0). Using the distance formula introduced above, we may in other words say that we're required to confirm whether the expression

$\sqrt{(R-0)^2 + (S-0)^2}$ is equal in value to the expression $\sqrt{(U-0)^2 + (V-0)^2}$ OR

We need to confirm whether $(R^2 + S^2) = (U^2 + V^2)$?

<u>STATEMENT (1) alone</u>: This statement says that R + S = 1. However note how this statement only talks of the point (R, S) and shares no information whatsoever about where the point (U, V) could possibly lie on the XY plane. We can thus in no manner get any sort of confirmation on the relative comparison of the distances at which the two points (R, S) & (U, V) lie from the origin. This information is nowhere close to being sufficient.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: Now this statement on the contrary does sort of provide some sort of a relation by which the coordinates of one of the points is related to the coordinates of the other. The equation tosses out the following relations: U = (1 – R) *(a relation between the X – Coordinates of the two points)* & V = (1 – S) *(a relation between the Y – Coordinates of the two points)*.
We can thus write that
$(U^2 + V^2) = (1 - R)^2 + (1 - S)^2 = (1 + R^2 - 2*R) + (1 + S^2 - 2*S) = (R^2 + S^2) - 2*(R + S) + 2$.
Or $(U^2 + V^2) = (R^2 + S^2) - 2*(R + S) + 2$
Now the entire onus of our little confirmation game rests on the value of the SUM (R + S).
Note the following cases: Should (R + S) = 1, we get $(U^2 + V^2) = (R^2 + S^2)$ giving us a **YES** answer to the question up top, however, should (R + S) be any other value except 1 we'll get a **NO** answer to the question up top.
We thus arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Clubbing the two pieces of information given in the two statements together, we've got the coordinates of our two points (R, S) & (U, V) conforming to the following:
R + S = 1 – according to statement (1) &
$(U^2 + V^2) = (R^2 + S^2) - 2*(R + S) + 2$ – according to statement (2)
It's pretty easy to see how we get that one little piece of information from statement (1), the piece that was keeping us from labelling the 2nd statement sufficient. We can simply substitute the value of the sum (R + S) from statement (1) into statement (2) to get
$(U^2 + V^2) = (R^2 + S^2) - 2*1 + 2 = (R^2 + S^2)$ or
$(U^2 + V^2) = (R^2 + S^2)$ – a CINFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.92

We're given two SETS X & Y each with ONLY *POSITIVE* **integers** as their elements. We're asked to confirm whether (the greatest integer in SET X) is > (the greatest integer in SET Y)?

STATEMENT (1) alone: This statement shares information only about the SET X and has absolutely nothing to mention on what the SET Y might look like. This is obviously too little information to work with at this stage and should thus be out rightly discarded as insufficient.
STATEMENT (1) alone – INSUFFICIENT

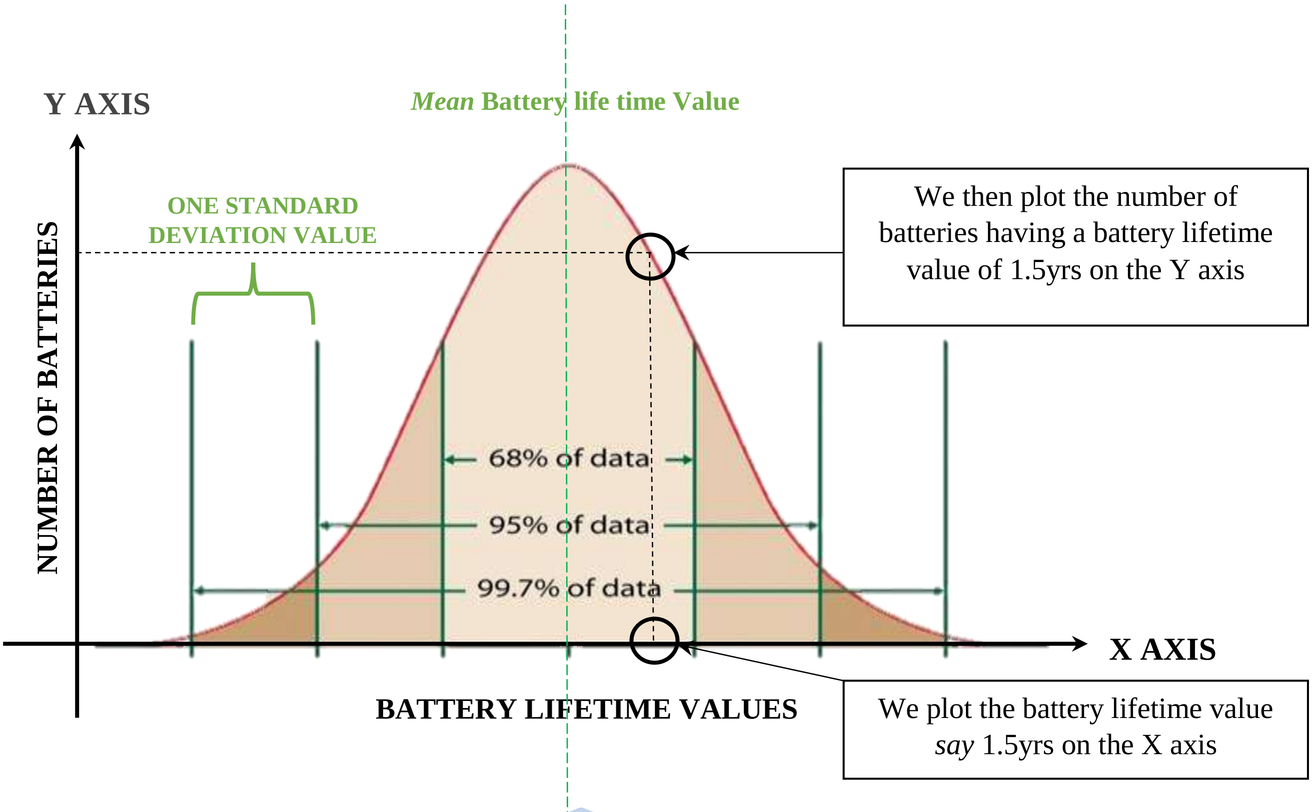
STATEMENT (2) alone: Once again this statement shares information only about the SET Y and has absolutely nothing to mention on what the SET X might look like. This is again obviously too little information to work with at this stage and should thus be out rightly discarded as insufficient.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the two statements together we now get a sense of what each of the SET might look like. This is at least a start! We'll begin with each piece of info one by one:
SET X consists of 5 CONSECUTIVE ODD integers each less than 20 – statement (1) &
SET Y consists of 3 CONSECUTIVE EVEN integers each less than 15 – statement (2).
Having gone through the above, we will now follow an approach targeted at getting us a YES/NO scenario to the main question asked up top. We'll draw out the following cases:
CASE I: SET X may be chosen as X = {11, 13, 15, 17, 19} *say* and SET Y may be chosen as Y = {4, 6, 8} *say*. The two SETS chosen here answer us with a **YES** to the question up top.
CASE II: SET X may be chosen as X = {1, 3, 5, 7, 9} *say* and SET Y may be chosen as Y = {10, 12, 14} *say*. The two SETS chosen here answer us with a **NO** to the question up top.
We thus arrive at a YES/NO scenario with regards to the confirmation asked in the question.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

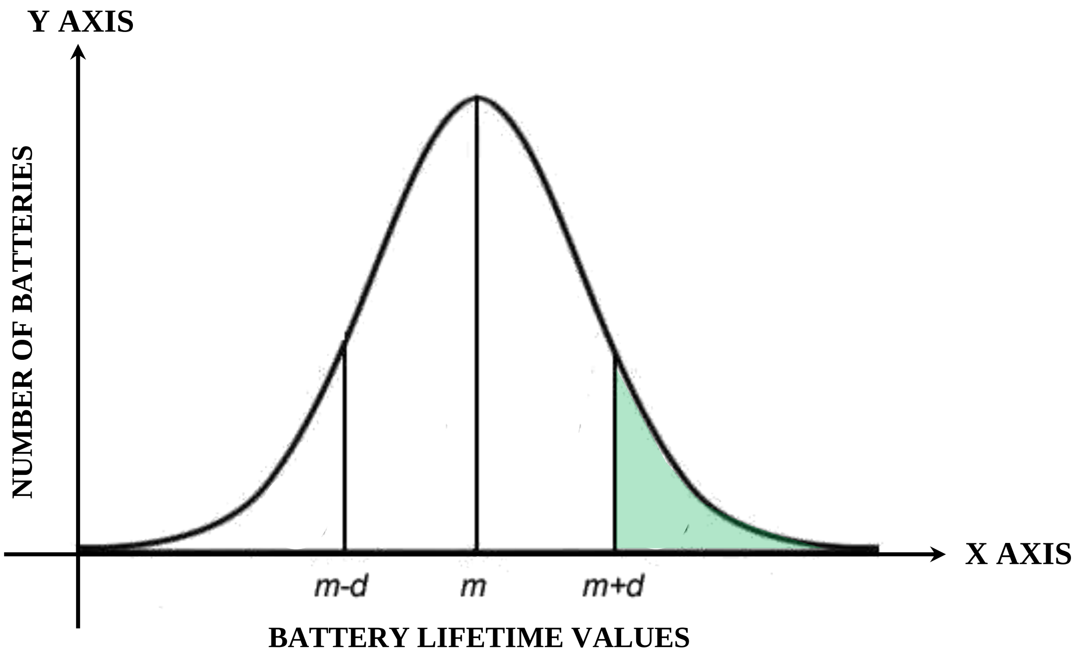
Q.93

This question says that the lifetime values of all the batteries produced in a year when plotted as a frequency distribution curve *(which means that for each particular* ***value of the lifetime*** *of a battery you're plotting the* ***number*** *of batteries that have that particular lifetime on the Y – axis. In other words, you first start out by plotting the lifetime values – say 3 yrs, 5 yrs, 7 yrs and so on – as points on the X – axis or the horizontal axis and then plot the corresponding number of batteries against their lifetime values on the Y – axis)* gives us a distribution that is symmetric about the mean value of the lifetime of the batteries. This essentially means that each of the batteries having lifetimes less than the mean lifetime value behave (in terms of number of batteries exhibiting the lifetime against which it is plotted) in the exact same manner as the batteries with lifetimes greater than the mean lifetime value.

The diagram below shows how we actually plot the data on the graph to generate the kind of curve that we get. As can be seen in the diagram below the left half (the portion to the left of the green dotted line) of the distribution curve is exactly the same as the right half.

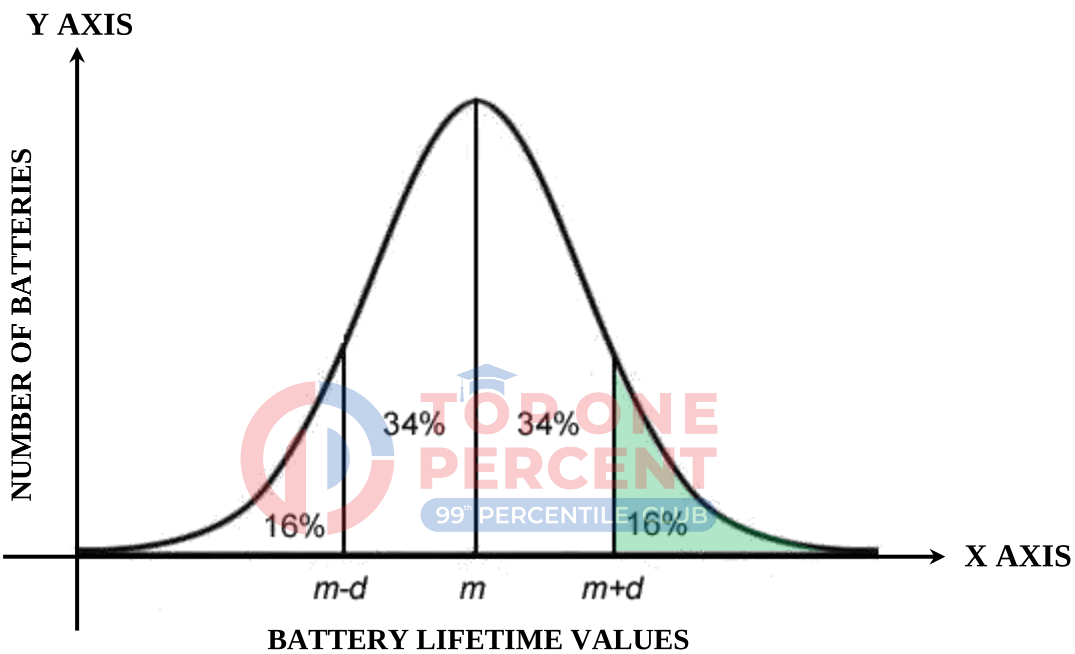


Having said all that we return to our question to note that the question mentions the *Mean* of the battery life distribution to be *m* and the standard deviation to be *d*. The diagram above may then be simplified to give us the following diagram as shown below:



With the above rough framework or picture in mind we will now begin with our analysis of the question. The question asks us for a *unique* value of the **percentage** that the portion to the right of the ($m + d$) mark comprises. In other words we are supposed to find the **percentage** of data points (i.e. to say batteries) that lie in the green shaded region.

STATEMENT (1) alone: This statement says that the portion between $m - d$ & $m + d$ comprises 68% of all the data points in the distribution given above. This means that the portion beyond – to the right of ($m + d$) and to the left of ($m - d$) comprises (100 – 68)% = 32% of all the data points (i.e. the remaining ones). Since the two portions i.e the one to the right of ($m + d$) and one to the left of ($m - d$) are identical and symmetrical about the mean, they each should comprise of (32/2) = 16% of the entire distribution. This is diagrammatically represented below:

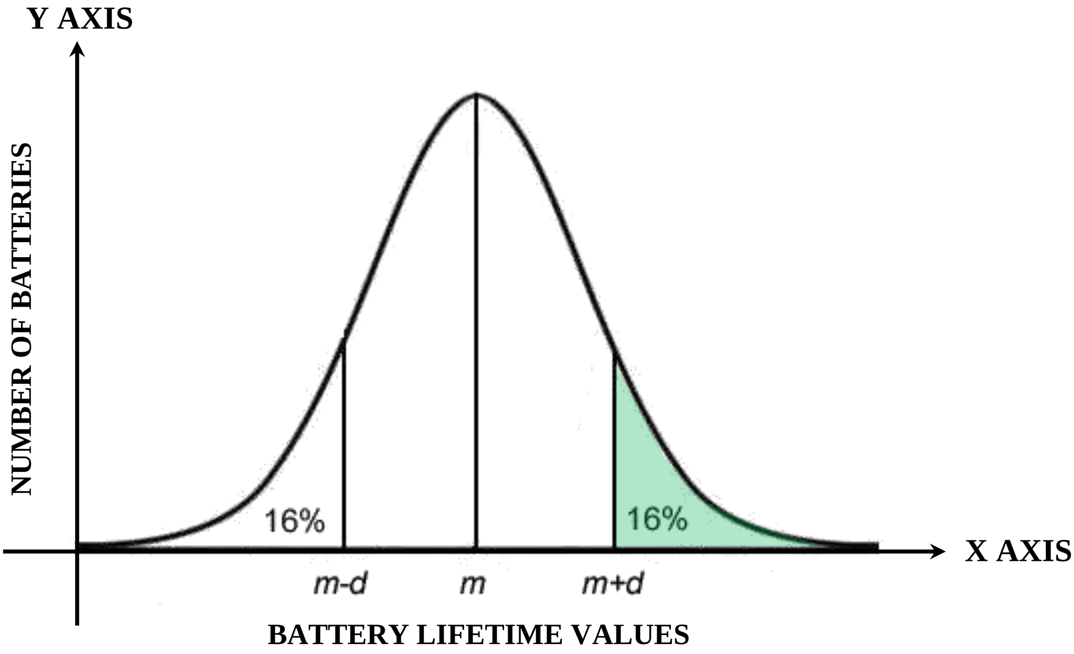


As can be seen from the diagram above we get a *unique* percentage value of the green shaded portion of the distribution.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement simply hands out the value of the portion to the left of ($m - d$). Since the distribution is symmetrical about the mean, the green shaded portion whose *unique* value we're seeking is exactly same as the portion to the left of ($m - d$) and thus also comprises 16% of the distribution.

INTENTIONALLY BLANK



As can be seen from the diagram above, the green shaded portion being exactly same as the portion to the left of (*m* – *d*) again also comprises 16% of the distribution – a *unique* value obtained.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Top 1% expert replies to student queries (can skip) (Link)

Q.94

We're given a MOD equation in a single variable X, and we're asked to confirm whether a single *unique* value of the variable X exists? We'll take a look at the equation in the main question before proceeding on with the statements.

The question gives out the following equation: |(X + 2)| = 4. This means that the absolute value of the quantity inside the MOD can either be +4 or –4 because for either of the two values that the expression (X + 2) might take on, the MOD of (X + 2) will always be 4. Now X + 2 = +4 gives us a value of X = 2, whereas considering (X + 2) = –4 gives us a value X = –6. In other words the question boils down to the following: I have a SET of values that the variable X can take on *(fortunately I've only got two discreet values that I have to deal with)* given by X = {2, –6} and I am supposed to narrow down to ONE single value that X can take on.

<u>STATEMENT (1) alone</u>: This statement says that the numeral X can take on any value except for a value that when squared gives us a result 4. There are only two such values that we know of and they are X = {2, –2}. Therefore, in effect all that this statement says is that X ≠ {2, –2}. Taking this in conjunction with what we've already derived in the question stem – X = {2, –6}, we can say that since X ≠ –2 according to this statement, the only value that X may then take on is of –6. Therefore, this statement has narrowed it down to a single/*unique* value of the variable X = –6.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the numeral X can take on values that when squared gives us a result 36. There are only two such values that we know of and they are X = {6, –6}. Therefore, in effect all that this statement says is that X = {6, –6}. Taking this in conjunction with what we've already derived in the question stem – X = {2, –6}, we can say that since the only value of X that conforms to both the conditions laid out by this statement and the question stem is X = –6. Thus the only value that X may then take on is of –6. Therefore, this statement too has narrowed it down to a single/*unique* value of the variable X = –6.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.95

We're given V & W as *DISTINCT* **integers**. We're asked confirmation on whether the value of the integer V equals 0?

STATEMENT (1) alone: This statement says out the following mathematical relation: $V*W = V^2$. We may rearrange to write $V*W – V^2 = 0$ or $V*(W – V) = 0$. It proves immensely crucial to remember that we're given that the two integers V & W are distinct. In other words, we're given that $V \neq W$ or that $V – W \neq 0$. Thus, for the expression $V*(W – V)$ to be equal to zero *(with $V – W \neq 0$)* V must definitely equal 0 – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: All this statement does is say out the *unique* value of the integer W = 2. Clueless about any sort of connection that the integer W might bear with the integer V, we're left stranded in the middle of nowhere on this info.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.96

The question asks if $\sqrt{(\mathbf{X} – 5)^2} = (5 – \mathbf{X})$?

It is important to note that the square root of any quantity is always and always +ve. Thus the question in a way is asking whether $(5 – \mathbf{X}) > 0$? (which is essential for the above equation to hold)

Or, is $\mathbf{X} < 5$?

STATEMENT (1) alone: Statement says $–\mathbf{X}*|\mathbf{X}| > 0$, since $|\mathbf{X}|$ is a +ve quantity, the inequality is only possible if $\mathbf{X} < 0$ → this gives a CONFIRMED YES answer to the question is $\mathbf{X} < 5$?

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement straight out gives the answer to the question up top *(whether (5 – **X**) > 0?)* saying that (5 – **X**) is indeed > 0 or **X** indeed is < 5 – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.97

We're given a certain SET of 7 (ODD) numbers. We're asked for a *unique* value of the median of the SET. Note that since the list consists of 7 (ODD) number of elements, the median is actually an element present in the SET.

STATEMENT (1) alone: All this statement says is that three of the numbers in the list are less than 10 or in other words the rest of the 4 numbers are either equal to or greater than 10. However, the statement makes it unclear as to whether the number 10 is actually a member of the list or not. The rest of the 4 numbers (the ones that this statement does not talk about) could either be {10, 11, 12, 13} making 10 the *median* or be {11, 12, 13, 14} making 11 the *median*. Carrying on such, we see that we have absolutely no FIX on the value of the *median* of the SET.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement says is that four of the numbers in the list are greater than 10 or in other words the rest of the 3 numbers are either equal to or less than 10. However, the statement makes it unclear as to what the values, of the 4 numbers that are greater than 10, are. The 4 numbers *(the rest of the three numbers being less than 10, the median has to be one of the four numbers that are given to be greater than 10)* could either be {11, 12, 13, 14} making 11 the *median* or be {12, 13, 14, 15} making 12 the *median*. Carrying on such, we again see that we have absolutely no FIX on the value of the *median* of the SET.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Even clubbing the two statements together, we see that there is little (actually nothing at all) that we can achieve in terms of getting a *unique* value of the *median* of the list introduced in the question stem. Considering the two statements together we know that 3 of the numbers in the list are less than 10 and the remaining 4 are greater than 10, however, we are absolutely clueless still as to what the actual value of the numbers in the list are. Since the median has to come from the 4 – all greater than 10 – numbers, we need to know the value of the least of these 4 numbers which will be the median of the list *(as that number will have 3 below and 3 above it in terms of value).*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.98

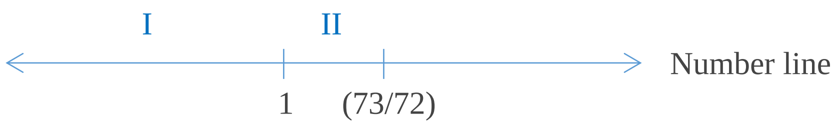
This question has a pure plug and play solution that would work best for it. We're asked confirmation on whether the SUM $(X + Y)$ is < 1? for two numerals X & Y.

A YES/NO scenario simulation by making cases/plugging in values should be our target!

<u>STATEMENT (1) alone</u>: This statement stipulates a range of values that the variable X has to conform to, saying that $X < (8/9)$. However, since we're totally free to assume any value of the variable Y, our YES/NO case generation sees no serious obstacles. For demonstration sake we may choose $Y = 0$ to get a **YES** case or $Y = 1$ to get a **NO** case. We clearly most easily arrive at a YES/NO juncture.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement stipulates a range of values that the variable Y has to conform to, saying that $Y < (1/8)$. However, since we're totally free to assume any value of the variable X, our YES/NO case generation again sees no serious obstacles. For demonstration sake we may choose $X = 0$ to get a **YES** case or $X = 1$ to get a **NO** case. We clearly again most easily arrive at a YES/NO juncture.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the information contained in the two statements together, we get range restrictions on both the variables X & Y.
$X < (8/9)$ – according to statement (1) &
$Y < (1/8)$ – according to statement (2)
Note that we can simply add the two inequalities above *(since both inequalities bear the same less than sign)* to get $(X + Y) < \{(8/9) + (1/8)\}$ or the SUM $(X + Y) < (73/72)$. This can be represented on the number line as follows:



The derived information above says that the SUM $(X + Y)$ can lie in either region I or II. This again gives us a YES/NO scenario about the SUM $(X + Y)$ lying in region I definitively.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.99

The question laying down its rules for evaluating the sales tax on the sale and purchase of a house in County X, asks to calculate the total tax paid by Colleen for her two transactions mentioned in the question. The question stem stipulates that the BUYING and the SELLING both require a 0.5% on the Sale price as tax payment to the County. Colleen is said to have BOUGHT and SOLD a house in the same county. We're thus to seek a *unique* value of the total tax paid to the county by Colleen.

Let us try and put this information mathematically so that the expression whose *unique* value we're to seek may become clear. Let the Sale Price of her old home be denoted by SP_O & let the Sale Price of her new home be denoted by SP_N. Then all we're required to find id the value of the expression $(0.5/100)*(SP_O + SP_N)$. Thus, we must know either the individual values of the variables SP_O & SP_N, or the value of the SUM expression $(SP_O + SP_N)$.

<u>STATEMENT (1) alone</u>: This statement gives out the value of the variable **SP_O = $169,500**. However, this is just one piece of the puzzle that we need to solve the question completely. Unaware of the value of the variable SP_N renders this statement insufficient to answer us definitively.

STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement mathematically spells out as to say:
$SP_N = \{1 + (20/100)\}*SP_N$ OR **$SP_N = (6/5)*SP_O$**. However, this is a single linear relation in two variables (SP_O & SP_N) and can thus generate multiple values of each of the variables that may satisfy the relation. The multiple values thus generate give out multiple values of the SUM expression asked in the question stem up top.

STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the information contained in the two statements together, we get the following relations to which the variables (SP_O & SP_N) conform.
SP_O = $169,500 – as spelled out by statement (1) &
$SP_N = (6/5)*SP_O$ – as spelled out by statement (2)
Clearly the above may be seen as a SET of two linear relations in two variables that can accordingly be solved to get a *unique* value of each of the variables (SP_O & SP_N). It's pretty easy to see how we may substitute the value of the variable SP_O from the 1st statement into the 2nd one to get the value of the variable SP_N. Once the variables are known, we know that we've got ourselves a *unique* value of the expression up top in the question stem. ONLY for demonstration sake you may solve to find the value of the total tax paid = $1864.50 – a *unique* value obtained.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.100

This is one of those questions that pretty much handled via taking into consideration ***(a)*** the data that is present in the question stem and the statements taken together and ***(b)*** the additional data that we might need to come up with a solid conclusion regarding the question raised in the question stem. I would consider such questions more direct in the sense that all they're asking at your end is whether you can come up with possibilities *(I wouldn't call them cases here)* that might show that the information given might not really be up to the mark in terms of sufficiency! You'll get a clearer idea of what I have to say once we've gone through the solution!

In the crux of it all the question's really interested in is whether Sue had her bank balance fall below the threshold value of $1000 last month? Note however, that the question stem only lays out the conditions that allow it to impose a penalty on a customer account.

We'll take up the statements one by one to prove their insufficiency!

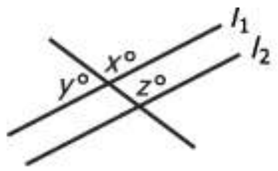
STATEMENT (1) alone: All this statement says out is the initial amount that Sue held in her bank account before the month began. Having absolutely no information about what her withdrawals and deposits for the previous month and in the order in which they happened clearly makes this information too insufficient to help us even get close to getting anything concrete regarding the question stem. Assuming our own values about the above mentioned absent quantities we can easily create a YES/NO situation. *(In fact when such less info is revealed we shouldn't even try creating an actual YES/NO but know that such a situation can and does exist).*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Although a total of $2000 was withdrawn, it is unclear what the initial amount in the bank was and in what portions were the withdrawals made that add up to $2000. Moreover no information about deposits if any is given. Assuming our own values about the above mentioned absent quantities we can easily create a YES/NO situation. *(In fact when such less info is revealed we shouldn't even try creating an actual YES/NO but know that such a situation can and does exist).*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Even together the statements mention the initial amount and withdrawal with absolutely nothing on deposits and the relative manner of the withdrawals and deposits. This again can easily create a YES/NO situation depending on how much money was deposited during the month. *(Note that there has to some deposit made – and this can't be ignored – otherwise how can you withdraw $2000 from an account that has only $1500 to begin with.*
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.101

The question provides us with a set of parallel lines L_1 & L_2 with a third line (L_3 say) intersecting the set of two parallel lines. Out of the angles thus formed and displayed, we're required to find the value of the angle marked by **X**° *(figure shown below)*. In other words this is again a *unique* value seeking answer.



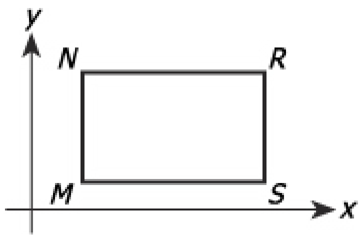
This probably fares among the easiest problems on this data set! Honestly, I feel it's a complete waste to perform any – whatsoever calculations that you might want to do to have yourself convinced of the sufficiency of the statements thrown at you!

<u>STATEMENT (1) alone</u>: The statement gives out the value of the angle shown by the variable **Y**^{o}. All this statement really requires at our end is to know that **X**^{o} & **Y**^{o} summed together form a 180^o angle. *(They're the only angles into which a 180^o straight line is divided into)* Knowing the value of one of the angles surely leads us to the other – other being the one whose *unique* value we're seeking!
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives out the value of the angle shown by the variable **Z**^{o}. All this statement really requires at our end is to know that **X**^{o} & **Z**^{o} together form a pair of corresponding angles that equal each other whenever you've got a straight line cutting through a set of two parallel lines. *(The fact the lines L_1 & L_2 are parallel requires that the two angles equal each other in value.* Knowing the value of one of the angles surely leads us to the other – other being the one whose *unique* value we're seeking!
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.102

We're given a rectangle MNRS chalked out on the XY coordinate plane as shown below:



We're asked to seek a *unique* value of the area of the rectangle MNRS chalked out above. A targeted approach at proving that multiple values of the area can exist should help us get rid of insufficient statements quicker in such situations.

Before we begin with this question it makes sense to take note of an observation in such questions involving figures. Figures no matter how much 'drawn to scale' they might seem, are to be treated as depicting true only the information that is explicitly said out in the question stem or the statements. For instance the figure above:- All this figure really has anything mentioned about itself is the fact that MNRS is a rectangle. Anything beyond that is OUR ASSUMPTION and could get us into trouble 5 times out of 10. Therefore, it would be a sin to say even consider that the rectangle is say parallel to the set of axes shown at this *point. My sharing this point may not seem so relevant to the question at hand, however it will come in handy for at least 30% of the geometry questions.*

STATEMENT (1) alone: All the statement does is hand out the coordinates of the point M (2, 1). Clearly this is too less of a situation to even begin to estimate the length of the sides of the rectangle so that we may get somewhere close to arriving at a *unique* value of the area of the rectangle.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Once again, all this statement does is hand out the coordinates of the point N (2, 5). Clearly this is too less of a situation to even begin to estimate the length of the sides of the rectangle so that we may get somewhere close to arriving at a *unique* value of the area of the rectangle.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Even piecing the two bits of information together all we can arrive at is the coordinates of the points M (2, 1) & N (2, 5). Since the X-Coordinate of both the points here are the same, we may now infer that the side MN is parallel to the Y-Axis (and hence the rectangle to the set of axes). However, all we can infer till this point is the length of one of the two sides (MN & MS) whose product yields us an area value. Since the second side is free to take on any numerical value, it is easy to see how we can have scores of values of the value of the area of the rectangle – No *unique* value obtained.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.103

Quickly going through the question stem along with the statements that it offers us, we can see that we'll be dealing with two variables. Let for that purpose **C** be the cost (exclusive of the tip) to George for the taxi ride and let **T** be the tip offered to the Taxi driver.
We're to find the *unique* value of the variable **C** *(not of the SUM (**C** + **T**). We're asked the amount George was charged and not the amount he eventually ended up paying.)*

STATEMENT (1) alone: Mathematically this statement translates into the following:
T = (15/100)***C**, however this is a single linear equation in two variables **C** & **T**, which will furnish a score of values of both the variables that can satisfy the equation as paired solutions (**C**, **T**).
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Mathematically this statement translates into the following:
T = $6.00, however this is a single variable value with no connection whatsoever with the other variable (whose value we're looking to find). This is clearly too less of information to even have us close to arriving at anything.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together, we've sort of got two pieces of information about two variables **C** & **T**. **T =** (15/100)***C** – from statement (1) and **T =** \$6.00 – from statement (2). A single glance at this information should be enough for you to gauge the sufficiency of the information with the two statements together. Either we can look at the above as a system of two equations in two variables that can be satisfactorily solved for a *unique* value of each of the variable **C** & **T**. Or simply read it as knowing what (\$ 6.00) constitutes 15 % of an unknown is enough to find the *unique* value if the unknown.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.104

We're asked to guess the *unique* value of a three digit number (represented as XYZ) KNOWING that NONE of the three digits are equal. Another thing that we can infer at this point is that since it is given to be a THREE digit integer we know the one value that X cannot take and that is 0.
An approach targeted at finding out multiple values of what is asked with the purpose of exhausting out all possible values that three digit numeral might seem fit to take on before arriving at a *unique* value of the three digit number, should the case be such, is what we'll adopt in moving forward with this question.

STATEMENT (1) alone: This statement says that all three *(distinct)* integers add up to a total of 10. Getting even two different values that fit the conditions laid out by this statement should be enough to prove that a *unique* value does not exist. 1 + 4 + 5 = 10 (even with just these values because of no specification of order in which X, Y & Z might exist, we can make 3! = 6 possibilities). 145 and 514 are two possible values that the Integer XYZ can take on. This is enough to prove the insufficiency of the statement.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: the statement gives out the order in which X, Y & Z exist in terms of relative order of magnitude. We're given X < Y < Z. However, this alone can generate multiple opportunities that will all satisfy the condition of this statement. *(X =1, Y = 3 & Z = 4 and X =1, Y = 3 & Z = 5 are two such possibilities)*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two restrictions given out in each statement together the entire picture looks something like: X < Y < Z with all of them adding up to 10. Now the 1 + 4 + 5 = 10 case that we took up in the analysis in statement (1) can under the second condition X < Y < Z generate just one possibility → 145. However another possibility that might add up to 10 is 2 + 3 + 5 = 10 which in conjunction with what the second statement has to say gives me a number 235 (different from 145). I'm therefore still able to generate multiple values even when I have both statements considered together.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.105

We're given a positive numeral **B** to start us off, and we're asked whether **A*B** is positive? **A** being another numeral.
A YES/NO case making targeted approach should work well with us for this question.

STATEMENT (1) alone: The statement says the following to hold true $\mathbf{A}^2*\mathbf{B} > 0$. Now given that **B** is already positive (as per the question stem) the above inequality will hold true for all non-negative ($\mathbf{A} \neq 0$), both positive and negative, values of the numeral **A**. In other words, for the above to hold true **A** can either be positive or negative making us arrive at a YES/NO situation regarding the question asked in the question stem.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says: $\mathbf{A}^2 + \mathbf{B} = 13$. It's a better idea to take on integer values of the variable **A** to exemplify the insufficiency of this statement. Consider $\mathbf{B} = 9$ say, substituting this value back into the equation in this statement I get $\mathbf{A}^2 = 4$ or $\mathbf{A} = \pm 2$ – A YES/NO answer to the question asked up top.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two restrictions given out in each of the statements together we've got – $\mathbf{A}^2*\mathbf{B} > 0$ – statement (1) & $\mathbf{A}^2 + \mathbf{B} = 13$ – statement (2). Seeing the squared value of **A** in both statements is definitely bound to make one suspicious of whether anything new has been added by combining the two together. We can pick up an example from our analysis of the 2nd statement $\mathbf{B} = 9$ & $\mathbf{A} = \pm 2$ to see whether it also satisfies the condition laid out by the 1st statement. $9*(\pm 2)^2$ is indeed positive. Therefore we've got $\mathbf{A} = \pm 2$ satisfying the two statements considered together – which again has us at a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.106

The question stem mathematically relates into saying that X + Y = $24,000. Let R_X & R_Y be the rate of interest earned annually on the two statements X & Y. We're given $R_Y = 7\%$ and we're asked to seek a *unique* value of the variable Y.

STATEMENT (1) alone: The one year dollar amount of interest on investment X = $(X*R_X)/100$ and the dollar amount of interest on investment Y = $(Y*R_Y)/100 = (7*Y)/100$. Therefore the statement mathematically translates into saying: $(X*R_X)/100 = (7*Y)/100$ or $7*Y = X*R_X$. This together with X + Y = $24,000 (from the question stem) is a system of two linear equations, however in THREE variables – (X, Y & R_X). Such a situation cannot yield a *unique* value of each of the unknown variables. *(A unique value of each of the variables, involved in the system, requires that the number of equations equal the number of variables. So a three variable set would require a system of three equations in those three variables, for us to be able to solve the three variables for a unique value of the variable)*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement on its own simply gives out the value of the variable R_X saying that R_X = 5%. This information on its own in conjunction with the information in the question stem only puts us at a starting position with nothing to equate or compare to form any sort of equation. In other words having no mention of the relationship of the interests evaluated on the two investments shows how little information the statement on its own carries.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Combining the two pieces of information in the two statements together we arrive at the following: 7*Y = X*R_X – Statement (1) & R_X = 5% - Statement (2). In other words, 7*Y = 5*X which is one linear equation in variables X & Y. This information in conjunction with X + Y = $24,000 given out in the question stem forms for me a system of two equations in two variables which can conveniently be solved for a *unique* value of the variables X & Y. Alternatively you may see that 24000 which is divided into two parts (according to the first equation) is divided such that the two parts are in the ratio 5 : 7. Knowing this (ratio – a piece of additional info about the relation between the two parts that add up to 24000) we can definitely finds *unique* values for the two parts.

*This right here is the end of the analysis of this statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (**Y**) is enough to mark C as your answer and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.*

Solving yields X = $14,000 & Y = $10,000 – a *unique* value.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.107

The question involves dealing with a quadratic inequality – an inequality involving a squared term of a variable. The question asks confirmation on the following:

Is 2***X** – 3***Y** < $\mathbf{X}^2$?

A YES/NO case making approach with the help of plugging in values into the question seems a more economical approach keeping in mind we would like to save as much time as we can on the exam.

STATEMENT (1) alone: This statement gives out a linear relation in **X** & **Y** → (2***X** – 3***Y**) = –2. Taking a closer look at the left hand side of the original form of the inequality given out in the question stem, we observe that it is the exact same as the left hand side of the equation given out by this statement. Therefore we can take the value of (2***X** – 3***Y**) as –2 from this statement and substitute it back into inequality given out in the question stem to reduce the main confirmation question down to → Is –2 < $\mathbf{X}^2$ or the question as to asking Is $\mathbf{X}^2 > –2$? Now since $\mathbf{X}^2$ is an always non-negative quantity no matter what the value of the variable **X** is taken as *(look at it this way, the minimum that the value of* X^2 *can fall to is 0)*, the value of $\mathbf{X}^2$ will always definitely be > a negative number (–2) – a CONFIRMED YES.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement by itself lays out the following conditions: The variable **X** > 2 & the variable **Y** > 0. The situation sort of boils down to testing out the confirmation question Is $2*\mathbf{X} – 3*\mathbf{Y} < \mathbf{X}^2$? for values of **X** & **Y** that fall within the range specified in this statement. We might want to rearrange the terms in the inequality relation so that we keep one kind of variables to one side of the inequality, this makes things a little more comfortable when it comes to plugging in values. So we're looking at a question of the sort Is $2*\mathbf{X} – \mathbf{X}^2 < 3*\mathbf{Y}$? What we'll do is take one side of the above inequality one at a time:
Left Hand Side: $2*\mathbf{X} – \mathbf{X}^2$ can be written as **X***(2 – **X**) → a multiplication of **X** & (2 – **X**).
The current statement says that **X** > 2 which means **X is positive**. Also if **X** > 2 → (2 – **X**) < 0 or (2 – **X**) **is negative**. Therefore the multiplication will always be –ve or therefore the Left Hand Side will always be **NEGATIVE**.
Right Hand Side: 3***Y**. The current statement says **Y** > 0 or 3***Y** > 0 or the right hand side is **POSITIVE**.
Therefore the main question stem can be reduced to asking whether a **NEGATIVE** quantity < **POSITIVE** quantity which is always true – again a CONFIRMED YES.

STATEMENT (2) alone – SUFFICIENT

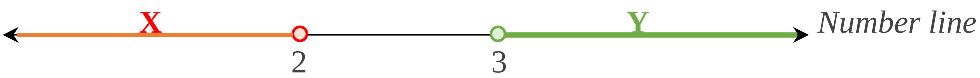
ANSWER – (D).

Q.108

The question gives out the following relation in X & Y. (X/2) = (3/Y) or X*Y = 6. We're asked confirmation on whether X < Y?

A YES/NO case making approach with the help of plugging in values into the question seems a more economical approach keeping in mind we would like to save as much time as we can on the exam.

STATEMENT (1) alone: The statement gives out the following range of values that Y can take on $Y \geq 3$. Since Y is positive in this statement we can cross multiply across the inequality to write $(3/Y) \leq 1$. Substituting the value of (3/Y) from the main equation in the question stem – (X/2) = (3/Y) – we arrive at $(X/2) \leq 1$, or $X \leq 2$. In other words the regions from where X & Y can take on various values can be marked on the number line as follows:
X → can take values from the red region and Y → can take on values from the green region.



Clearly a case where Y > X – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the following range of values that Y can take on $Y \leq 4$. Using the fact that $X*Y = 6$, I find it easier to pick out values of X and Y (values that conform to both $X*Y = 6$ & $Y \leq 4$) and disprove the sufficiency of this statement. Y = 2, X = 3 gives me **NO** case and Y = 3, X = 2 gives me a **YES** case. I thus arrive at a YES/NO scenario. *The reason I took on the other approach (an algebraic approach as you may call it) in the previous statement is because I saw 3/Y formation across the inequality which could be directly substituted from the equation given in the question stem. Also notice how in this statement because Y can take on negative values I cannot cross multiply across the inequality $Y \leq 4$.*

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.109

Let Marta have with her **X** number of 23 cent pencil and **Y** number of 21 cent pencils. We're required to seek a *unique* value of the variable **X**. – A useful sticky note to keep in the back of our minds while going through this question is the fact that **X** & **Y** can only take on non-negative integer values as they represent the number of whole pencils with Marta.

STATEMENT (1) alone: Reading this alone should signal off an insufficiency vibe. All this statement says (mathematically put) is **X** + **Y** = 6. **X** & **Y** can take on multiple values as paired solutions to the mathematical equation given. *(Example: X = 3, Y = 3 & X = 4, Y = 2)*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Let's just first write down (mathematically) what the statement has to say before commenting on the sufficiency or the insufficiency of the statement. Using our introduced variables we can write: 23***X** + 21***Y** = 130. The first thought that runs through our minds is that this again is a linear equation in two variables and thus can have multiple numeral (**X**, **Y**) pairs that will satisfy this equation. However, it might costs us dearly to not take into consideration the little sticky note we had at the back of our minds to remind us of the fact that **X** & **Y** can only take on non-negative integer values. We therefore now begin with the hunt for Integer pairs (**X**, **Y**). One way of going about this is substituting different integer values that **X** can take on (beginning with 0) and seeing if we get a corresponding integer value for **Y** as well. The test although seems lengthy actually takes up less time than it may seem:

X = 0 → 130 not divisible by 21, therefore No integer value of **Y**. *(don't actually calculate for a value of Y, just know that 130 since not divisible by 21 will yield a fraction and move on. So in effect it is a kind of a divisibility test.)*

X = 1 → (130 – 23) not divisible by 21, therefore NO integer value of **Y**.

X = 2 → (130 – 46) here is actually divisible by 21, therefore an integer value of **Y = 4**.

X = 3 → (130 – 69) not divisible by 21, therefore NO integer value of **Y**.

X = 4 → (130 – 92) not divisible by 21, therefore NO integer value of **Y**.

X = 5 → (130 – 115) = 15 not divisible by 21, therefore NO integer value of **Y**.

We need not go beyond this as it will only fetch us negative values. Once we've gone below 21 as in the above case where we get 15 to be tested for divisibility, we need not go any further with the test.
Thus our test leaves us with just one possible solution with **X** & **Y** both as integers. **X** = 2 – a *unique* value answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.110

We're given a *POSITIVE* Integer **X** and we're asked whether the integer **Y** is positive as well. A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about such questions.

STATEMENT (1) alone: The statement gives out the following inequality to which the Integers CONFORM to 7***X** – 2***Y** > 0. This may be rearranged to be written as the following: **Y** < (7/2)***X**. Now **X** being a positive integer (as said in the question stem) can take on values such as say **X** = 2, for which the inequality reduces down to **Y** < 7. This condition on **Y** can accommodate both positive *(**Y** = 3)* (YES case) and negative *(**Y** = –3)* (NO case). We thus arrive at a YES/NO case scenario.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: The statement gives out the following inequality to which the Integers CONFORM to –**Y** < **X**. This may be rearranged to be written as the following: **X** + **Y** > 0. Now **X** being a positive integer (as said in the question stem) can take on values such as say **X** = 10. This condition on **Y** can accommodate both positive *(**Y** = 3)* (YES case) and negative *(**Y** = –3)* (NO case). We thus arrive at a YES/NO case scenario again.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two pieces of information given out in the two statements together, We've got **Y** < (7/2)***X** – Statement (1) & **X** + **Y** > 0 or **Y** > –**X** – Statement (2). Combining the two pieces of information together we get that the value of the integer **Y** is bound by the following limits → –**X** < **Y** < (7/2)***X**, where **X** is a POSITIVE integer. We'll put in a possible value of **X** (= 4 *say*) to see more precisely what we get! → We'll arrive at –4 < **Y** < 14. Clearly for some value of **X** (= 4) we get both POSITIVE and NEGATIVE possible values of **Y**. Again a YES/NO scenario.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.111

The whole load of information contained in the question stem might make more sense once it is properly sorted out. We're given a total of 96 members belonging to a state legislature. Now with regards to the voting scenario on the bill:

There were a total of 28 (25 absentees + 3 who abstained) who did NOT vote.
Number who VOTED = 96 – 28 = 68.
Therefore, if we assume the Number that voted FOR as **F** & the Number that voted AGAINST as **A**, we may write **F** + **A** = 68.
We're required to seek a *unique* value of the variable **F**.

STATEMENT (1) alone: The statement gives out the value of the variable **A** saying that **A =** (1/3)*(total membership) = (1/3)*96 = 32. Using the statement derived in the question stem giving me the total of **F** & **A** – **F** + **A** = 68, I can clearly figure out my *unique* **F** as **F =** 68 – 32 = 36 – a *unique* value obtained. *The calculations presented again are for demonstration purposes alone. The moment you figure out that proceeding forth down the line will yield me a unique value for the variable asked is the moment you label this statement sufficient and move on.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement spells out mathematically as follows:
F = (those that abstained or were absent) + 8 = 28 + 8 = 36 – a *unique* value obtained. This is the most direct give away of the actual and *unique* value of the quantity asked in the question stem. *The calculations presented again are for demonstration purposes alone. The moment you figure out that proceeding forth down the line will yield me a unique value for the variable asked is the moment you label this statement sufficient and move on.*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.112

We're given *POSITIVE* Integers *M* & *N*, such that the integers conform to the following relation: *M***N* = **K**. We're asked confirmation on the following relation:

Is *M* + *N* = **K** + 1?

A YES/NO targeted approach by making cases/plugging in values might be a good option of going about such questions.

STATEMENT (1) alone: We're given out the value of one of the Integers namely *M* = 1. Plugging this back into the product relation mentioned in the question stem *M***N* = **K**, we'll obtain *N* = **K**. → Using the information thus gathered to calculate the following SUM – *M* + *N* = 1 + **K** – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement mentions **K** to be a prime number. *A prime is an integer (> 1) that has exactly 2 factors, namely 1 & the number itself.* Therefore the product form in which **K** is expressed in the question stem – *M***N* = **K**, requires that of the integers *M* & *N*, one of them be 1 and the other **K**. Therefore, again the SUM – *M* + *N* comes out to be = 1 + **K** – again a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.113

Note that Even though the question stem mentions the total expenditure (the total 100% value) = \$1.6 bn, a superficial read of the question stem together with the statements sort of hints us that the entire question along with its solving may only deal with percentages and there might not actually be the need to calculate the 67.8% of \$1.6 bn unless we're actually dealing with absolute values in the question. My point is, it's better we wait before going for the heavy duty calculations till they're actually required.

The question in its crux says that 6 countries make up 67.8% of a certain amount paid and the remaining percentage (32.2%) comprises 153 countries. We're asked whether a particular country **X** fares among the 6 countries comprising the 67.8%.

A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this questions.

STATEMENT (1) alone: The statement says that country **X** is definitely not among the top 4 countries that comprise 56% of the total expenditure paid. One thing that is inferable at this very point is the fact that the 5^{th} & the 6^{th} highest paying countries together comprise (67.8% – 56%) = 11.8%. However, not a shred of information about what **X** paid or where it could have fared among the countries with respect to how much it paid, renders this statement alone futile in our attempt to try to arrive at a concrete solution to the question asked in the main question stem. In simpler terms **X** could equally be the 5^{th} or 6^{th} or be among the remaining 153 countries. The equally likely possibility of the two cases gives us a YES/NO scenario.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the value in percentage that country **X** contributed to the total expenditure paid = 4.8%. However, making YES/NO cases here are equally convenient to see through to as they were in the statement above. Country **X** could very well be the 6^{th} highest payer say with the rest 5 highest paying countries paying (67.8 – 4.8)% = 63% giving me a **YES** answer. For country **X** now to fare among the 153 countries, we have to make sure that it is possible that all the top 6 countries individually paid more than 4.8% given that they together paid up 67.8% of the total. Taking the average of the payments of the top 6 countries (= (67.8/6)%) tells me that it is definitely somewhere around 11% approximately. If I just consider a case where all the top 6 countries paid equally and amounts equal to the average ~ 11%, then all countries in the top 6 do end up paying more than 4.8%, making **X** fare in the remaining 153countries and thus giving a **NO** answer.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements, with their laid out conditions, together we get that – that the 5^{th} & the 6^{th} highest paying countries together comprise (67.8% – 56%) = 11.8% and that **X** is not in the top 4 – statement (1) & that country **X** contributed to the total expenditure paid = 4.8% – statement (2). Creating a YES answer case is easy where I'll say that country is the 6^{th} highest payer with the 5^{th} highest paying 11.8 – 4.8 = 7% which is still less than the average paid by the top 4 countries (= 56/4 = 14%). Since everything in this case works out – top 4 paying say 14% each 5^{th} paying 7% and country **X** faring 6^{th} in terms of its share of the total expenditure – I get a **YES** answer.

Creating a NO case would require that each of the 5th and 6th highest paying countries shell out more than what **X** contributed. One possibility is 6.8% (paid by the 5th highest) + 5% (paid by the 6th highest) = 11.8%. This case has **X** (with a share of 4.8%) faring below the top 6 and thus among the 153 remaining members, giving thus a **NO** answer. We thus still arrive at a YES/NO situation.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.114

We can rearrange the equation or the relation given in the question stem to write the relation among the three variables as X + Y + 2*Z = 0; we're asked confirmation on whether the variable X is positive or If X > 0?

A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this questions.

STATEMENT (1) alone: The statement stipulates that Z is negative. However, no information whatsoever about the third variable Y deems this statement as lacking information to arrive at anything concrete with this statement alone.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement stipulates that Y is positive. However, no information whatsoever about the third variable Z again deems this statement as lacking information to arrive at anything concrete with this statement alone.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The statements taken together stipulate two conditions on two separate variables. We can now treat Z as negative and Y as positive. However, unaware of their relative magnitudes leaves even the combined info vulnerable to fail the sufficiency test. A quick plug and check can have us mark E and move on. Z = –1 & Y = 1 gives a positive X and thus a **YES** answer to the question up top. Z = –1 & Y = 4 gives a negative X and thus a **NO** answer to the question up top. We thus arrive at a YES/NO situation again.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.115

Before we proceed with this question it proves beneficial to just sort of go through the definition of what standard deviation is and understand the theoretical aspect of it and keep the formula at a lower priority.

The standard deviation (SD) measures the amount of variation or dispersion from the average. A low standard deviation indicates that the data points tend to be very close to the mean (also called expected value); a high standard deviation indicates that the data points are spread out over a large range of values.

Having said that, we'll now proceed further with our question. Let the unknown values in the SET S be represented as S_1 & S_2 and similarly let the unknown values in the SET T be represented as T_1 & T_2. We may now jot down our two SETS (each containing 5 *positive* INTEGERS) as shown below:

SET S:

	S_1		S_2	
30		40		50

SET T:

	T_1		T_2	
30		40		50

We're given that the average of both the SETS is equal and equal to 40.
We're asked for a definitive relative comment on the standard deviations of the two SETS!
More specifically: Is $(SD)_S > (SD)_T$?

STATEMENT (1) alone: This statement alone only specifies on of the values of the unknowns S_1 & S_2 as 25. With the additional info in the question stem telling us that the average comes out to be 40 for each SET we can find out the 2nd unknown as well (= 55). Thus we get all the values of the integers that are present in the SET S. We can definitely pin down a *unique* or fixed value of the SD for the SET S. However, with SET T still containing two unknowns leaves plenty of options for the value that SD of the SET T might assume. The plenty options thus render this statement insufficient for our cause.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone only specifies on of the values of the unknowns T_1 & T_2 as 45. With the additional info in the question stem telling us that the average comes out to be 40 for each SET we can find out the 2nd unknown as well (= 35). Thus we get all the values of the integers that are present in the SET T. We can definitely pin down a *unique* or fixed value of the SD for the SET T in this case. However, with SET S still containing two unknowns leaves plenty of options for the value that SD of the SET S might assume. The plenty options thus render this statement insufficient for our cause.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Considering the two statements together we've got two lists with known values of all variables in both the lists. In other words we're given two lists of 5 integers with known (fixed) values of the integers the list contains. This information right here should be enough to know that knowing all 5 members of both lists, we can calculate the SD, which will come out to be a *unique* value in each case, of both lists and thus definitively comment on the comparison between the SD of the two lists. *If you're still unconvinced at this point below are the complete lists of both SETS.*

SET S:

25 30 40 50 55

SET T:

30 35 40 45 50

The above sets will yield a definitive comparison result of their respective standard deviations – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.116

The algebraic version of the distance between two points on a number line is the MODULUS function or operation. Therefore, if we say that the question requires us to find the distance between the point 2*X and the point 3*X, we can algebraically translate this into saying that the question requires to find the value of the following expression: |3*X – 2*X| = |X|. The question stem can thus be algebraically translated as to saying: What is value of |X|?
We're of course required to seek a *unique* value of |X|!

STATEMENT (1) alone: This statement algebraically put says the following:
|(–X) – X| = 16 or |–2*X| = 16 or |–2|*|X| = 16 or |X| = 8 – a *unique* value obtained.
*Note that the following property applies to MOD functions → |A*B| = |A|*|B|*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement algebraically put says the following:
|X – 3*X| = 16 or |–2*X| = 16 or |–2|*|X| = 16 or |X| = 8 – a *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.117

We're given two positive integers *N* & *K* such that the integer *K* is > 1. We're asked the *unique* value of the **remainder** when the integer *N* is divided by the integer *K*.

Kindly note a result on remainders that might come in handy not just for this question, but for many more questions involving finding out the ***remainder*** *when a product of different integers is given. Let m, n & p be integers such that they yield* ***remainders*** R_1, R_2 *&* R_3 *respectively when multiplied by an integer* ***D*** *(divisor), then for an integer* ***L*** *such that* ***L*** *may be written as the product of the integers m, n & p or,* ***L*** *= m*n*p. The* ***remainder*** *when* ***L*** *is divided by* ***D*** *is then simply the product of the INDIVIDUAL remainders (*R_1, R_2 *&* R_3*) that m, n & p would yield when divided by* ***D*** *individually. Mathematically or more simply put the* ***remainder*** *when* ***L*** *(= m*n*p) is divided by* ***D*** *is* ***remainder*** *=* $R_1*R_2*R_3$ *OR if* $R_1*R_2*R_3$

*comes out to be ≥ **D** → the **remainder** is the same in value as the remainder that (R_1*R_2*R_3) would yield when divided by **D**.*

We'll see how the above result comes in handy while solving this particular problem.

STATEMENT (1) alone: N is given of the form $N = (K + 1)^3 = (K + 1)*(K + 1)*(K + 1)$. Consider $K + 1$ for a second. For $K > 1$, $K + 1$ divided by K will always and always yield a **remainder** = 1. Therefore, (using the above purple colour text result) we may infer that the **remainder** when the PRODUCT of three Integers (each equal to $K + 1$), each of which yields a **remainder** 1 individually, is simply equal to the product of the individual **remainders** (or the **remainders** when each of $K + 1$ is divided by K). Therefore, the net remainder comes out to be = 1*1*1 = 1 – a *unique* answer.
Alternatively, if one were to overlook the result application mentioned above, a slightly more time consuming approach would be to expand the expression $(K + 1)^3$ and see what we get. Thus we may write $N = (K + 1)^3 = K^3 + 3*K^2 + 3*K + 1$, which when divided by integer $K > 1$ will always and always yield a **remainder** = 1 – a *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement on its own just gives out the value of the Integer K = 5. However, we have absolutely no idea whatsoever about what the value of the integer N (the dividend) could be. It is pretty easy to rule this one out as insufficient in a flash.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (D).

Q.118

We're asked if the number **X** (not necessarily an Integer) is ≥ 3?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option to keep in mind while going about this questions.

STATEMENT (1) alone: This statement spells out an equation in a single variable **X**, however the equation is quadratic. The statement says that **X** conforms to the following relation: $\mathbf{X}^2 - 9 = 0$ or, $\mathbf{X} = \pm 3$. If you take $\mathbf{X} = +3$, the question up top in the question stem gets a **YES** answer, however, if you take **X** to be = –3, the question up top gets a **NO** answer. We've clearly arrived at a YES/NO scenario using this statement.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement spells out the following range to which the values of the variable **X** conforms to: **X** < 10. A number line representation would the present the picture even more clearly!

The statement says that the value of the variable **X** can lie regions I & II which gives us a YES/NO situation/scenario regarding the confirmation that **X** lies in the region II and beyond to the right. Since we can't gather a definitive answer, the statement proves to be insufficient.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The first statement says that **X** can have only two values: **X** = ±3 & the second statement says that the value of **X** must be such that it is less than 10 (**X** < 10). Therefore, even considering the two statements together, both the values of **X** given out by the first statement hold as possible values that the variable **X** can take on. However, our analysis in statement (1) showed that if **X** had a value = ±3, we would end up with a YES/NO scenario situation. Therefore, we see that even considering the two statements together, we're not able to narrow down our pool of values that we had using the 1st statement. That is essentially why even the clubbed info turns out to be insufficient as well.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.119

Let X be the total number of registered voters. Kindly note the language of the question in the sense that it asks us to seek a *unique* value of the actual number (not percentage) of registered voters that cast votes for the winning candidate.
We're given that (3/4)*X voters cast ballots.

STATEMENT (1) alone: This statement just sort of puts a name to the variable **X**. The statement can be written out mathematically as saying that (1/4)***X** = 25,000 or **X** = 100,000. However, no information can be inferred about the number of voters casting their ballots for the winning candidate. In terms of the quantity that we're required to find, this is far too less info to arrive at anything concrete.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says that the number of registered voters who cast ballots for the winning candidate were 55% of the registered voters who DID cast ballots. Or mathematically: number of voters for winning candidate = (55/100)*(3/4)***X**. However, the unknown value of the variable **X** allows for multiple solutions rather than a *unique* solution which we seek.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information arrived at in the two statements: number of voters for winning candidate = (55/100)*(3/4)***X** – statement (2) & **X** = 100,000 – statement (1). Using the statement (1) in statement (2) info is like providing the missing piece of the puzzle in statement (2). Using the two, we can definitely arrive at *unique* value of the 'number of voters for winning candidate' = 4125 – a *unique* value answer. *Any calculations are for demonstration only.*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.120

This question is more about getting a fix on the set of consecutive numbers than it is about anything else. Once we know exactly what the 6 consecutive integers are, we can surely and easily get the value of *N* which is = product of the least and the greatest of the consecutive integers. Having said this we'll consider the statements one by one:

STATEMENT (1) alone: Once we know the greatest integer (= 20), all we need to do then is to start counting backwards till we get 6 integers. So my integers become {20, 19, 18, 17, 16, 15}. *N* can now be easily found. *The only thing that matters is our being confident that the statement if analysed further down will eventually lead to a unique value for what is asked. Once we're sure of the attainment of a unique value (no matter which stage of calculation we're at), we can leave right at that point to label sufficient and move on.*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the mean value of the 6 consecutive integers. Once the mean of the 6 consecutive integers is known, we can construct our integer set around the mean to get the whole SET of the 6 integers and thus the *unique* value of the product *N*.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.121

We're given *N* & *S* as two *POSITIVE* 2–Digit Integers. We're asked for confirmation on whether *N* > *S*?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option to keep in mind while going about this questions.

STATEMENT (1) alone: This statement gives out a relative comparison between the units digit of the two integers saying: (Units Digit)$_N$ > (Units Digit)$_S$. However, no mention of how the tens digits of the two integers are related leaves us to interpret the above information in multiple possible ways. *N* = 2**8**, *S* = 5**3** AND *N* = 5**8**, *S* = 2**3** are easily obtainable two cases that give conflicting answers up top in the question stem. It's pretty easy to see a YES/NO situation creation here!
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out a relative comparison between the tens digit of the two integers saying: (Tens Digit)$_N$ > (Tens Digit)$_S$. Even with no mention of how the units digits of the two integers are related, requires us to at least pay some attention towards the case making scenario. The relative comparison of the tens digit in this case changes the game entirely. Let for demonstration purposes *N* be = 10*X + Y, where 1 ≤ X ≤ 9 & 0 ≤ Y ≤ 9 AND *S* be = 10*A + B, where 1 ≤ A ≤ 9 & 0 ≤ B ≤ 9. If we take the difference of the two numbers by subtracting *S* from *N* → *N* – *S* = (10*X + Y) – (10*A + B) = 10*(X – A) + (Y – B). Since we're given that X > A → X – A > 0, X and A being digits this means that the minimum value that X – A can take on is 1. Now the Max negative (Y – B)

can get is when Y = 0 and B = 9 making Y – B = –9. If I substitute into 10*(X – A) + (Y – B) the minimum that X – A can go and the maximum negative that Y – B can go, I get *N – S* = 10*1 – 9 = 1 thus *N – S* can never ever drop below 1 or *N – S* is always > 0 or *N* is always > *S*. This was a sort of a mathematical proof of the obvious → If I have two 2-digit numbers such that the tens digit of one of the numbers is greater than the other say one has a tens digit of 4 and the other a tens digit of 3, then no matter whatever value the units digits of the two might take on The first number will always be in the 40s and the second always in the 30s, thereby stipulating that one with the greater tens digit will be greater.
A CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.122

We're given a *POSITIVE integer* N and asked the value of the **remainder** when the expression (N – 1)*(N + 1) is divided by 24.

Let's just break open 24 in terms of the primes that multiply to form the number 24. We may write 24 as 24 = 2 x 2 x 2 x 3 or = 2^3 x 3

Before we proceed any further it proves beneficial to note that (N – 1) & (N + 1) form the immediately preceding and immediately succeeding integers in relation to the integer N. Or, in other words (N – 1), N & (N + 1) form three consecutive integers. ← *This piece of information how much ever trivial it may seem, is sometimes missed out on. This piece forms a crucial part of the solution framework for this question.*
I'll be following a more theoretical approach with the aim of explaining the crux of attacking divisibility question, but a plug in simple values approach to generate a YES/NO situation should also work just fine here.

STATEMENT (1) alone: This statement simply says that N is odd. We'll represent N as N = (2*k + 1), where k is a non–negative integer {0, 1, 2,…so on} → *this is the usual representation of an odd number*. Now (N – 1) is then = 2*k & (N + 1) is then = 2*k + 2 = 2*(k + 1). The expression (N – 1)*(N + 1) may now be written as (N – 1)*(N + 1) = 2*k*2*(k + 1) = 2^2*{k*(k + 1)}.

We'll keep this aside for a while and take the expression k*(k + 1) up for a little further analysis. Note that this expression is nothing but the product of **two** *non-negative integers*. (*as k in the expression 2*(k + 1) has values = {0, 1, 2,…so on}*) Since the product of any two consecutive integers is always even, *(one of them will be even and the other odd)* the expression k*(k + 1) will always be divisible by 2.

Now let's go back to the original expression 2^2*{k*(k + 1)} and count the number of 2s in this product. We've got a 2^2 outside and then we've got the even expression k*(k + 1) that is at least divisible by 2. Or, the expression 2^2*{k*(k + 1)} is at least divisible by a product of three 2s or by 2^3 which is 8.

Summarizing, the expression (N – 1)*(N + 1) given N is odd is definitely divisible by 8.

However, the expression's divisibility by 3 *(as 24 = 8 x 3)* is uncertain as we're not given whether N is divisible by 3. → If N is divisible by three then the expression (N – 1)*(N

+ 1) is a product of numbers that immediately precede and immediately succeed a multiple of three – namely N and hence is not divisible by three giving **NO** answer. However, If N is not a multiple of 3 say 31 for instance, then the expression (N – 1)*(N + 1) becomes = 30*32 – which is divisible by three and hence yields a **YES** answer. This creates a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: Before beginning with our analysis it may prove beneficial to note that the expression (N – 1)*(N + 1) forms but a part of the slightly larger expression (N – 1)*N*(N + 1) – which is a multiple of three consecutive integers. Now given that the product of three consecutive integers is always divisible by, the expression (N – 1)*N*(N + 1) will thus be divisible by 3 for any value of N as **one** of the numbers out of (N – 1), N & (N + 1) will always definitely be a multiple of three. However, the moment we take out N from the larger expression (N – 1)*N*(N + 1) to be left with (N – 1)*(N + 1) alone, the whole scenario about divisibility by 3 boils down to specifically tracking exactly which of the three numbers (N – 1), N & (N + 1) is the multiple of three.

Moving on, the statement says that N is not a multiple of three, thereby stipulating that the multiple of three has to come from either of the two numbers (N – 1) or (N + 1). Thus, in other words the expression (N – 1)*(N + 1) DOES contain a multiple of 3 or is definitely divisible by 3.

However, the statement says nothing about whether N is odd or even. If N is even for instance, then (N – 1) & (N + 1), forming the immediately preceding and immediately succeeding integers in relation to the integer N, are both odd giving us a **NO** answer. But if N is odd, then as shown in the analyses of statement (1) the expression (N – 1)*(N + 1) will be divisible by 8 and thus by 24 giving us a **YES** answer. This again creates a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together →
Statement (1) says: the expression (N – 1)*(N + 1) given N is odd is definitely divisible by 8.
Statement (2) says: the expression (N – 1)*(N + 1) DOES contain a multiple of 3 or is definitely divisible by 3.
Hence in conjunction the two say that the expression (N – 1)*(N + 1) is definitely divisible by both 8 as well as 3. Or, in other words the expression is definitely divisible by 24.
A CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.123

The language in the question stem allows us to write the *POSITIVE* Integer **N** as **N** = 3**K* + 2, where *K* is an integer such that *K* = {0, 1, 2,…so on} AND write the *POSITIVE* Integer **T** as **T** = 5**U* + 3, where *U* is an integer such that *U* = {0, 1, 2,…so on}. We're asked to seek a *unique* value of the **remainder** when the product **N*T** is divided by 15 which may be written as 15 = 5*3. 5 & 3 are individual divisors that yield fixed **remainders** when they divide **T** & **N** respectively. In other words we're required to find the value of the **remainder** when (3*K + 2)*(5*U + 3) is divided by 3*5. → *Note that the **remainder** cannot simply be 2*3 as 3 & 5 are distinct numbers*

An approach targeted at finding multiple *(at least more than one)* values of **remainder** with the hope that we'll exhaust all possible cases/scenarios before arriving at a conclusion that a *unique* value of the **remainder** exists seems a befitting option of going about this question to keep in the back of our minds.

STATEMENT (1) alone: This statement says that the integer (**N** – 2) is divisible by 5. In other words, we can say that (**N** – 2) is a multiple of 5. This may be mathematically written by representing the number (**N** – 2) as (**N** – 2) = 5*P, where P is an integer. In other words we may write the positive integer **N** according to this statement as **N** = 5*P + 2. The question stem already stipulates **N** to be of the form **N** = 3*K + 2, where K = {0, 1, 2,…so on}. Use the following result below to sort of get a combined form of representation of the *POSITIVE* integer **N**.

→ *For the same integer **A** (say) that can be written in two different forms of the type (i.e. the same integer just conforms to two separate relations simultaneously) **A** = p*X + q & **A** = u*Y + v, where p, q, u & v are constants & X & Y are integer variables that may take on values such as {0, 1, 2, 3,…so on}.(The above equations in words mean that **A** when divided by p leaves a remainder q & that **A** when divided by u leaves a remainder v) It always proves useful to generate a single COMBINED form that may represent **A** such that the representation makes sure that both the two different relations implied by the equations **A** = p*X + q & **A** = u*Y + v are simultaneously satisfied. Thus the two are incorporated into one single form. Follow the following simple steps:*

1. *Take the LCM of p & u, let it be L*
2. *Begin substituting the values of integers X & Y starting from the least non-negative integer value 0. Our aim is to find the least possible values of both X & Y such that p*X + q equals u*Y + v.*
3. *Let the value of p*X + q = u*Y + v = C in the case that both the two are equal for the minimum possible values of both X & Y (X & Y don't have to be the same but the value of the expression they generate p*X + q & u*Y + v has to be). C should always be < L*
4. *The combined or incorporated form then is **A** = L*Q + C where Q can take on different integer values and L & C are constants.*

Using the steps above we'll try to find a combined form for the integer **N**. The LCM of 5 & 3 is 15 (= L) and P = K = 0 gives 5*P + 2 = 3*K + 2 = 2 (= C). My combined or incorporated form then becomes **N** = 15*Q + 2, where Q = {0, 1, 2,…so on}. *(The above may also be noted as a general result → If two an integer G divided by two different integers – both of which are less than G – give the same remainder r, then G divided by the LCM of the two integers will also yield the same remainder r)* The question stem stipulates a form of **T** = 5*U + 3. Now for a product **N*****T**, we know that **N** divided by 15 always yields the same remainder = 2 (**N** = 15*Q + 2 as given out by the info in this statement combined with that in the question stem), however, the Integer **T** = 5*U + 3, where U = {0, 1, 2,…so on} gives out

different values of the remainder when divided by 15. *(For example **T** = 5*0 + 3 = 3 & **T** = 5*1 + 3 = 8 when divided by 15 give out remainders 3 & 8 respectively)*
Have a look at the result below before proceeding further:

*Kindly note a result on remainders that might come in handy not just for this question, but for many more questions involving finding out the **remainder** when a product of different integers is given. Let m, n & p be integers such that they yield **remainders** R_1, R_2 & R_3 respectively when multiplied by an integer **D** (divisor), then for an integer **L** such that **L** may be written as the product of the integers m, n & p or, **L** = m*n*p. The **remainder** when **L** is divided by **D** is then simply the product of the INDIVIDUAL remainders (R_1, R_2 & R_3) that m, n & p would yield when divided by **D** individually. Mathematically or more simply put the **remainder** when **L** (= m*n*p) is divided by **D** is **remainder** = $R_1*R_2*R_3$ OR if $R_1*R_2*R_3$ comes out to be ≥ **D** → the **remainder** is the same in value as the remainder that ($R_1*R_2*R_3$) would yield when divided by **D**.*

For the same DIVISOR = 15 to divide off the PRODUCT of two different integers **N** & **T**, the **remainder** is simply the *product* of the individual remainders yielded when **N** & **T** are divided by 15 *individually*. Therefore, the **remainder** when (**N*****T**) is divided by 15 now becomes equal to the **multiplication** of the remainders when **N** is divided by 15 (which is fixed = 2) WITH the remainder when **T** is divided by 15 (this value however is still variable as it is shown above to be displaying at least 2 distinct values above 3 & 8). Therefore, the **remainder** comes out to be either 2*3 = **6** or 2*8 = 16 divided by 15 again (since 16 ≥ 15) = **1**. Two values of the quantity (**remainder**) that we we're required to seek a *unique* value for pretty much does our job of proving this statement's insufficiency.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement says that the integer **T** is divisible by 3. In other words, we can say that **T** is a multiple of 3. This may be mathematically written by representing the number **T** as **T** = 3**R*, where *R* is an integer. In other words we may write the positive integer **T** according to this statement as **T** = 3**R*. The question stem already stipulates **T** to be of the form **T** = 5**U* + 3, where *U* = {0, 1, 2,…so on}. Using the same result and steps that we used in the previous statement analysis to get a sort of get a combined form of representation of an integer, we can find a common representation of the *POSITIVE* integer **T**.

The LCM of 5 & 3 is 15 (= L) and *R* = 1 & *U* = 0 gives 3**R* = 5**U* + 3 = 3 (= C). My combined or incorporated form then becomes **T** = 15**J* + 3, where *J* = {0, 1, 2,…so on}. The question stem stipulates a form of **N** = 3**K* + 2. Now for a product **N*****T**, we know that **T** divided by 15 always yields the same remainder = 3 (**T** = 15**J* + 3 as given out by this statement info combined with that in the question stem), however, the Integer **N** = 3**K* + 2, where *K* = {0, 1, 2,…so on} gives out different values of the remainder when divided by 15. *(For example **N** = 3*0 + 2 = 2 & **T** = 3*1 + 2 = 5 when divided by 15 give out remainders 2 & 5 respectively)*

Again, using the second result applied in the previous statement analysis, we may proceed further.

For the same DIVISOR = 15 to divide off the PRODUCT of two different integers **N** & **T**, the **remainder** is simply the *product* of the individual remainders yielded when **N** & **T** are divided by 15 *individually*. Therefore, the **remainder** when (**N***T**) is divided by 15 now becomes equal to the **multiplication** of the remainders when **N** is divided by 15 (this value is still variable as it is shown above to be displaying at least 2 distinct values above 2 & 5) WITH the remainder when **T** is divided by 15 (which in this case is fixed = 3). Therefore, the **remainder** comes out to be either 3*2 = **6** or 3*5 = 15 divided by 15 again (since 15 ≥ 15) = **0**. Two values of the quantity (**remainder**) that we we're required to seek a *unique* value for pretty much again does our job of proving this statement's insufficiency.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information together →
Statement (1) says: **N** can be written as to be of the form **N** = 15*Q + 2, where Q = {0, 1, 2,…so on}, thereby stipulating that we've got ourselves a FIXED remainder = **2** when the integer **N** is divided by 15 individually.
Statement (2) says: **T** can be written as to be of the form **T** = 15*J + 3, where J = {0, 1, 2,…so on}, thereby stipulating that we've got ourselves a FIXED remainder = **3** when the integer **T** is divided by 15 individually. Now simply reusing the second result (in the purple) said out in the statement (1) analysis, we can tell ourselves that the **remainder** value when the product (**N*T**) is divided by the same divisor 15, that was individually dividing the two Integers (**N** & **T**) just a moment ago – above, will be the product the individual remainders that the Integers yielded. Thus the **remainder** value is simply = **2*3 = 6** – a fixed/*unique* value.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.124

The questions easy in the sense that all it requires at our end is piece together the different pieces of the puzzle to know whether we form a complete picture or not?
Let, for our convenience, the number of 1 – person, 2 – person and 4 – person capacity units be **O**, **T** & **F** respectively. Then the question stem says **O** + **T** + **F** all add up to a total of 540 units. We're asked how many of the **F** units were occupied on a certain day. Not to mention we're required to find a *unique* value of this quantity.

STATEMENT (1) alone: This statement pretty much spells out the value of the integer **F** (well integer because the number of the units cannot obviously be a fraction) rather directly. Mathematically the statement says that **F** = (1/3)*540 = 180. However, the question stem asks us specifically for the number **F** units THAT WERE OCCUPIED on a certain day. Only knowing the total number of 4 – person capacity units isn't even remotely connected to what we're required to find out. This is pretty clearly insufficient.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement shares the information regarding the number of occupied 4 – person capacity units out of the total **F** available at the motel, saying that on the certain day for which we're concerned about, the occupied number of 4 – person capacity

units was (80/100)***F**. However, unaware of the absolute value of the variable **F** in this statement leaves us stranded in the middle of nowhere in our course to come out with a *unique* value of the quantity asked up top.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together →
Statement (1) says: The absolute value of the variable **F** *(total number of 4 – person capacity units available at the motel)* = 180.
Statement (2) says: The number of occupied 4 – person capacity units on the certain day was (80/100)***F**.
I think this pretty much makes it clear that the two statements considered in conjunction with each other give out a fixed/*unique* value of the quantity asked up top. This should be clear without the actual calculations *(which are mostly a waste of time on DS)* because really all we need to do is take the absolute value of **F** from what statement has to say and substitute in the expression that statement generates for us.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.125

We're given that the symbol @ represents one of the two arithmetic operations (addition or multiplication, but which one → that's unknown)
We're also given an *INTEGER* **K**.
We're asked the absolute value of 3 @ **K**? *(based on what the symbol could/may represent)*
Since we're supposed to find a definitive/*unique* answer to the enquiry in the question stem, a targeted approach at finding multiple values *(at least two)* should work well here! *It's useless to riddle your minds with what the exact operation represented by the symbol could be. It proves easier to just concentrate on seeing whether a unique solution to the question asked exists.*

STATEMENT (1) alone: We're given that the operation represented by the symbol @ conforms to the following identity 2 @ **K** = 3. *(be sure not forget the little piece of information in the question stem that stipulates **K** to be an INTEGER)*
Let's take up the two possibilities that the symbol @ may represent one by one:
MULTIPLICATION: The identity translates into saying 2 x **K** = 3. We may rearrange the above to say **K** = (3/2) = 1.50 – a fraction. This CONTRADICTS with the original definition of **K** being an *INTEGER*. Since the identity yields a fractional value of **K**, we cannot have the identity hold for the symbol @ representing multiplication. We thus have just ruled out multiplication and are left with the symbol @ representing just ONE arithmetic operation – ADDITION.
This means the identity in this statement can be written in the following form 2 + **K** = 3 or **K** = 1, thereby also yielding a fixed value that the INTEGER **K** can take on. We'll now substitute this info back into the main question up top (What is the absolute value of 3 @ **K**?) to see if we can generate a *unique* value of the expression.

3 @ **K** = 3 + 1 = **4** – a *unique* value *(which should also be easy to see without actually going through all these steps considering that we had gotten a FIX on the value of the INTEGER **K** and the operation that the symbol @ represents)*
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: We're given that the operation represented by the symbol @ conforms to the following identity 1 @ 0 = **K**. *(again be sure not forget the little piece of information in the question stem that stipulates **K** to be an INTEGER)*
Let's take up the two possibilities that the symbol @ may represent one by one:
MULTIPLICATION: The identity translates into saying 1 x 0 = **K**. Or, **K** = 0 (an integer and is thus perfectly fine). We can thus accept multiplication as one viable possibility.
ADDITION: The identity translates into saying 1 + 0 = **K**. Or, **K** = 1 (an integer and is thus perfectly fine). We can thus accept addition as a viable possibility as well.
Let's try and substitute the two cases back into the quantity (3 @ **K**) for which we're required to find a unique value.
MULTIPLICATION: (& **K** = 0) 3 @ **K** translates into 3 x 0 = **0**
ADDITION: (& **K** = 1) 3 @ **K** translates into 3 + 1 = **4**
We've thus clearly arrived at two distinct values of the expression (3 @ **K**) for which we were required to seek a *unique* value according to the question stem!
STATEMENT (2) alone - INSUFFICIENT
ANSWER – (A).

Q.126

We're given *POSITIVE* Integers R & T. We're asked whether the product R*T is even?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

STATEMENT (1) alone: This statement stipulates the SUM of the two integers to be ODD saying R + T = ODD → Since neither the SUM/DIFFERENCE of TWO EVEN nor TWO ODD numbers can ever generate an ODD integer, it implies that for the SUM R + T to yield an ODD output the pair (R, T) must exist as an (ODD, EVEN) pair – not necessarily in that order. In other words one of R or T will be ODD and the other EVEN. This statement thus in a way says that in the product R*T, there definitely exists one EVEN number, and this very fact substantiates the product R*T to be even – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that R^T is ODD. In other words the statement is equivalent to saying R*R*R…multiplied T times = ODD. Now this definitely means that R has to be ODD, since only the product of ODD integers can generate a net resultant ODD integer. However note here that T is simply the number of times that R has to be multiplied to get an ODD product. T can thus either be ODD (= 3, R being ODD R^3 will be ODD as well) or be EVEN (= 2, R being ODD R^2 will again be ODD as well.). Now R being ODD the ODD/EVEN polarity of R*T all depends on whether T is ODD or EVEN and since we have no fix on the ODD/EVEN polarity of the integer T, the product R*T can either be ODD or EVEN – having us arrive at a YES/NO situation here.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

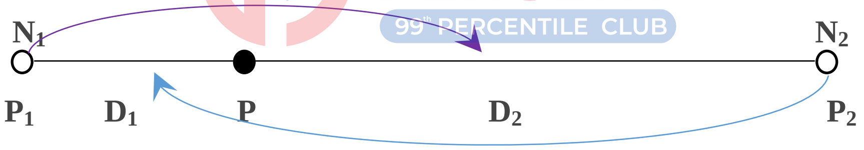
Q.127

I would agree that the language of the question sort of tends to pull on our heartstrings, in the sense that we might have it pegged for a 2 overlapping SETS problem initially. But notice how the question stem along with its two statements talks of the students who are business majors and does not (anywhere) bring in the NON business majors students anywhere in his discussion. The question comes across like one discussing the property (proportion of business majors) of two groups (Males & Females) along with a mention of the same property for the combined group *(when he says that 2/5 of the students at college C are business majors)*. It thus makes more sense to consider this question being in the realm of combined mean interpretation result.

In fact this is a perfect case scenario to view things via the *combined proportion* interpretation result:

$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,

N_1 = Sample size of SET 1 – *number of female students at college C*

N_2 = Sample size of SET 2 – *number of male students at college C*

P_1 = *proportion of business majors among the female students*

P_2 = *proportion of business majors among the male students*

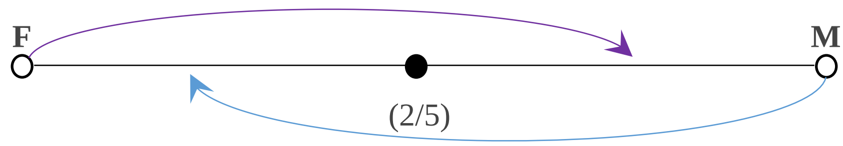
P = *proportion of business majors among all college students*

D_1 = (**$P - P_1$**) = Deviation distance of **P_1** from the combined proportion of the two SETS

D_2 = (**$P_2 - P$**) = Deviation distance of **P_2** from the combined proportion of the two SETS

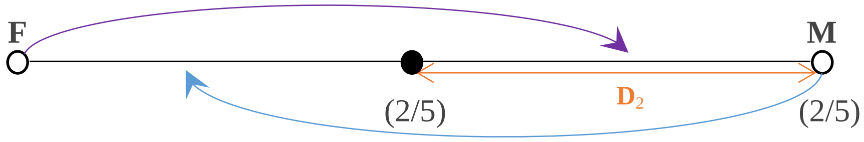
Now with this background info we can present the information given in the question stem as follows:

If **M** & **F** are the number of male and female students at the college C,



We're asked for the value of the variable **F**.

STATEMENT (1) alone: This statement gives out the value of the proportion of males that are business majors in a way giving the value of the variable $\mathbf{P_2}$ = (2/5). However, this value is exactly equal to the proportion (**P**) of the business major students at college C in general (male + female). The diagram above may now be modified to add information from this statement as follows:



The above diagram makes less sense to follow on with since D_2 comes out to be **0**. You may either note a general result for the above specific case (a case in which either one of $\mathbf{P_1}$ or $\mathbf{P_2}$ ends up being equal to **P**) which goes something like: If the case arrives at a situation where say one of $\mathbf{P_1}$ or $\mathbf{P_2}$ equals in value to the combined property value **P**, then the second one of $\mathbf{P_1}$ or $\mathbf{P_2}$ must also equal **P** thereby giving us a scenario where all three become equal and the above line shrinks into a single DOT at the centre (since D_1 & D_2 both equal 0). If the above seems sheer muck I suggest looking at things mathematically:

Let X be the proportion of females that are business graduates in the college C, then according to the information in this statement $(2/5)^{th}$ of males and X of females together make up $(2/5)^{th}$ of the total population (**M** + **F**). This may be written out as:
(2/5)***M** + X***F** = (2/5)*(**M** + **F**) solving which gives us X = (2/5). Hence the proportion of females = proportion of males = proportion of the two combined together.

Thus, we know from this statement that $(2/5)^{th}$ of the female students also at college C are business graduates. However, this information on its own helps me least to arrive at a *unique* value of the variable **F**.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the number of female students at college C that are business graduates (= 200). However, this alone is miles away from giving us an actual figure of the number of the number of **total** female students at college C. The question stem states the fraction of the total students at college C that are business graduates and does little to add anything useful.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together →
Statement (1) says: $(2/5)^{th}$ of the female students at college C are business graduates.
Statement (2) says: 200 of the female students at College C are business majors.
Therefore, the above two pieces referring to the same thing (number of female students at College C that are business majors) can form two sides of an equation as follows:

(2/5)***F** = 200 → **F** = 500 – a *unique* value answer. *The calculations are unnecessary in the event that you realize by glancing at the two statements that the two pieces of information will definitely yield a unique answer.*
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.128

The question puts forward an inequality in the form of a question asking us confirmation on whether Y is < (X + Z)/2?

STATEMENT (1) alone: The statement gives out an inequality relation among the variables X, Y & Z in the following form → Y – X < Z – Y which may be rearranged to give us Y < (X + Z)/2 which is a direct conformational answer to the question asked up top in the question stem – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement gives out an inequality relation among the variables X, Y & Z in the following form → Z – Y < (Z – X)/2 which may be rearranged to give us Y > (X + Z)/2 which is again a direct conformational answer to the question asked up top in the question stem – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.129

We're given a *POSITIVE* integer **T** and are asked the *unique* value of the **remainder** when the expression ($\mathbf{T}^2$ + 5***T** + 6) is divided by 7. Before proceeding with the statements it makes sense to see if we can represent the expression above in a factorized form. We may split 5***T** as follows to write the expression as $\mathbf{T}^2$ + 2***T** + 3***T** + 6 *(splitting 5 as 5 = 3 + 2 makes sense because 2 & 3 also make up the factors that when multiplied equal 6)* or **T***(**T** + 2) + 3*(**T** + 2) or (**T** + 2)*(**T** + 3) – which may be seen as a product of two positive integers.

STATEMENT (1) alone: This statement says that **T** divided by 7 yields a remainder 6. **T** may thus be written as to be of the form **T** = 7**K* + 6, where *K* = {0, 1, 2,…so on}. Substituting this form in the product {(**T** + 2)*(**T** + 3)} that we reduced the expression in the question stem to we get: (7**K* + 8)*(7**K* + 9) = ((7**K* + 7) + **1**)*((7**K* + 7) + **2**) which may be seen as a product of two Integers – ((7**K* + 7) + **1**) & ((7**K* + 7) + **2**) – that yield **remainders** 1 & 2 when divided by 7 individually. I'll just cite the result that I'll use to arrive at the value of the **remainder** that the product of the two integers yields when divided by 7.

Kindly note a result on remainders that might come in handy not just for this question, but for many more questions involving finding out the ***remainder*** *when a product of* *different integers is given. Let m, n & p be integers such that they yield* ***remainders*** *R_1, R_2 & R_3 respectively when multiplied by an integer* ***D*** *(divisor), then for an integer* ***L*** *such that* ***L*** *may be written as the product of the integers m, n & p or,* ***L*** *= m*n*p. The* ***remainder*** *when* ***L*** *is divided by* ***D*** *is then simply the product of the INDIVIDUAL remainders (R_1, R_2 & R_3) that m, n & p would yield when divided by* ***D*** *individually. Mathematically or more simply put the* ***remainder*** *when* ***L*** *(= m*n*p) is divided by* ***D*** *is* ***remainder*** *= R_1*R_2*R_3 OR if R_1*R_2*R_3 comes out to be ≥* ***D*** *→ the* ***remainder*** *is the same in value as the remainder that (R_1*R_2*R_3) would yield when divided by* ***D****.*

Therefore, the value of the **remainder** that the product of the two integers yields when divided by 7 is simply = 1*2 = 2 – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the $\mathbf{T}^2$ or (**T*T**) when divided by 7 yields a remainder 1. This does become a bit tricky to evaluate (and you'll see what I mean in a moment) in terms of what the remainder could be when the integer **T** is divided by 7. I'll approach this in a pretty rudimentary sense but only for demonstration purposes
The *POSITIVE* integer **T** (or any integer for that matter) can give me the following remainder values when divided by 7 – {0, 1, 2, 3, 4, 5, 6}. Now assuming that **T** divided by 7 gives me each of the values in the above set as a potential remainder, I'll check to see how many values in the set actually lead me to the result mentioned in this statement (i.e. $\mathbf{T}^2$ divided by 7 gives a remainder 1). I'll be using the result mentioned in the statement (1) analysis in purple. So all along in my investigation below I'll be answering the following question for each value that I take up – Does the remainder when $\mathbf{T}^2$ divided by 7 come out to be 1?
0: remainder = 0*0 = 0 – NO
1: remainder = 1*1 = 1 – **YES**
2: remainder = 2*2 = 4 – NO
3: remainder = 3*3 = 9 – divided by 7 gives remainder = 2 – NO
4: remainder = 4*4 = 16 – divided by 7 gives remainder = 2 – NO
5: remainder = 5*5 = 25 – divided by 7 gives remainder = 4 – NO
6: remainder = 6*6 = 36 – divided by 7 gives remainder = 1 – **YES**

The above analysis shows me that **T** divided by 7 can thus yield me two possible values of the remainder = 1 & 6 – for both of which the remainder $\mathbf{T}^2$ divided by 7 will yield a remainder = 1.
We'll consider the two remainder values one by one:
T divided by 7 yields a remainder = 1
T may be written as **T** = 7**K* + 1 – substituting this form in the question stem product expression {(**T** + 2)*(**T** + 3)} → (7**K* + **3**)*(7**K* + **4**) – a product of two integers to which the same result above (the one in purple) can be applied to give the value of the **remainder** = 3*4 = 12 divided by 7 = 5 = **remainder**.
T divided by 7 yields a remainder = 6
T may be written as **T** = 7**K* + 6 – substituting this form in the question stem product expression {(**T** + 2)*(**T** + 3)} → (7**K* + 8)*(7**K* + 9) = ((7**K* + 7) + **1**)*((7**K* + 7) + **2**) – a product of two integers to which the same result above (the one in purple) can be applied to give the value of the **remainder** = 1*2 = 2

This statement thus has us arriving at two different values of the **remainder** (2 & 5) asked in the question stem – NO *unique* value obtained.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.130

We're given a SET S that consists 20 *DISTINCT* **positive** integers. We're asked the exact number out of the 20 integers that are ODD.

STATEMENT (1) alone: This statement pretty much throws us the answer to the question asked up top directly in the sense that by saying that 10 of the integers out of the 20 total are EVEN which tacitly implies that the remaining 20 – 10 = 10 integers must be ODD – a sort of *unique* and CONFIRMED answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the 10 integers out of the total 20 integers are multiples of 4 (which are definitely even). This statement, however, leaves us uncertain about the rest of the 10 integers in the sense whether they're EVEN (not being multiples of 4 say 22 or 30) or ODD. This clearly is limited in the sense of helping us arrive at anything concrete regarding the question raised up top.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.131

The question gives out an inequality saying $W + X < 0$ and asks us whether $W – Y > 0$? We can rearrange this to say that the question asks us to confirm whether $W > Y$?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

STATEMENT (1) alone: This statement gives out the following inequality to which the numbers X & Y conform to → $X + Y < 0$. We can rearrange this to write $X < –Y$. Now the question stem's got another inequality for us that the numbers W & X conform to → $W + X < 0$ which may be rearranged to write $X < –W$. Therefore, the two statements together sort of give us 2 conditions to which the number X conforms to $X < –Y$ & $X < –W$. In all the two conditions only tell us that the two numbers ($–Y$ & $–W$) are greater than some number X, however, a closer look at what the question asks us confirmation on (Is $W > Y$?) reveals that there really is no way of getting a relative comparison between $–Y$ & $–W$ or between Y & W. If you're still the least bit sceptical at this point, I suggest we try some simple values that satisfy both $X < –Y$ & $X < –W$ and see whether we can get a confirmation between the relative comparison (Is $W > Y$?) of Y & W. It is pretty easy to see that $X = –10$, $Y = 1$ & $W = 2$ satisfies both $X < –Y$ & $X < –W$ and gives me a **YES** answer to the question up top (Is $W > Y$?), however, (swapping the values of Y & W) $X = –10$, $Y = 2$ & $W = 1$ again satisfies both $X < –Y$

& $X < -W$ yet gives me a **NO** answer to the question up top (Is $W > Y$?). We thus arrive at a YES/NO situation/scenario.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out the relative placement of the numbers Y, X & W on the number line saying $Y < X < W$. This is a pretty direct give away of the answer to the question up top, saying that if $Y < X < W$, then W turns out be the GREATEST of the three (Y, X & W) and Y turns out to be the LEAST of the three (Y, X & W), and thus ensuring that Y is indeed $< W$ – a CONFRIMED YES answer to Is $W > Y$?
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.132

Note that whenever a question talks of combining two SETS (as in here the Drama and the Music clubs), we're supposed to keep a weather eye on the OVERLAP POSSIBILITY of the two SETS. This question is all about testing just that. By checking for possible overlap, I mean asking yourself whether a member can belong to both the two clubs simultaneously.

We're required to seek a *unique* value of the male proportion of the combined membership.

STATEMENT (1) alone: This statement gives me information about only the Drama club and none about the Music club. Clearly this is just one of the pieces of the puzzle to complete the picture.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives me information about only the Music club and none about the Drama club. Clearly this is just one of the other pieces of the puzzle to complete the picture.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
15 male members out of the 16 total belonging to the Drama Club – as per statement (1) &
10 male members out of the 20 total belonging to the Music Club – as per statement (2)
It may seem that we have all the information we need to figure out the proportion of males in the combined membership. We may even go a step further to calculate the *unique* value of this proportion saying percentage of males = {(10 + 15)/(16 + 20)}*100.
HOWEVER, the above may only be possible if and only if the two SETS (music and drama clubs) are MUTUALLY EXCLUSIVE, i.e. have no member in common. And since nothing of this sort is given *(saying that no member of one club is a member of the other)*, it serves us a deadly penalty to ASSUME so. To exemplify:

It may be so that 5 of the males are common to both clubs *(and assuming that no other member except these 5 males belong to both the clubs)*. The combined male membership then becomes = 15 + 10 – 5 = 20 instead of the 25, and the combined total membership becomes 16 + 20 – 5 = 31.

Since we do not know the degree of overlap (if any) of the members of the two clubs, we CANNOT comment on the value of the proportion of males in the combined membership.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.133

There is a typographical error in this question statement. The first statement wrongly mentions 'f feet 10 inches' instead of '5 feet 10 inches'.

We're given N people in a certain group, whose average height we're supposed to measure.

STATEMENT (1) alone: According to this statement the SUM of the heights of the (N/3) tallest people in the group is (6 feet 2.5 inches)*(N/3) and the SUM of the heights of the remaining (2*N/3) people is (5 feet 10 inches)*(2*N/3). Thus, the total SUM of the heights of all the members is (6 feet 2.5 inches)*(N/3) + (5 feet 10 inches)*(2*N/3). Thus the average height of the people in the group is = (SUM of heights)/No. of people
= {(6 feet 2.5 inches)*(N/3) + (5 feet 10 inches)*(2*N/3)}/N
= (6 feet 2.5 inches)*(1/3) + (5 feet 10 inches)*(2/3)
= 5 feet 11.5 inches – a *unique* value answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: According to this statement the total SUM of the heights of all the N people is 178 feet 9 inches. However, since we have no idea about the absolute value of the number (N) of people participating in the height measurement, we cannot get a *unique* value of the expression (178 feet 9 inches)/N or the average height of the members. N may take on any value as per this statement giving us multiple values of the average height of the members in the group.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.134

We're given integers M & N and are asked to confirm whether M is ODD?

STATEMENT (1) alone: According to this statement the SUM (M + N) is ODD, meaning that **EITHER** M is ODD and N is EVEN – a **YES** answer to the question up top **OR** M is EVEN and N is ODD – a **NO** answer to the question up top. A clear YES/NO situation at our hands.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement the SUM (M + N) = (N^2 + 5) which may be rearranged to write M = N^2 – N + 5, or M = N*(N – 1) + 5. Take note here that for ANY integer N (ODD or EVEN), the multiplication of the two consecutive integers N &

(N – 1) will ALWAYS be EVEN *(at least one of N or N – 1 has to be EVEN)*. Since 5 is odd, M may thus be written as M = EVEN + ODD = ODD – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.135

Let **P**, **Q**, **R**, **S** & **T** denote the first time jobless claims filed in the weeks P, Q, R, S & T respectively. We're then simply required to seek the *unique* value of the difference (**P** – **T**).

STATEMENT (1) alone: According to this statement: (**P** + **Q** + **R** + **S**)/4 = 388,250 or (**P** + **Q** + **R** + **S**) = 4*(388,250) = 1553000. However, no mention of the variable **T** leaves us stranded while seeking the *unique* value of the difference (**P** – **T**).
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement: (**Q** + **R** + **S** + **T**)/4 = 383,000 or (**Q** + **R** + **S** + **T**) = 4*(383,000) = 1532000. However, no mention of the variable **P** leaves us stranded in this case while seeking the *unique* value of the difference (**P** – **T**).
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the two statements together, we have:
(**P** + **Q** + **R** + **S**) = 1553000 – as per statement (1) &
(**Q** + **R** + **S** + **T**) = 1532000 – as per statement (2).
We may subtract the second statement from the first to eliminate all the unwanted variables (**Q**, **R** & **S**) to get (**P** – **T**) = 1553000 – 1532000 = 21,000 – a *unique* value answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.136

In *median* questions it is always a good idea to first arrange the known values/elements of the SET in ascending order. So we'll write it out as shown below with the unknown(s) kind of hovering above the known values:

X

1 3 8 12

We're asked to confirm whether the *median* of the above SET above is greater than its *mean*?

STATEMENT (1) alone: According to this statement **X** > 6. **X** being an integer can thus take on the following values **X =** {7, 8, 9…so on}. Let's plug and observe what we get. For **X** = 7 *say*, the *median* = 7 and the *mean* = (1 + 3 + 7 + 8 + 12)/5 = 21/5 = 4.2. Since *median* > *mean* we get a **YES** answer to the question up top. However, For **X** = 51 *say*, the *median* = 8 and the *mean* = (1 + 3 + 8 + 12 + 51)/5 = 75/5 = 15. Since *median* < *mean* we get a **NO** answer to the question up top. We thus have with us a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: For **X** to be greater than the *median* of the 5 numbers in the SET, **X** simply has to be greater than the middle value of the 5 integers in the SET or **X** has to lie beyond the value 8 (i.e. **X** > 8) in the SET shown above, making 8 the middle most value or the *median*. Let's plug and observe what we get. For **X** = 9 *say*, the *mean* = (1 + 3 + 8 + 9 + 12)/5 = 33/5 = 6.6. Since *median* > *mean* we get a **YES** answer to the question up top. However, For **X** = 51 *say*, the *median* = 8 and the *mean* = (1 + 3 + 8 + 12 + 51)/5 = 75/5 = 15. Since *median* < *mean* we get a **NO** answer to the question up top. We thus have with us a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The statements above together stipulate the following:
X > 6 – as per statement (1) &
X > 8 – as per statement (2).
Since the stipulation by statement (2) already encapsulates the what statement (1) has to say, we can simply say that **X** conforms to **X** > 8 i.e. **X** = {9, 10, 11,…so on}. This condition has already been tested for in statement (2). In other words the two statements clubbed together do not derive anything new from what is already stated in the individual statement (2). It is useless to plug and test again for we already know that the condition is insufficient.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.137

We're given two *POSITIVE* **integers** X & Y, and are asked to confirm whether (X*Y) is a multiple of the integer 8?

STATEMENT (1) alone: According to this statement X & Y can each be written as X = 10**P* & Y = 10**Q*, where *P* & *Q* are integers such that the only factor they have in common is the integer 1. Therefore, we may write X*Y = (10**P*)*(10**Q*) = 100**P***Q* = 2^2 x 5^2 x *P* x *Q*. Now for *P* = 1 & *Q* = 2, we get a **YES** answer to the main question up top. However, for *P* = 1 & *Q* = 3, we get a **NO** answer to the main question up top. We thus have us a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement the LCM of X & Y is 100 = 2^2 x 5^2. Since (2^2 x 5^2) is a multiple of both X & Y, we may write X & Y as 100 = (2^2 x 5^2) = *M**X and (2^2 x 5^2) = *N**Y, where *M* & *N* are integers. Now for X = 20 & Y = 50, we get a **YES** answer to the main question up top. However, for X = 25 & Y = 4, we get a **NO** answer to the main question up top. We thus again have us a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together give out the LCM and HCF of the two integers X & Y. Note the following result:

For two positive integers A & B, the (LCM of A & B) x (HCF of A & B) = product of A & B.

Therefore the product X*Y = GCD x LCM = 10*100 = 1000 which is definitely divisible by 8 – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.138

We're given the following relation to which four variables conform: Z*Y < X*Y < 0. We're asked to confirm whether the following MOD relation holds true: |X – Z| + |X| = |Z|? OR the question asks to confirm whether |X – Z| = |Z| – |X|?

STATEMENT (1) alone: According to this statement Z < X, or (Z – X) < 0 OR (X – Z) > 0. Since (X – Z) > 0, |X – Z| = X – Z → *for whatever comes out of a MOD has to be a positive quantity, e.g.|–2| = 2.*
Now since Z*Y < X*Y or (Z – X)*Y < 0 as well according to the info in the question, Y must be > 0 *(since (Z – X) < 0)*. Since Y > 0, Z < X < 0 *(since Z*Y < X*Y < 0)*. Therefore, for both negative Z & X, |Z| = –Z & |X| = –X OR |Z| – |X| = –Z – (–X) =
(X – Z).
Because each of |X – Z| & (|Z| – |X|) equals (X – Z), thus |X – Z| = (X – Z) = |Z| – |X| OR |X – Z| = |Z| – |X| – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: According to this statement Y > 0. Since Z*Y < X*Y < 0 according to the main question → Z < X < 0 i.e. both Z & X are negative. Also since Z < X, it implies (Z – X) < 0 OR (X – Z) > 0. We may now write |X – Z| = X – Z → *for whatever comes out of a MOD has to be a positive quantity, e.g.|–2| = 2.*
For both negative Z & X, |Z| = –Z & |X| = –X OR |Z| – |X| = –Z – (–X) = (X – Z).
Again because each of |X – Z| & (|Z| – |X|) equals (X – Z), thus |X – Z| = (X – Z) = |Z| – |X| OR |X – Z| = |Z| – |X| – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.139

Let machines J & K take **J** & **K** minutes to wrap 60 pieces of candy. We're given the value of one variable **J** = 2 and are asked to seek a *unique* value of the expression (2***K**) *(wrapping twice the amount at the same constant rate obviously requires double the time)* or of the variable **K**.

STATEMENT (1) alone: According to this statement **K** > 5 minutes. However, this is a range of values that **K** can take on and not a *unique* value. This is clearly nowhere near sufficiency.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: If **J** & **K** minutes are the **times** *(and not rates)* taken by the two machines to individually wrap 60 pieces of the candy working independently, then the time taken by both machines working together is given as **T** = **J*K/(J + K)**.
According to this statement then **J*K/(J + K)** = 1.5, given (**J** = 2) we may reduce this to 2***K**/(2 + **K**) = 1.5 → **K** = 6, or (2***K**) = 12 – a *unique* value answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.140

Let $\mathbf{P}_{1993}$, $\mathbf{P}_{1994}$ & $\mathbf{P}_{1995}$ represent the number of video cameras produced in the years 1993, 1994 & 1995 respectively, then we're required to seek a *unique* value of the variable $\mathbf{P}_{1995}$. But before we proceed further here's what the question stem has to tell us:

$\mathbf{P}_{1993} = 1000$,
$\mathbf{P}_{1994} = \{1 + (X/100)\}*\mathbf{P}_{1993} = \{1 + (X/100)\}*1000$
$\mathbf{P}_{1995} = \{1 + (Y/100)\}*\mathbf{P}_{1994} = \{1 + (Y/100)\}*\{1 + (X/100)\}*1000 = \{1 + (X + Y)/100 + X*Y/10000\}*1000 = \{100 + (X + Y) + X*Y/100\}*10$, or reiterating,
$\mathbf{P}_{1995} = \{100 + (X + Y) + X*Y/100\}*10$.
Thus, we're required to seek a *unique* value of the entire expression $\{100 + (X + Y) + X*Y/100\}*10$ as a whole.

STATEMENT (1) alone: This statement gives out the value of the product $X*Y = 20$. However, the fixed product of X & Y can assume multiple values of the variables X & Y that, for every value of the variable pair (X, Y) that multiplies to give 20, give a different SUM value $X + Y$. For instance $X = 1$, $Y = 20$ gives me an $(X + Y)$ value of 21 and thus a 1212 value of the expression up top, however, $X = 10$, $Y = 2$ gives me an $(X + Y)$ value of 12 and thus a 1122 value of the expression up top. We clearly do NOT get a *unique* value of the variable or the expression asked in the main question up top.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out the value of the following expression:
$X + Y + (X*Y/100) = 9.2$ → adding the value 100 to both sides of the equation we get $100 + X + Y + (X*Y/100) = 100 + 9.2 = 109.2$, thus
$\mathbf{P}_{1995} = \{100 + X + Y + (X*Y/100)\}*10 = 10*109.2 = 1092$ – a *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.141

Although one might feel the sudden urge to plunge in and apply everything he/she knows of two overlapping SETS to this question, it must be noted that the question even though mentions two possibly overlapping SETS *(as in people who used the first ticket and the people who used the second ticket)*, the question talks or wants us to work on the tickets rather than the people. We're required to work on the number of tickets used *(tickets*

CANNOT be grouped in overlapping SETS as in a ticket that was used by person 1 and person 2) which DO NOT require the overlapping SETS framework of a solution, since for every ticket that was either purchased or used, there was exactly ONE person who either purchased or used it.

Having said that, we'll now proceed forth with our question. The question says that there were 2*20 = 40 tickets purchased in all by the 20 people attending the concert. Given the possibility that there are people that there are people who've used up just one of the two tickets purchased as well as those who've not used either of the two purchased, the question asks us to seek a *unique* value of the percentage/fraction of the total (= 40) tickets that were USED.

STATEMENT (1) alone: This statement informs us with ONE piece of the puzzle required to solve the question up top. The Statement tells us the number of people that used ONLY 1 out of the 2 tickets purchased (= 10). However out of the remaining 20 – 10 =10 people that we have, we're absolutely clueless about how many may have used up neither of the two tickets bought. Unaware of that little complementary piece of information, we're flooded with multiple answers to the question asked up top in the main question.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement informs us with the second complementary (to the piece given out by statement (1)) piece of the puzzle required to solve the question up top. The Statement tells us the number of people that used NEITHER of the 2 tickets purchased (= 4). However out of the remaining 20 – 4 =16 people that we have, we're absolutely clueless about how many may have used up ONLY 1 of the two tickets bought. Unaware of that little piece of information, we're again similarly flooded with multiple answers to the question asked up top in the main question.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information contained in the two statements together we sort of get a complete picture of the entire scenario as follows:
Statement (1) says that 10 out of the 20 people used up ONLY 1 of the two tickets purchased.
Statement (2) says that 4 out of the 20 people used up NEITHER of the two tickets purchased.
This automatically implies that the number of people who ended up using both of the purchased tickets was 20 – (10 + 4) = 6.
Thus, the total number of tickets used up were = (2*6) + (1*10) + (0*4) = 22 and thus the percentage (of the total tickets bought) that were used comes out to be = (22/40)*100 = 55% - a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.142

Let the cost of a Soft Drink at the stand be $**D** and the cost of a Sandwich at the stand be $**S**. Then all we're asked really is to seek the *unique* value of the variable **S**.

STATEMENT (1) alone: The statement can be mathematically spelled out as follows:
S + 2***D** = \$3.15. However, note that this is a SINGLE linear equation in two variables (**S** & **D**) and can thus generate scores of values of the paired solution (**S**, **D**) that will each satisfy the condition or the equation laid out by this statement alone. We thus can clearly NOT get us a *unique* value of the variable **S**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement can be mathematically spelled out as follows:
3***S** + **D** = \$5.70. However, note that this is again a SINGLE linear equation in two variables (**S** & **D**) and can thus generate scores of values of the paired solution (**S**, **D**) that will each satisfy the condition or the equation laid out by this statement alone. We thus can clearly NOT get us a *unique* value of the variable **S**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information contained in the two statements together we sort of get ourselves the following:
S + 2***D** = \$3.15 – as laid out by Statement (1), &
3***S** + **D** = \$5.70 – as laid out by Statement (2)
Note that the above is a SET or a SYSTEM of two distinct linear equations in two variables (**S** & **D**), that can be appropriately be solved to get us a *unique* value of each of the variable (**S** & **D**).

This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variables required (**S** & **D**) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination and are for demonstration purposes only.*
Solving the set of two equations above gives us **D** = \$0.75 & **S** = \$1.65 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.143

We're given a *POSITIVE* **three** digit integer *K*. We're asked to seek the *unique* value of the hundreds digit of the integer *K*.

STATEMENT (1) alone: We're given that the hundreds digit of the integer (K + 150) is 4. Using this we can thus substantiate a range of values that the three digit integer (K + 150) can take on. Since the hundreds digit is 4 we may write that (K + 150) must be such that $400 \leq (K + 150) < 500$ or K must be such that $250 \leq K < 350$. Clearly, the range may allow us a hundreds digit of 2 *(in case K = 270)* or a hundreds digit of 3 *(in case K = 320)*. No *unique* answer renders this statement insufficient.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We're given that the tens digit of the integer (K + 25) is 7. Using this we can thus substantiate a range of values that the three digit integer (K + 25) can take on. Since the tens digit is 7 we may write that (K + 25) must be such that X70 ≤ (K + 25) < X80, where X is a variable digit such that 1 ≤ X ≤ 9, or that K must be such that X45 ≤ K < X55, where X is a variable digit such that 1 ≤ X ≤ 9. Since the hundreds digit (X) even in the range stipulated is variable, we can clearly see how we again end up with no *unique* value of the hundreds digit of the three digit integer K.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the two pieces of information given out in the two statements together, we know that K must be of the sort such that:
250 ≤ K < 350 – according to statement (1) &
X45 ≤ K < X55, where X is a variable digit such that 1 ≤ X ≤ 9 – according to statement (2).
Note that, for every digit value of X, i.e. hundreds digit, according to statement (2) the value of K lies between the 45's and the 55's of that hundred, so K can have the following values according to statement (2)
145 ≤ K < 155
245 ≤ K < 255
345 ≤ K < 355…so on and so forth.
However, the statement (1) stipulates K to be in the range 250 ≤ K < 350.
Thus taking the common values of the three digit integer K from the above we get that the integer K conforms to the following:
250 ≤ K < 255 as well as 345 ≤ K < 350, OR in other words K can take on the following set of values K = {250, 251, 252, 253, 254, 345, 346, 347, 348, 349}. Clearly we can still have two values of the hundreds digit of the three digit integer K namely 2 & 3 as can be seen from the SET drawn out above – hence still no *unique* value obtained.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.144

Let's try and mathematically quote what this statement requires us to seek a *unique* value of!

However, before proceeding further with the question and its statements, we'll just brush up our knowledge of the formula that allows us to calculate distances on an XY or Co-ordinate plane. The Formula states that if (X_1, Y_1) & (X_2, Y_2) be two points on the XY or Co-ordinate plane then the distance between the points *(which is nothing but the length of the line segment that joins the two points)* is given as the SQUARE ROOT of the SUM of the SQUARED DIFFERENCES between the X & the Y co-ordinates of the two points. Mathematically if **D** represents the distance of between the points (X_1, Y_1) & (X_2, Y_2), then **D** may be written out as **D** = $\sqrt{(X_1 - X_2)^2 + (Y_1 - Y_2)^2}$.

Coming back to the question, we're given two points in the rectangular co-ordinate plane → a point **P** with coordinates (A, B) and point **Q** with coordinates (C, D). We're now asked the unique value of the distance between the points **P** & **Q** or in other words the length of the segment joining the points **P** and **Q**. Using the above formula the distance may be written as

D = $\sqrt{(A - C)^2 + (B - D)^2}$. Thus in other words we are to seek a *unique* value of the expression ($\sqrt{(A - C)^2 + (B - D)^2}$).

STATEMENT (1) alone: This statement alone says that the absolute value of the term (B – D) = 4. However, looking at the expression up above, whose *unique* value we're required to find, we know that this is just one piece of the puzzle that we need in order to solve for the *unique* value of the expression up above. With (A – C) left to take on any value possible, it is impossible for us to get a fix on a *unique* value of the variable **D** or of the distance between the points **P** & **Q**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone says that the absolute value of the term (A – C) = 3. However, looking at the expression up above, whose *unique* value we're required to find, we know that this is just one piece of the puzzle that we need in order to solve for the *unique* value of the expression up above. With (B – D) here left to take on any value possible, it is impossible for us to get a fix on a *unique* value of the variable **D** or of the distance between the points **P** & **Q**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the information given out in the two statements together we now know the values of both
(B – D) = 4 – as per statement (1) &
(A – C) = 3 – as per statement (2).
Note now that all we really need to do to find a *unique* value of the variable **D** or of the expression ($\sqrt{(A - C)^2 + (B - D)^2}$) is two substitute the two individual pieces of the puzzle in the expression. **D** thus simply becomes **D** = $\sqrt{(3^2 + 4^2)}$ = 5 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.145

Although one might be tempted to draw out the entire information on a number line for a much clearer reference, it does make sense to see just how troublesome the algebraic form actually is. We're given three *POSITIVE* **integers** A, B & C. We're asked to comment on the relative positions of the three points representing the integers on the number line.
We're asked to confirm whether A, B & C are such that either A < B < C OR C < B < A?

STATEMENT (1) alone: This statement says that the positive integer B may be written as B = A + 3 – in terms of A, as well as B = C – 5 – in terms of the integer C. Now, B = A + 3 gives us that B > A & B = C – 5 gives us that B < C. Clubbing together we get that A < B < C – which is a CONFIRMED YES answer to the question up top in the main question.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the positive integer C may be written as C = B + 5 – in terms of B, as well as C = A + 8 – in terms of the integer A. We can equate the values of the integer C given out in the two statements above to get A + 8 = B + 5, or that B =

A + 3 which again gives us that B > A & C = B + 5 already gives us that B < C. Clubbing together we get that A < B < C – which is a CONFIRMED YES answer to the question up top in the main question.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.146

Let the price of one Hot Dog at the stand be $**D** and the price of one Soda at the stand be $**S**. Then all we're asked really is to seek the *unique* value of the expression (3***D** + 2***S**). In other words we're required to seek the *unique* value of the individual variables **S** & **D**.

STATEMENT (1) alone: The statement introduces an inequality relation and can be mathematically spelled out as follows:
5***S** < 2***D**. However, note that this is a linear inequality in two variables (**S** & **D**) and can thus generate scores of values of the paired solution (**S**, **D**) that will each satisfy the condition or the inequality laid out by this statement alone. We thus can clearly NOT get us a *unique* value of the variables **S** & **D** and hence of the expression (3***D** + 2***S**).
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement can be mathematically spelled out as follows:
9***D** + 6***S** = $21. I understand the sudden and immediate urge to note how because this equation is a SINGLE linear equation in two variables (**S** & **D**), thereby generating scores of values of the paired solution (**S**, **D**) that will each satisfy the equation, it is impossible to get to us a *unique* value of the variables (**S** & **D**), and thus label this statement insufficient. However, note that the question requires us to get to a *unique* value of the expression (3***D** + 2***S**). Taking note of the information shared by this statement – 9***D** + 6***S** = $21 which may be written as 3*(3***D** + 2***S**) = $21 or, dividing both sides by 3, may be written as (3***D** + 2***S**) = (21/7) = $3 – a *unique* value obtained. Note that because of certain simple mathematical manipulation *(dividing both sides by the integer 3)* we can bypass the entire solving for a *unique* value of each of the two variables to straight away arrive at a *unique* value of the expression itself. We may say in other words that we were already directly given the *unique* value of the expression (3***D** + 2***S**) in this statement. It was only multiplied by the integer 3.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.147

Let the number of computers purchased be **C** and the number of printers purchased be **P**. Then by the question stem we're asked to seek a *unique* value of the variable **C**.

STATEMENT (1) alone: This statement simply puts on a range of values that the integer variable **P** can take on saying that **P** > 3, or that **P** = {4, 5, 6,…so on}. However, we're clearly miles away from getting us a *unique* value of the variable **C**, which has absolutely no mention in this statement at all.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement can be mathematically spelled out as follows: 2000***C** + 300***P** = 15000 or that 20***C** + 3***P** = 150. However, note that this is a SINGLE linear equation in two variables (**C** & **P**) and can thus generate scores of values of the paired solution (**C**, **P**) that will each satisfy the condition or the equation laid out by this statement alone. We thus can clearly NOT get us a *unique* value of the variable **C**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the information given out in the two statements together we now know the values of both the variables (**C** & **P**) conform to the following restrictions:
P > 3 – as per statement (1) &
20***C** + 3***P** = 150 – as per statement (2).
However, the first statement gives us a range of values that the integer **P** can take on. The best available solution to ruling out the sufficiency of this statement is to plug in values that conform to the range of the values that the variable **P** can take on, and check whether we can get at least two distinct values of the variable **C**. *Note that **P** = 10, gives me **C** = 6 & **P** = 30, gives me **C** = 2.* We thus see that at least two distinct values of the integer variable **C** exist. We thus can NOT get to a *unique* value of the variable asked in the main question up top.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.148

We're given the values of the variables X (= 3) & Y (= 6) to begin with and are asked our confirmation on whether the following inequality holds true: Y > *N**X + *K*, where *N* & *K* are constants. We may substitute the values of X & Y in the inequality expression to have the question ask us whether 6 > 3**N* + *K*? *(N & K are constants)*

STATEMENT (1) alone: This statement gives out the value of the constant *N* = 5. This may further reduce the inequality expression in the question stem to have the question ask us whether 6 > 3*5 + *K*? or whether 6 > 15 +*K*? where *K* is some constant. However, unaware of the value of the constant *K* leaves us with conflicting YES/NO answers to this question. *(For instance K = –14 gives us a **YES** answer and K = 1 gives us a **NO** answer)*
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out the value of the constant *K* = –10. This may further reduce the inequality expression in the question stem to have the question ask us whether 6 > 3**N* – 10? where *N* is some constant. However, unaware of the value of the constant *N* once again leaves us with conflicting YES/NO answers to this question. *(For instance N = 1 gives us a **YES** answer and N = 7 gives us a **NO** answer)*
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the information given out in the two statements together we now know the absolute values of both the constants *N* (= 5) & *K* (= –10). We may substitute the values of *N* & *K* in the inequality expression in the question stem up top to have the question ask us whether 6 > 3*5 –10? Or whether 6 > (15 – 10)? Or whether 6 > 5? Which is nothing but an inequality question in absolute values (No variables) and can definitely be answered with a CONFIRMED YES.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.149

The question asks us to confirm whether X + C = Y + C? which can be reduced (by eliminating C on both sides) to have the question ask us whether X = Y?

STATEMENT (1) alone: This statement straight out tosses at us the DIRECT answer to the query made in the question stem up top, saying that YES indeed X is = Y – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the following relation X = C, however the question up top is concerned with establishing the equality between X & Y. This statement alone has no mention of what the numeral Y might be. Therefore, this statement has little to aid us in confirming the question asked up top.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.150

We're given that *N* is an integer between 3 & 9 *(unless and until 3 & 9 are mentioned to be inclusive to the range mentioned we will have to take them to exclusive to the range of values that N can take on)* *N* therefore may take on the following 5 values {4, 5, 6, 7, 8}. We're asked to narrow down to a single/*unique* value that *N* can take on out of the following 5 values.

STATEMENT (1) alone: Since the distance of two points X & Y on the number line may be represented using the MOD representation → |X – Y|, we may write the information presented in this statement mathematically as follows: |*N* – 3| = (2/3)*|9 – 3| = 4. Now if the absolute (MOD) value of (*N* – 3) is 4 then this implies that the value that (*N* – 4) can take on is either +4 or –4. We'll take up each case to see the value of *N* that we get. (*N* – 3) = 4 gives me ***N* = 7** and (*N* – 3) = –4 gives me ***N* = –1**. Before hastily concluding that we've got two values of *N* with us, we should remember that there is a range of values that the integer *N* can take on according to the question stem – {4, 5, 6, 7, 8}. By this range since *N* cannot take on the value –1 we're left with the integer *N* taking on one possible value which is *N* = 7 – a *unique* value obtained.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement pretty much gives out the value of *N* directly as seen in the diagram below. The statement diagrammatically says:

This pretty much says that all we need to do to get to the value of N is add 10 to –3 giving us $N = 7$ – a *unique* value obtained.

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.151

To begin with we're given 5 **DISTINCT** *POSITIVE* **integers**. We're asked confirmation on whether the average of the SET of the 5 integers is ≥ 30?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

STATEMENT (1) alone: The statement stipulates that each of the 5 **DISTINCT** *POSITIVE* **integers** is a multiple of 10. Notice here how generating a YES case is a piece of cake in the sense that we can take up all the multiples that are greater than 30 to create a SET say {100, 110, 120, 130, 140} yielding an average of 120 and thereby giving us a **YES** answer to the question up top. We'll now begin our quest for a NO case scenario. It is obvious that to come up with the least value of the average of the set of the 5 integers, I'll have to choose its members such that they too exhibit least values that a member of the SET can take on. Now since an integer in this set has to be **DISTINCT** & *POSITIVE* as well as a multiple of 10, the minimum value that the least integer can take on is thus 10, the next one 20, the next 30 and so on. Continuing in such a manner my SET with the members taking on the least value possible then comes out to be {10, 20, 30, 40, 50} ← this is the minimum level that I can stoop to. The average of the above SET can clearly be seen to be the middle most value = 30 giving me yet another **YES** answer. It thus becomes impossible to generate or have a NO situation or scenario. We thus arrive at a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: the statement is one of the most direct ones available in confirming the answer to the question up top in the question stem. The statement straight out gives us the value of the average of the list of 5 integers. Since *Mean* = (SUM/No. of elements), we know that the average of the 5 integers in the list is 160/5 = 80 which is definitely > 30 – a CONFIRMED YES. *Note again that we shouldn't have to arrive at the value 80 to know that the statement is sufficient. Knowing that a fixed SUM and fixed number of elements will always yield a fixed value of the average (regardless of whether the value is greater or less than 30) of the list of the 5 integers is enough to know that the info is enough to satisfactorily confirm (with a 100% surety) whether the average is greater than 30 or not. Remember that in DS all we're bothered about is gauging the sufficiency with a 100% confidence level.*

STATEMENT (2) alone – SUFFICIENT

ANSWER – (D).

Q.152

We're given that a certain jar contains **B** black, **W** white and **R** red marbles. Let's first begin by writing out the expressions for the probability of the events that are being compared in the question.
Just a recap →
Probability (in general) = (Number of favourable cases)/(Total number of cases)
Probability that the marble picked will be red = **R** / (**B** + **W** + **R**)
Probability that the marble picked will be white = **W** / (**B** + **W** + **R**)
Now we may put the wordy question stem in more of a mathematical form:
The question stem asks confirmation on whether Probability (red) > Probability (white)?
OR whether **R** / (**B** + **W** + **R**) > **W** / (**B** + **W** + **R**)? Now since the SUM (**B** + **W** + **R**) is definitively positive *(they're just numbers of different coloured marbles)*, we can cancel it from both sides of the inequality to reduce our confirmation question further down to Whether **R** > **W**? *(OR is the number of red marbles in the jar greater than the number of white marbles)*

<u>STATEMENT (1) alone</u>: This statement gives out an inequality relation among the number of each of the coloured marbles in the following form →
R / (**B + W**) > **W** / (**B + R**) – since each of the variables **B**, **W** and **R** is positive, there is absolutely no issue cross multiplying across the inequality. The cross-multiplication across the inequality gives us: **R***(**B + R**) > **W***(**B + W**) or **R*B + R**^{2} > **W*B + W**^{2} rearranging to take all the terms to one side of the inequality gives us: (**R*****B – W*B**) + (**R**^{2} – **W**^{2}) > 0 or **B***(**R – W**) + (**R + W**)*(**R – W**) > 0 or *(taking the expression (**R** – W) common)* we get: (**R – W**)*(**B + W + R**) > 0. Now since the expression (**B + W + R**) is a SUM up of three POSITIVE integers, there is not a shred of doubt that the expression as a whole is definitely positive and therefore for the multiplication of (**B + W + R**) with (**R – W**) to be positive *(as stipulated by the inequality (**R** – W)*(**B** + W + **R**) > 0)* the term (**R – W**) must be > 0, or **R** must be > **W** – a CONFIRMED YES.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives out the following inequality conformation: **B** – **W** > **R**, which can be rearranged to give **B** > **R** + **W**. In other words all this statement really tells me is that the number of black marbles is greater than the red and the white marbles taken together. However, we have no clue, with this information at hand, about the relative comparison between **R** and **W**. It is pretty easy to take up certain values to confirm this → **B** = 10, **R** = 4 & **W** = 2 conforms to the inequality given out by this statement **B** > **R** + **W** and gives me a **YES** answer to the question up top (Is **R** > **W**?). On the other hand, **B** = 10, **R** = 2 & **W** = 4 again conforms to the inequality given out by this statement **B** > **R** + **W** yet gives me a **NO** answer to the question up top (Is **R** > **W**?) having us arrive at a YES/NO scenario.
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.153

This question is a time distance question for which the formula that we can keep at the back of our minds is *Distance = Speed x Time.*
Let the distance from Alba to Benton be **D** miles. We're given that Julio drove the first *X* miles averaging a speed of 50 miles an hour and drove the remaining (**D** – *X*) miles averaging 60 miles an hour. We're asked to seek a *unique* value of the time Julio took to cover the first *X* miles of his journey. Using the formula that I introduced up top we can quote the same question mathematically by saying: We're asked to seek a *unique* value of the expression *(since time = Distance/speed) X*/50 or in other words seek a *unique* value of the variable *X*.

STATEMENT (1) alone: The statement gives out the value of the total time it took Julio to cover the **D** (= 530 miles) miles; total time = 10 hours. With two new pieces of the puzzle, it makes sense to first at least see what this amounts to mathematically:
Total Time = (Time for the first *X* miles) + (Time for the remaining (**D** – *X*) miles), or
Total Time = (*X*/50) + {(**D** – *X*)/60} = 10, or
(*X*/50) + {(530 – *X*)/60} = 10. Now before you actually proceed to solve this equation and waste those immensely crucial minutes in doing so, it makes more sense to take note of the fact that the above is a LINEAR equation in a single variable *X*, which can be solved to obtain a *unique* value of the single variable *X*. This being a DS problem this is all we're required to know.

This right here is the end of the analysis of this statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (X) and thus of the expression (X/50) is enough to label this statement sufficient and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.
Solving the equation (in the variable *X*) above gives us *X* = 350 and (*X*/50) = 7 hours. It therefore, took Julio 7 hours to travel his *X* miles of the journey – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This information if mathematically put translates into the following:
(Time taken to travel first *X* miles) – (Time taken to travel remaining (**D** – *X*) miles) = 4, or
(*X*/50) – {(**D** – *X*)/60} = 4, *Kindly note that we can't substitute* ***D*** *= 530 miles here because that was the first statement only*!
This statement further reduces to (11**X*/300) – (**D**/60) = 4. Observe here that we arrive at a single LINEAR equation again however with 2 variables (*X* & **D**). Needless to say we can generate scores of values of the pair (*X*, **D**) that can satisfy the equation above. In order for us to acquire a *unique* value of the pair (*X*, **D**), we need TWO LINEAR equations in the two variables. We thus arrive at a point where we're confident that a single *unique* value of *X* or *X*/50. *(you're welcome to experiment by plugging in* ***D*** *= 60 & 120 to see that u arrive at at least two distinct values of the variable X above – enough to mark this insufficient)*
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.154

Let the cable company install X cable outlets at the Horace family's house. Then according to their fee structure layout given in the question stem, it costs the Horace family a total of $(30 + 20*X) to get the job done. According to the question stem we are to seek a *unique* value of the expression (30 + 20*X) or in other words a *unique* value of the variable X.

STATEMENT (1) alone: This is probably the most direct form that any statement can spell out the exact info that the question stem requires us to seek info. The statement straight out gives us the *unique* value of the variable X (= 3) itself and hence the *unique* value of the expression (30 + 20*X). It's pointless to actually go forth and calculate the precise value of the expression, for all we need to be sure of is its sufficiency.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement mathematically translates into the following:
Total amount charged for the X outlets installed = (30 + 20*X); therefore
Average charge per outlet = (30 + 20*X)/X = 30 as given out by this statement. Before you rush towards solving for the *unique* value of X, all you really need to take note of here is that the above equation is a single LINEAR equation in one variable that can be easily solved for a *unique* value of that variable (X). This info is enough to know that a *unique* value of the variable X and hence of the expression (30 + 20*X) exists and is thereby enough to substantiate the sufficiency of this statement.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.155

The question pretty much has the same concept that decimal rounding off has lying underneath it. Instead of rounding off to the nearest hundredths or tenths, we're in a way here asked to round off to the nearest multiple of 100. Under such a scenario, as the one mentioned in the question stem, any number, between two consecutive multiples of 100 *(say 300 & 400)*, that is **at or beyond** the halfway point *(350)* is said to be closer to 400 and similarly any number that lies **prior** to the halfway point *(350)* is said to be closer to 300.

Keeping the above in mind, we'll try and write out a range of values that both variables X & Y can take on:

If 500 is the multiple of 100 that is closest to X → $450 \leq X < 550$, and
If 400 is the multiple of 100 that is closest to Y → $350 \leq Y < 450$.
Simply adding up the least and the most values that X & Y can individually take on gives us a range of values that the expression (X + Y) can take on. Therefore, we have with us the following range: $(450 + 350) \leq (X + Y) < (550 + 450)$, or
$800 \leq (X + Y) < 1000$ as per the question stem till now. We're required to seek that one *unique* multiple of 100 to which the number (X + Y) is closest to.

STATEMENT (1) alone: This statement sort of tends to trim down the values that the variable X can take on by saying that X < 500. Using this in conjunction to the range

stipulated for variable X by the question stem: $450 \leq X < 550$, we can narrow down our window of values that X can take on → **$450 \leq X < 500$**. However, no mention of the variable Y leads us to stick to the same range as given out in the question stem → $350 \leq Y < 450$. We can again now add the two separate ranges of X & Y to get the range of (X + Y). Therefore, $800 \leq (X + Y) < 950$. However, It is quite clear from the range that this statement eventually ends up stipulating to (X + Y), that (X + Y) can either take on a value of *say* 925 answering us with 900 as the answer to our question up top or take on a value of *say* 825 answering us with 800 as the answer to the question up top. We therefore do not arrive at a *unique* value for the quantity asked in the question stem.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement sort of tends to trim down the values that the variable Y can take on by saying that Y < 400. Using this in conjunction to the range stipulated for variable Y by the question stem: $350 \leq Y < 450$, we can narrow down our window of values that Y can take on → **$350 \leq Y < 400$**. However, no mention of the variable X leads us to stick to the same range as given out in the question stem → $450 \leq X < 550$. We can again now add the two separate ranges of X & Y to get the range of (X + Y). Therefore, $800 \leq (X + Y) < 950$ again. However, as shown above, It is quite clear from the range that this statement eventually ends up stipulating to (X + Y), that (X + Y) can either take on a value of *say* 925 answering us with 900 as the answer to our question up top or take on a value of *say* 825 answering us with 800 as the answer to the question up top. We therefore do not arrive at a *unique* value for the quantity asked in the question stem.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have the following trimmed down ranges of the values that each of X & Y can take on:
$450 \leq X < 500$ – as per statement (1), and
$350 \leq Y < 400$ – as per statement (2).
Adding them up once again gives us the range that (X + Y) can take on considering the conditions laid out in the two statements together. Thus,
$800 \leq (X + Y) < 900$, However once again, It is quite clear from the range that even the combined statements eventually ends up stipulating to (X + Y), that (X + Y) can either take on a value of *say* 875 answering us with 900 as the answer to our question up top or take on a value of *say* 825 answering us with 800 as the answer to the question up top. We therefore still do not arrive at a *unique* value (we're getting both 800 and 900 as answers) for the quantity asked in the question stem.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.156

We're given 4 variables *w, x, y* & *z*, that can take on exactly two values – either the value 0 or the value 1. We're asked to find the *unique* value of the SUM of the four variables or the value of the expression $(w + x + y + z)$. *(In other words we're supposed to get an individual fix on the which of the two values 0 or 1 can each of the 4 variables take on)*

STATEMENT (1) alone: This statement gives out a linear relation/equation to which the 4 variables must conform to: (w/2) + (x/4) + (y/8) + (z/16) = (11/16), which may be simplified to write: 8*w + 4*x + 2*y + z = 11. Our aim here on is to see how many possible solutions (keeping in mind that the only values that the variables can take on is either 0 or 1) to the reduced equation exist. Now if we begin by substituting w = 0, we'll see that even with x = y = z = 1, we won't be able to make a sum up to 11. Therefore ***w* definitely has to be 1**, which means we can further reduce the above equation by substituting w = 1 →
4*x + 2*y + z = (11 – 8) or 4*x + 2*y + z = 3. Clearly now since the only values each of x, y & z can take on are 1 & 0, ***x* definitely has to be 0** otherwise the entire sum (even keeping y = z = 0) would exceed 3. This further reduces the equation down to 2*y + z = 3, which is only possible if **both of *y* & *z* take on a value of 1**. We thus have been able to get a *unique* fix on the values of each of the four variables introduced (w = 1, x = 0, y = 1 & z = 1) and this will definitely yield us a *unique* value of the expression (= 3) asked for in the question stem.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out another linear relation/equation to which the 4 variables must conform to: (w/3) + (x/9) + (y/27) + (z/81) = (31/81), which may be simplified to write: 27*w + 9*x + 3*y + z = 31. Our aim here on again is to see how many possible solutions (keeping in mind that the only values that the variables can take on is either 0 or 1) to the reduced equation exist. Now if we begin by substituting w = 0, we'll see that even with x = y = z = 1, we won't be able to make a sum up to 31. Therefore ***w* definitely has to be 1**, which means we can further reduce the above equation by substituting w = 1 →
9*x + 3*y + z = (31 – 27) or 9*x + 3*y + z = 4. Clearly now since the only values each of x, y & z can take on are 1 & 0, ***x* definitely has to be 0** otherwise the entire sum (even keeping y = z = 0) would exceed 4. This further reduces the equation down to 3*y + z = 4, which is only possible if **both of *y* & *z* take on a value of 1**. We thus again have been able to get a *unique* fix on the values of each of the four variables introduced (w = 1, x = 0, y = 1 & z = 1) and this will definitely yield us a *unique* value of the expression (= 3) asked for in the question stem.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.157

We're given a list of 5 (an ODD number) *DISTINCT* **integers**. We're asked a confirmation question on the average of the two greatest integers in the list. We're asked if the average of the two greatest integers in the list is greater than 70?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

STATEMENT (1) alone: This statement says that the *median* of the 5 (an ODD number) *DISTINCT* **integers** in the list is 70. In other words 70 now becomes the middle most (3^{rd} from either the increasing end or the decreasing end) member of the list of integers. Since the list comprises *DISTINCT* **integers**, the two of the greatest integers in the list have to be greater than 70. Let the two greatest integers be denoted as (70 + X) and (70 + Y) where X &

Y are distinct POSITIVE integer additions to the value 70 (the *median*). Now as per the question stem above we're interested in what the average of the two greatest integers is?
Average of the two greatest integers = {(70 + X) + (70 + Y)}/2 = **70 + (X + Y)/2**
Since X & Y are positive (X + Y)/2 comes out to be a positive value that added to 70 as shown above makes the **Average of the two greatest integers** > 70 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

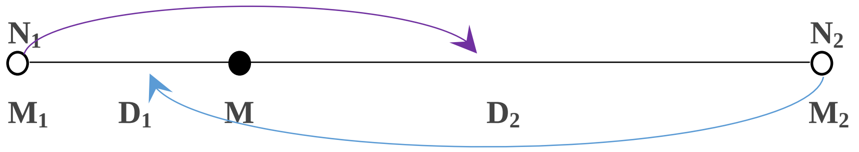
STATEMENT (2) alone: This statement says that the average of the 5 *DISTINCT* **integers** is 70. Since Average = SUM/(number of observations), we can also conclude that the SUM of the 5 *DISTINCT* **integers** = 70*5 = 350. Let X_1, X_2, X_3, X_4 & X_5 be the 5 integers in the list, such that $X_1 < X_2 < X_3 < X_4 < X_5$, then we've got ourselves the following equation: $X_1 + X_2 + X_3 + X_4 + X_5 = 350$. Now for the average of the two greatest integers (X_4 & X_5) to be greater than 70, i.e. $(X_4 + X_5)/2 > 70 \rightarrow (X_4 + X_5)$ must be > 140, the sum of the two greatest integers must be greater than 140 = {141, 142, 143…so on}. Now creating a **YES** scenario is easy where we just say that the SUM of X_4 & X_5 is 200 (> 140) say *(The sum of the remaining three integers then becomes = 350 – 200 = 150, giving us one possibility of the least integers values to be 49, 50 & 51 say)*
Now in order to create a NO scenario I need to make the SUM of the two greatest integers is ≤ 140. Let me take up the max value of the sum of these two (greatest) integers which is 140. This implies that the SUM of the remaining three must be 350 – 140 = 210. Now the two largest integers that I can choose that add up to 140 can be 72 and 68 say. Now for the remaining 3 (least) integers in the list their SUM has to add up to 210 and each of their values has to be less than 68 (for all 5 integers are distinct). The maximum possible values that I can assign to my X_1, X_2 & X_3 are 65, 66 & 67 respectively that add up to a total of 198 falling 12 short of the mandatory 210 value. Thus, such a case is impossible to exist.
The above case is demonstrated for the maximum value of the SUM (= 140) of the two greatest integers. The maximum value under the desire to create a NO situation. If we drop lower that this value of 140, then the SUM of the remaining three integers (350 – SUM of the two greatest) is only going to get bigger and tougher to chase by finding out values of integers such that they are the least in value and add up to the mandated (350 – SUM of the two greatest) SUM. We thus cannot under the above circumstances create a NO scenario – a CONFIRMED YES answer.

ALTERNATIVELY

A much easier solution and work around to the above exists. We'll view statement (2) via the combined *mean* interpretation result. Let X_1, X_2, X_3, X_4 & X_5 be the 5 integers in the list, such that $X_1 < X_2 < X_3 < X_4 < X_5$ again. We're given that the net (COMBINED) *mean* of the 5 integers is 70. Let us now make two separate groups within this list of 5 integers. Let the *first group* (SET 1) be comprised of the integers X_1, X_2 & X_3 and let the *second group* (SET 2) be comprised of the integers X_4 & X_5 (the two greatest of the list).
The above now becomes a perfect case scenario to view things via the *Combined mean* interpretation result:

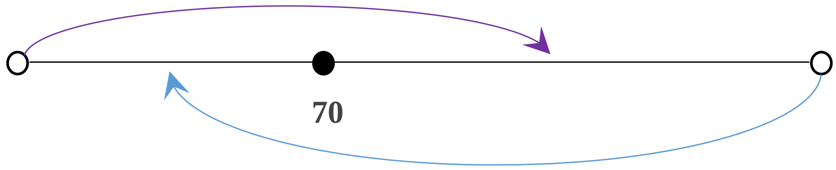
$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:

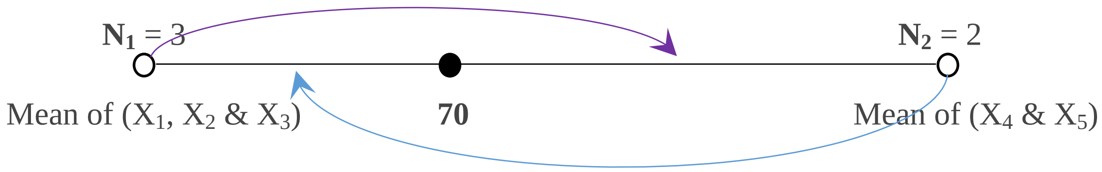


Where,
N_1 = Sample size of SET 1
N_2 = Sample size of SET 2
M_1 = Mean of elements of SET 1
M_2 = Mean of elements of SET 2
M = Combined Mean of the two SETS
D_1 = (**$M – M_1$**) = Deviation distance of **M_1** from the combined Mean of the two SETS
D_2 = (**$M_2 – M$**) = Deviation distance of **M_2** from the combined Mean of the two SETS

Now with this background info we can proceed further with the two groups we created among the 5 integers:



So till this point on the diagram, we know that middle black dot represents the combined *mean* (which is the mean of all the 5 integers together = 70) and that the two groups that we created (SET 1 & SET 2) will lie on either sides of the black dot or that the averages of the two SETS will lie on either side of the combined value that is 70. Now note that since each of X_4 & X_5 is individually greater in value than each of X_1, X_2 & X_3, the average of SET 2 will definitely be greater that the average of the SET 1 and hence will definitely lie to the right of 70 in terms of value as shown below:



Thus the Mean of (X_4 & X_5) > 70 > Mean of (X_1, X_2 & X_3) – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.158

Let each of the coats have a cost price CP and a sale price SP.
Since Gross profit = Total Revenue – Total Costs
The question requires us to seek a *unique* value of the expression 20*(SP – CP).

STATEMENT (1) alone: The sale price as per this statement is 2*SP hypothetically speaking. Therefore, mathematically this statement translates into the following:

20*(2*SP – CP) = \$2440, however note that this is a single LINEAR equation in two variables (SP & CP) and can thus generate scores of paired values of the form (SP, CP) that will satisfy this equation, however will yield different and distinct values of the expression 20*(SP – CP). *(SP = 70, CP = 18 & SP = 80, CP = 38 are two of the many possible solutions of the equation given out by this statement, both of which yield different values of the expression 20*(SP – CP))*. Thus a *unique* value not obtained.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: The sale price as per this statement is \$(SP + 2) hypothetically speaking. Therefore, mathematically this statement translates into the following:
20*((SP + 2) – CP) = \$440, or rearranging the terms we can infer that
20*(SP – CP) + 20*2 = \$440, or
20*(SP – CP) = \$400 which is nothing but a *unique* value of the expression asked in the question stem – a *unique* value (= \$400) obtained.
Notice how even with one equation in two variables again, this time we were able to rearrange the terms in the equation so as to directly arrive at the form of the expression on the left hand side with the value on the right hand side. Even the equation in this statement will generate scores of values of the pair (SP, CP) however for all those values their difference will always be unique.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.159

Let the initial (before the salary hike) salaries of Beth & Jim be **B** & **J** respectively and let both their salaries be increased by the same *r*%. Therefore, we may write:
Dollar increase in salary received by Jim = (*r*/100)***J** and
Dollar increase in salary received by Beth = (*r*/100)***B**.
The question stem asks confirmation on whether (*r*/100)***B** > (*r*/100)***J** or, since (*r*/100) is a surely positive quantity, on whether **B** is > **J**?

<u>STATEMENT (1) alone</u>: All this statement gives out is a range of the values that the variable **J** can take on, simply saying **J** > \$25,000. No mention whatsoever of the variable **B** makes it impossible for us to even begin to compare the two variables **B** & **J** as required in the question stem.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement mathematically spells out as follows:
J = (4/5)***B** or **J** = (0.8)***B** definitively guaranteeing (for both **B** & **J** are positive) that **J** < **B** – a direct CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.160

The first line of the question stem tells us that for company X, there was only a credit of employees during last year and no debit. If **B** & **E** represent the number of employees that make up company X in the beginning and the end of last year respectively, then we're simply asked to seek a *unique* value of the ratio (**E**/**B**).

<u>STATEMENT (1) alone</u>: Notice that if **B** & **E** represent the number of employees that make up company X in the beginning and the end of last year respectively, then the number of employees that the company acquired during last year (since no employee left the company X) = (**E** – **B**). The statement can now be seen to be handing out the value of the following ratio: **B** : (**E** – **B**) = 12 : 1
In other words, **B**/(**E** – **B**) = 12 or (taking reciprocals on both sides) (**E** – **B**)/**B** = (1/12) → (**E**/**B**) – 1 = (1/12) or (**E**/**B**) = 1 + (1/12) = (13/12) – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

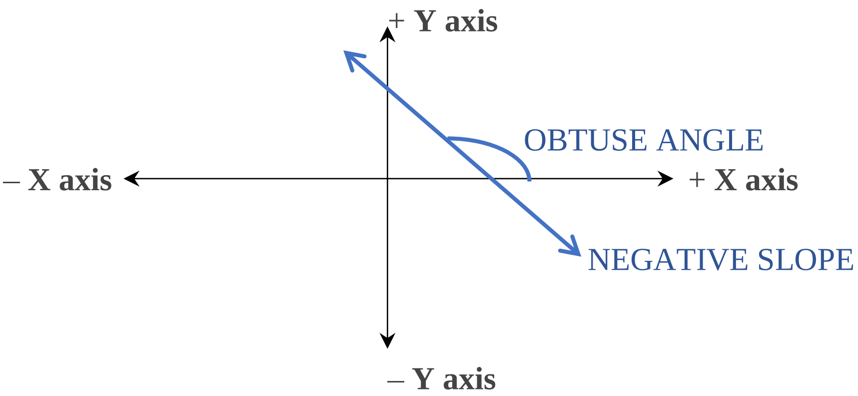
<u>STATEMENT (2) alone</u>: This statement all it does on its own is give out the value of the variable **B** = 144. Having no mention of the variable **E** leaves us stranded in the middle of nowhere in our pursuit for a *unique* value of the ratio (**E**/**B**).
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.161

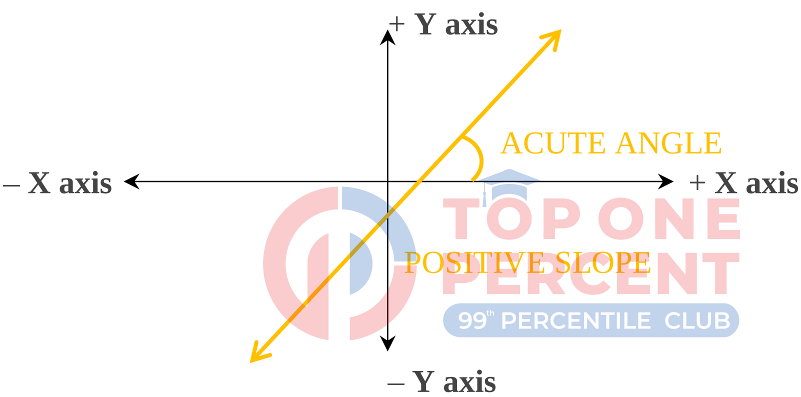
I understand the sudden urge to plunge in and write down the equation of the lines in the form Y = M*X + C and try and attempt this question algebraically, but how about if we go about this question in a completely different manner and that is DIAGRAMMATICALLY! Here's how! Let the slope of the lines M & K be m_1 & m_2 respectively. Then really all we're asked is whether m_1*m_2 = –ve? OR, In other we're asked whether of m_1 & m_2 exist as a positive negative pair *(that is one is positive and the other is negative)*. In our diagrammatic approach we will go by a YES/NO targeted framework where we will try and generate each of the two cases for we have an aim to prove every piece of info that comes our way insufficient. Let's just recapitulate what a positive and a negative slope looks like on an XY plane or a coordinate plane *(i.e. its diagrammatic representation)*.

Now a negative sloped line is one that will always subtend an obtuse angle with the +ve (→ direction) **X** axis.

INTENTIONALLY BLANK



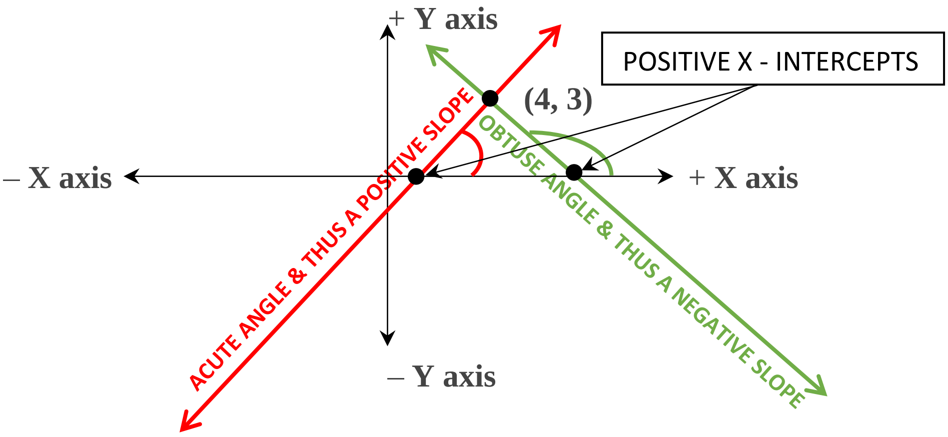
A positive sloped line is one that will always subtend an acute angle with the +ve (→ direction) **X** axis.



How about we only keep the above info (the two diagrams) in mind and try and attempt this question purely with the help of diagrams and of course our imagination! By saying so, what I mean is our entire focus will be to somehow diagrammatically show that a YES/NO scenario exists. We will still be following a YES/NO targeted approach by making cases, however, the case making will purely be taken over by our imagination as shown.

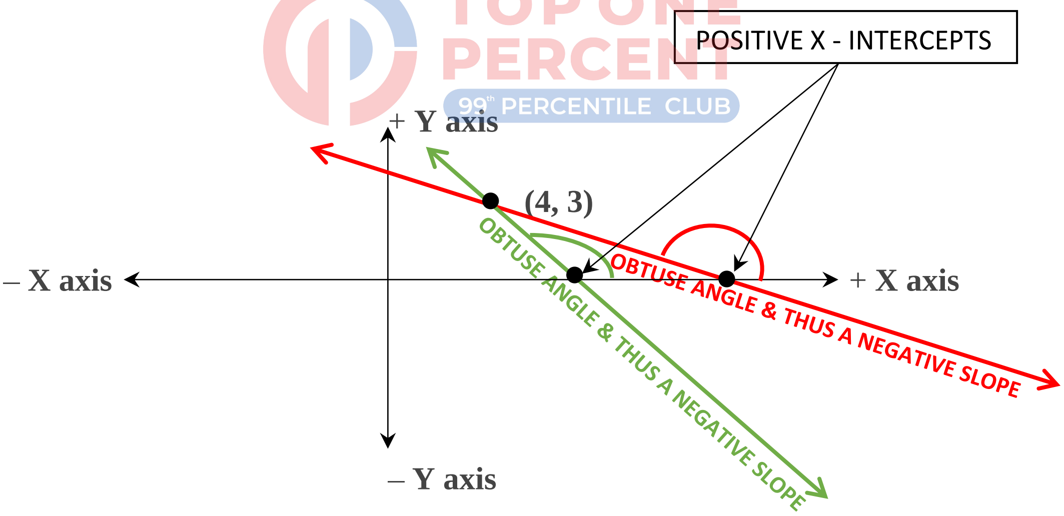
STATEMENT (1) alone: We'll try and understand the conditions this statement restricts us to. This statement stipulates that the product of the X – Intercepts *(which is nothing but the actual point of intersection of the line with the X – axis)* of the two lines is positive. This gives me two possible interpretations: Either both the X – Intercepts that the two lines mark on the X – axis are positive – i.e. they intersect the positive side of the X axis or both the X – Intercepts that the two lines mark on the X – axis are negative – i.e. they intersect the negative side of the X axis. Having said that there is just one little piece of information that the two lines conform to as well and that is the fact that both the lines contain or run through the same point (4, 3). Let's try and make our cases now!
Let, for our convenience, M be the red line and K be the green line.

CASE I:



With the red line exhibiting a positive slope and the green line a negative slope while passing through the same point (4, 3) the product in the above scenario gives me a NEGATIVE product of the two slopes giving me a **YES** answer to the question up top.

CASE II:

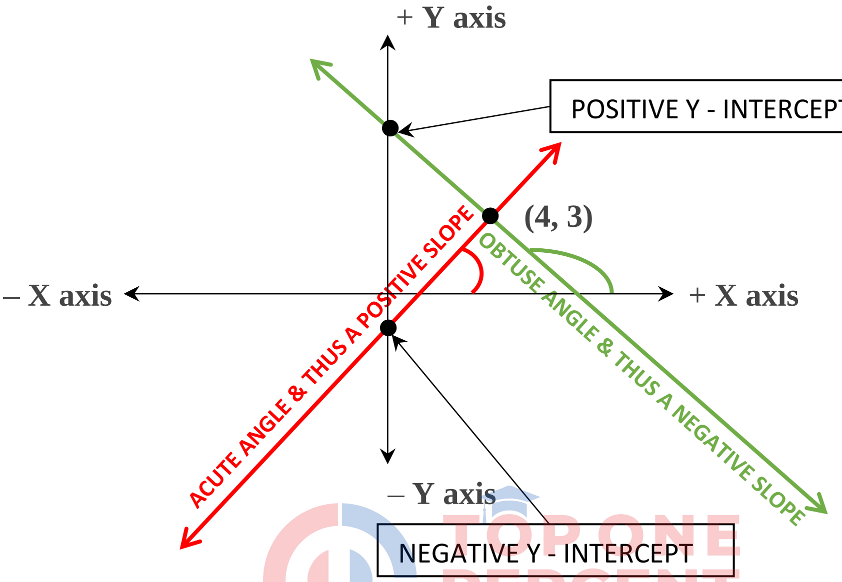


With both the red and the green lines exhibiting a negative slope while passing through the same point (4, 3) the product in the above scenario gives me a POSITIVE product of the two slopes giving me a **NO** answer to the question up top.
We thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We'll again try and understand the conditions this statement restricts us to. This statement stipulates that the product of the Y – Intercepts *(which is*

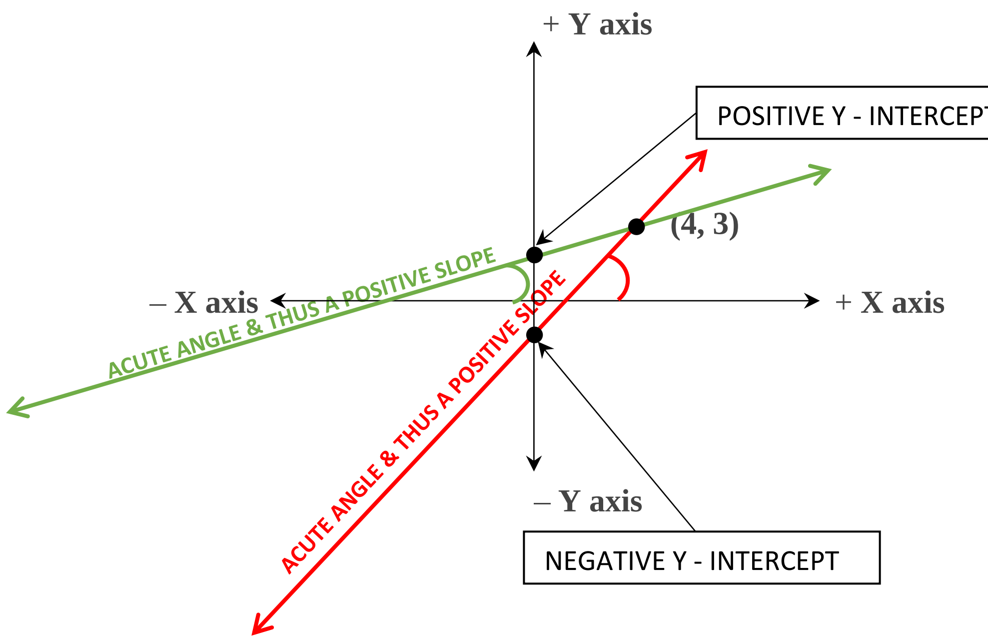
nothing but the actual point of intersection of the line with the Y – axis) of the two lines is negative. This gives me only one possible interpretations which is that the Y – Intercepts that the two lines mark on the Y – axis exist in a positive negative pair – i.e. one intersects the positive side of the Y axis and the other intersects the negative side of the Y – axis. Having said that there is just one little piece of information that the two lines conform to as well and that is the fact that both the lines contain or run through the same point (4, 3). Let's try and make our cases now!
Let, for our convenience, M be the red line and K be the green line.

<u>CASE I:</u>



With the red line exhibiting a positive slope and the green line a negative slope while passing through the same point (4, 3) the product in the above scenario gives me a NEGATIVE product of the two slopes giving me a **YES** answer to the question up top.

<u>CASE II:</u>



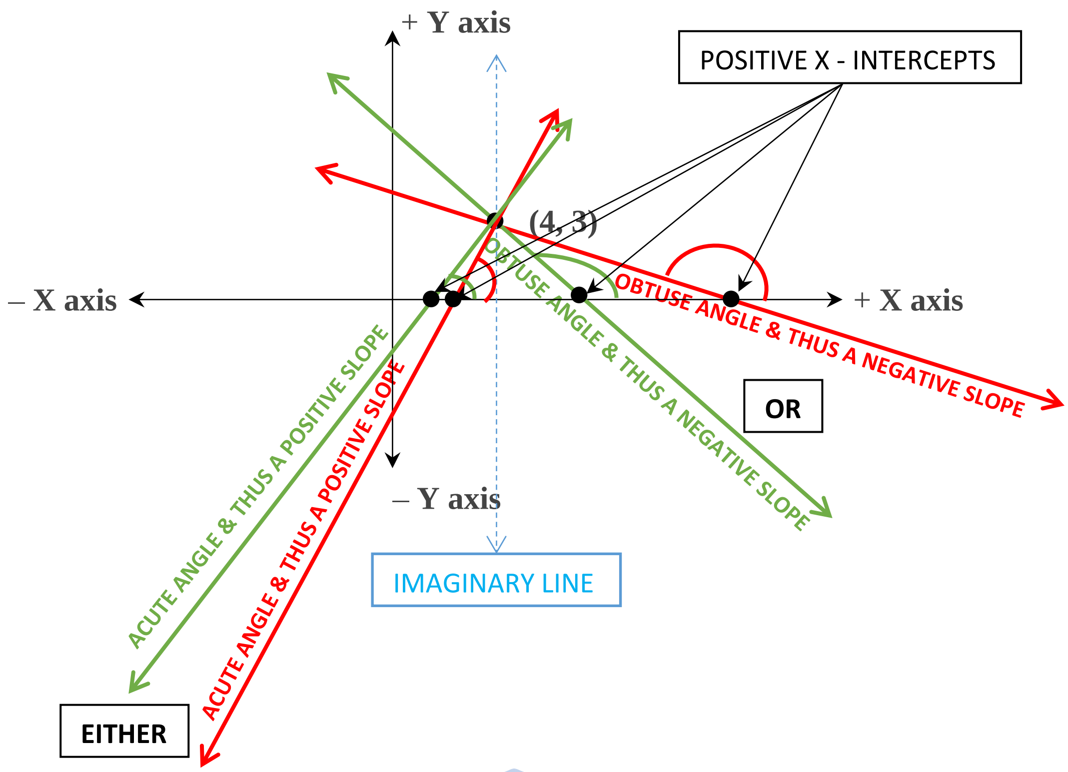
With both the red and the green lines exhibiting a positive slope while passing through the same point (4, 3) the product in the above scenario gives me a POSITIVE product of the two slopes giving me a **NO** answer to the question up top.
We thus arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, we have the following conditions to which the two lines conform to:
X – Intercepts: Either both the X – Intercepts that the two lines mark on the X – axis are positive – i.e. they intersect the positive side of the X axis or both the X – Intercepts that the two lines mark on the X – axis are negative – i.e. they intersect the negative side of the X axis.
Y – Intercepts: Y – Intercepts that the two lines mark on the Y – axis exist in a positive negative pair – i.e. one intersects the positive side of the Y axis and the other intersects the negative side of the Y – axis.
The additional piece of info that the two lines conform to is that they both pass through the same point (4, 3)

Notice that since the point (4, 3) lies in the Ist Quadrant, we cannot have both the X – intercepts negative because that will mandate that our Y – Intercepts be positive as well *(you may draw this out and check for yourselves)*. Therefore the only possibility that exists for the X – Intercepts is for both of them to be positive (or intersect the X – axis on the positive X – axis). Now with the X – intercepts fixed for two lines, that pass through the same point (4, 3), to have opposite signs on their Y – Intercept, there will exist only one such possibility as shown further down in the discussion:
(Notice that if we assume an imaginary VERTICAL line passing through the point (4, 3), then for the slopes of the two lines to bear the same sign and thus yield a positive product (a NO case scenario), both the lines will have to lie to one side of the vertical imaginary line as shown below)

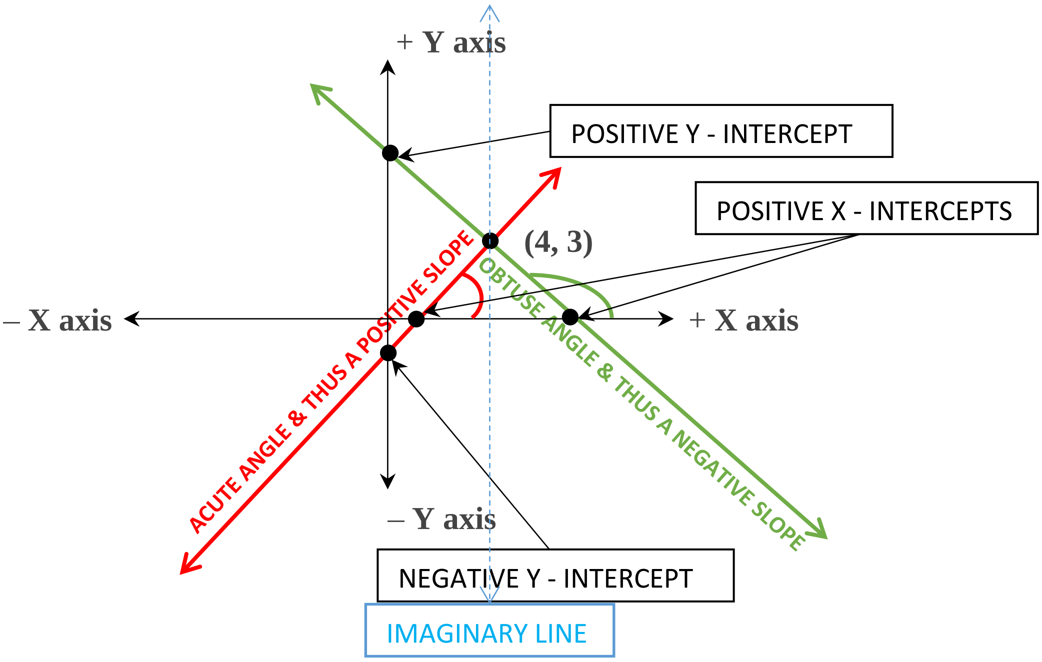
INTENTIONALLY BLANK

REQUIREMENTS FOR A POSSIBLE (NO CASE) SCENARIO GENERATION



The above diagram shows the two possibilities that I may have in my quest to generate a NO answer to the question up top (Kindly remember that for a NO answer I need the slopes of both the lines to exhibit the same sign). Since both the above cases (Keeping the X – Intercept positive) show me that a (positive/negative) pair of the Y – intercepts cannot exist under the conditions considered (conditions: lines have to pass through (4,3) and have to have positive X – intercepts), I can rule out the above two cases (the EITHER and the OR) from conforming to the conditions laid out by both statements together.
I am therefore left with only ONE possibility which is that the two lines lie on the opposite sides of the imaginary line as shown:

INTENTIONALLY BLANK



Since the above is the only possibility that can exist OR the only way that the lines may exist given the conditions laid out by considering the two statements together, we can thus CONFIRM that the slopes of the two lines that are drawn out keeping in mind the above restrictions will always and always yield a negative value of the product of their slopes.
A CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.162

We're given a *POSITIVE integer* N and asked the value of the **remainder** when the expression (N^2 – 1) OR (N – 1)*(N + 1) is divided by 8.

Let's just break open 8 in terms of the primes that multiply to form the number 8. We may write 8 as 8 = 2 x 2 x 2 or = 2^3

Before we proceed any further it proves beneficial to note that (N – 1) & (N + 1) form the immediately preceding and immediately succeeding integers in relation to the integer N. Or, in other words (N – 1), N & (N + 1) form three consecutive integers. ← *This piece of information how much ever trivial it may seem, is sometimes missed out on. This piece forms a crucial part of the solution framework for this question.*
I'll be following a more theoretical approach with the aim of explaining the crux of attacking divisibility question, but a plug in simple values approach to generate a YES/NO situation should also work just fine here.

<u>STATEMENT (1) alone</u>: This statement simply says that N is odd. We'll represent N as N = (2*k + 1), where k is a non–negative integer {0, 1, 2,…so on} → *this is the usual representation of an odd number*. Now (N – 1) is then = 2*k & (N + 1) is then = 2*k + 2 = 2*(k + 1). The expression (N – 1)*(N + 1) may now be written as
(N – 1)*(N + 1) = 2*k*2*(k + 1) = 2^2*{k*(k + 1)}.

We'll keep this aside for a while and take the expression *k**(*k* + *1*) up for a little further analysis. Note that this expression is nothing but the product of **two** *non-negative integers*. (as *k in the expression 2*(k + 1) has values = {0, 1, 2,…so on}*) Since the product of any two consecutive integers is always even, *(one of them will be even and the other odd)* the expression *k**(*k* + *1*) will always be divisible by 2.

Now let's go back to the original expression 2^2*{*k**(*k* + *1*)} and count the number of 2s in this product. We've got a 2^2 outside and then we've got the even expression *k**(*k* + *1*) that is at least divisible by 2. Or, the expression 2^2*{*k**(*k* + *1*)} is at least divisible by a product of three 2s or by 2^3 which is 8.

Summarizing, the expression (N – 1)*(N + 1) given N is odd is definitely divisible by 8 – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the positive integer N is not divisible by 8. However, under such a condition N may either be ODD (= 23 *say*) or may even be EVEN (= 26 *say*). If N is ODD (= 23 *say*) then then the product (N – 1)*(N + 1) is nothing but the product of 22 & 24 or N = 22*24 and is thus divisible by 8 giving us a **YES** answer about whether the expression (N – 1)*(N + 1) is divisible by 8 or not, however, if N is EVEN (= 26 *say*) then then the product (N – 1)*(N + 1) is nothing but the product of ODD numbers 25 & 27 or N = 25*27 and is thus NOT divisible by 8 giving us a **NO** answer about whether the expression (N – 1)*(N + 1) is divisible by 8 or not. We thus arrive at a YES/NO scenario.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.163

Let **M** be the total number of Men who voted in the election and **W** be the total number of Women who voted in the election. We're supposed to find a *unique* value of the SUM (**M** + **W**). We're also given that 240 out of the **M** men and 280 out of the **W** women voted for the winning candidate.

STATEMENT (1) alone: This statement mathematically spells out as **W** = (7/8)***M**. However, this is a single linear equation in two variables **W** & **M**, that can yield scores of values of the variables **W** & **M**, values that will satisfy the equation given out in this statement. However, each of those values will add up to a different SUM (**M** + **W**) – the quantity whose *unique* value we're required to seek as per the question stem. Thus, no *unique* value of the SUM obtained.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically spells out pretty directly as follows:
(30/100)***M** = number of Men who voted for the winning candidate *(which according to the question stem)* = 240 &
(40/100)***W** = number of Women who voted for the winning candidate *(which according to the question stem)* = 280
OR

(30/100)***M** = 240 & (40/100)***W** = 280, It is quite easy and sufficiently clear to see that the two statements above give me a *unique* value of the each of the variables **M** & **W** which can then be added up to give me a *unique* value of the SUM (**M** + **W**).
Just for reference sake (**M** + **W**) comes out to be = 1500. *(no need to calculate though)*
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.164

We're given that M*V < P*V < 0. We're asked if the value of the numeral V is > 0?

STATEMENT (1) alone: This statement says that the numerals M & P conform to the following inequality condition: M < P, or (M – P) < 0. Note how the even the question stem stipulates an inequality relation: M*V < P*V, or M*V – P*V < 0, or (M – P)*V < 0. A NEGATIVE product of two numbers {(M – P) & V} implies that the one of the two numbers is POSITIVE and the other NEGATIVE. Since we're given that (M – P) < 0 as per this statement, V therefore must definitely be POSITVE to have the product (M – P)*V to be < 0. A CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the number M is NEGATIVE. The question stem says that M*V < P*V < 0 or M*V < 0, in other words the product of M & V is also NEGATIVE. This implies that the number V must therefore definitely be POSITIVE – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.165

We're given that X & Y are number points on the number line and are asked what they SUM up to? In other words we're asked to seek a *unique* value of the SUM (X + Y).

STATEMENT (1) alone: We're given that the number 6 is halfway between X & Y. Now the mid-point of any two numbers on the number line can always be found by taking the simple average of the two numbers. By this I mean that the mid-point of the numbers X & Y is given by the expression: (X + Y)/2. Since 6 is the halfway mid-point of X & Y as per this statement, we can pretty much write (X + Y)/2 = 6 or (X + Y) = 12 – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement simply gives out a relation between the variables X & Y → Y = 2*X. However, according to this single LINEAR equation in two variables, X & Y both can take on scores of values that will add up to give different sums each and every time. *(try X = 1 and then X = 2 and the picture becomes even clearer)*
STATEMENT (2) alone – INSUFFICIENT
ANSWER – (A).

Q.166

We're given an integer M such that M has only two prime factors (P & T). We're asked if M is a multiple of (P^2*T), in other words we're asked if (P^2*T) completely divides M?

Now given that M has only two prime factors, M can be written down in the product form of the two primes as follows: $M = P^K*T^Q$, where both K & Q are integer powers ≥ 1.

➔ Before we proceed any further, I'll just repast a **Note** on how to find the **number** of factors of any positive integer K just to brush up our concepts!

1. The integer K is first of all broken down to the product of distinct prime numbers raised to their respective powers. So Let $K = (m^A)*(n^B)*(p^C)$, where m, n & p are prime numbers that raised to their respective powers – A, B & C – are multiplied together to yield K.
2. Then the total number of factors (inclusive of 1 & K) of K will be (A + 1)*(B + 1)*(C + 1), where A, B & C are positive integers. *(hence, (A + 1), (B + 1) & (C + 1) will at least be equal to 2)*

Coming back to the question, the total number of factors of M come out to be = (K + 1)*(Q + 1), such that each of K & Q is ≥ 1.

<u>STATEMENT (1) alone</u>: This statement says that the number of factors of M is more than 9. Now as per our analysis in the question stem above, the total number of factors of M come out to be = (K + 1)*(Q + 1), such that each of K & Q is ≥ 1. Thus, all the statement really says is that (K + 1)*(Q + 1) > 9, or **(K + 1)*(Q + 1) = 10, 11, 12,…so on**. Consider any composite number value 10 *say*, so that (K +1)*(Q + 1) = 10 = 5*2 → this implies either (K + 1) equals 5 and (Q + 1) equals 2 or vice versa OR it implies that either K = 4 & Q = 1 (CASE I) or K = 1 & Q = 4 (CASE II). We'll check what both our cases have to say.
<u>CASE I:</u> This case implies that M is of the form $M = P^4*T$ which being completely divisible by P^2*T *(something that the question asks for confirmation on)* yields us a **YES** answer.
<u>CASE II:</u> This case implies that M is of the form $M = P*T^4$ which is NOT divisible by P^2*T *(something that the question asks for confirmation on)* because the maximum power to which P is raised in the expression of M is just 1 and therefore yields us a **NO** answer. We therefore arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: All this statement tells us is that M is a multiple of P^3 or that we may write M as $M = Q*P^3$, where Q is an integer. The question stem also tells us that M is of the form $M = P^K*T^Q$, where both K & Q are integer powers ≥ 1. Since Q is at least equal to 1, and as per this statement alone K is at least equal to 3 therefore, the modified form of M may be written as $M = Y*P^3*T$, where Y is an integer. Since M consists of at least a P^3*T, it is definitely divisible by P^2*T or is definitely a multiple of P^2*T *(something that the question asks for confirmation on)* – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

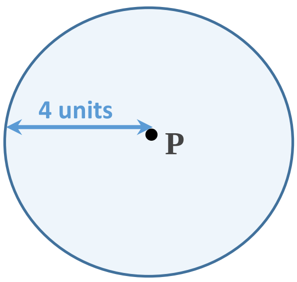
Q.167

We're given a circular area spanning a radius of 4 units with centre at a point P. We're given two other point namely X & Y lying in the same plane as that of the circle. We're asked confirmation on whether the point Y lies inside the circular region?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question. Must be sure to check the possibility of each of the cases (YES/NO).

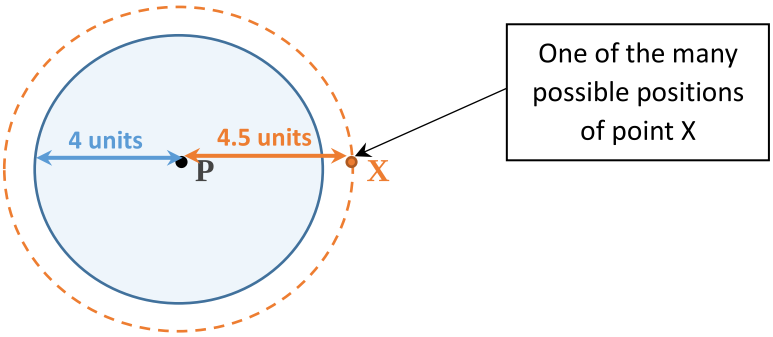
STATEMENT (1) alone: Notice how this statement alone only tells me about the distance of point X from the point P, saying that **the distance between point P and point X is 4.5** (> 4 units). However, the statement says absolutely nothing about the where the point Y could possibly lie on the same plane. No mention of point Y alone is enough to substantiate the insufficiency.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone says that **the distance between point X and point Y is 9**. In other words all this statement really tells me is that the line segment formed by joining the two points X & Y has a length of 9 units. However no mention of the position whatsoever relative to the circle (or its centre) leaves us with infinite options of where the point Y could lie again giving us an easy YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

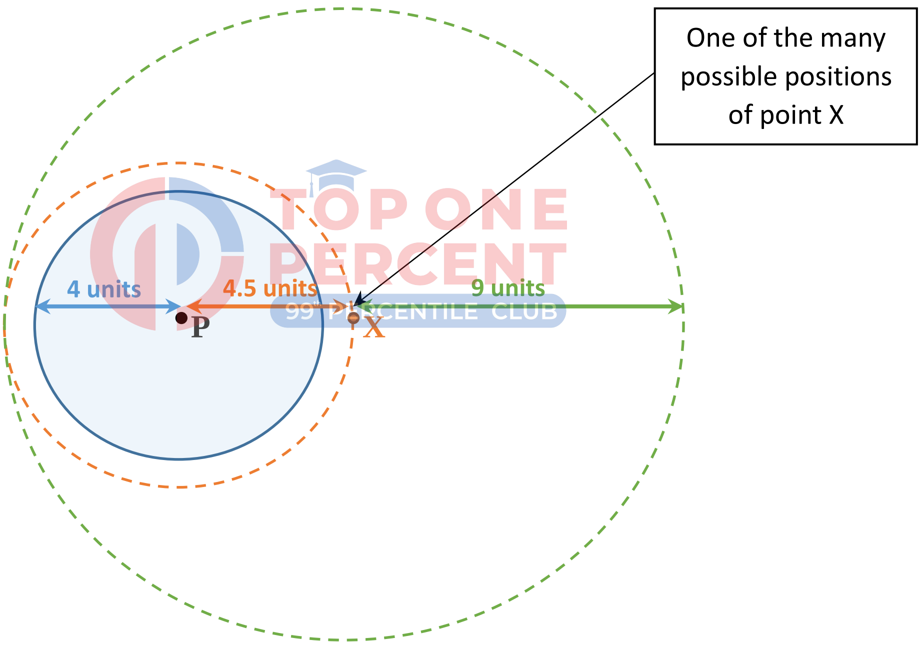
STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we sort of do get an entire picture as to where does the point Y lie in relation to the circle (or its centre). Statement (1) says that **the distance between point P and point X is 4.5** and the Statement (2) says that **the distance between point X and point Y is 9**. Let's pick up on the above scenario diagrammatically,
Let's begin by drawing out a circle at a fixed point P on some plane.



Using the info in statement (1), we can infer that the distance of the point X from the point P *(fixed point)* is fixed at a value of 4.5. Thus, the point X lies on a circle of radius 4.5 with centre P *(after all that is the definition of a circle – It is the collection of all the infinite points that lie at a fixed distance – called the radius – from a fixed point – called the centre).*
Therefore, we may chalk out the POSSIBLE positions of the point X as the orange circular curve shown below:



Using the info in statement (2), we can infer that the distance of the point Y from the point X is fixed at a value of 9. Thus, the point Y lies on a circle of radius 9 with centre as X *(after all that is the definition of a circle – It is the collection of all the infinite points that lie at a fixed distance – called the radius – from a fixed point – called the centre)*. Therefore, we may chalk out the POSSIBLE positions of the point Y relative to one of the many possible positions of point X as the green circular curve shown below:



As shown in the above diagram, for any random position of the point X on the orange circle the green circle *(the possible positions of point Y)* that is drawn will be such that it never passes through the blue shaded region. We can even generalize this a simple observation above by saying that for any position of the point X on the orange circle the resultant green circular curve (that is drawn to represent the possible positions of the point Y) will never ever pass through the blue shaded region thereby substantiating that the point Y under both conditions taken together will never ever lie in the circular region centred at P (or the blue shaded region) – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

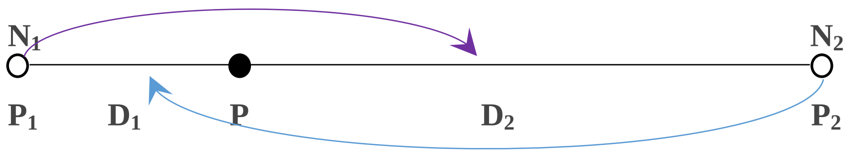
ANSWER – (C).

Q.168

This is a perfect case scenario to view things via the *Combined mean* interpretation result:
We'll use the diagrammatic representation of the *Combined mean* interpretation result which works equally for **percentages** as well:

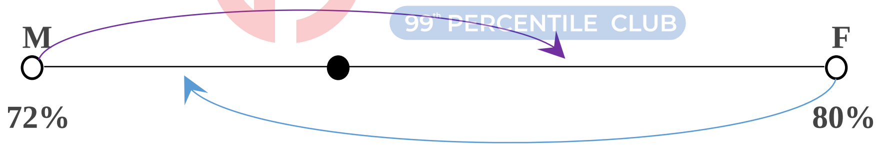
$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,
N_1 = Total number of Male students in the class
N_2 = Total number of Female students in the class
P_1 = Percentage of Male students that applied to college
P_2 = Percentage of Female students that applied to college
P = Net Percentage of students that applied to college
D_1 = (**$P - P_1$**) = Deviation distance of **P_1** from the combined percentage figure for all students
D_2 = (**$P_2 - P$**) = Deviation distance of **P_2** from the combined percentage figure for all students

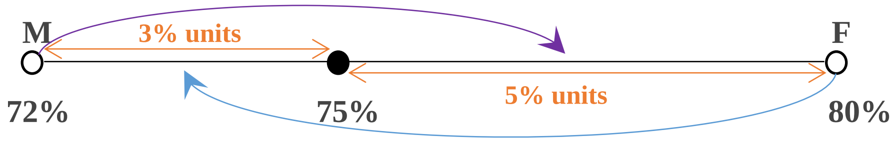
Now with this background info we can present the information given in the question stem as follows:
If **M** & **F** are the number of male and female employees at the company



We're asked the value of the fraction (**M/(M +F)**) or in other words the *unique* value of the ratio (**M/F**).

STATEMENT (1) alone: This statement only gives out the absolute value of the SUM (**M + F**). However, I'm still absolutely unaware of what the individual values of the variables **M** & **F** could be yielding me multiple different values of the ratio (**M/F**). In other words I know what the number of males and the number of females add up to, however I do not know the numbers themselves, or what portion of the total they comprise. Since we know nothing of the combined group – something that links the property known for one group (72%) with the property known for the other (80%) – this statement does little to arrive at anything concrete regarding what is asked.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This Information gives me the NET or the combined percentage of the entire class made up of **M** males and **F** females. The information presented in this statement may be added to the diagram originally made for this question as:



As is clear from the above diagram, the ratio of the sample sizes of the two sets or of the number of male students (**M**) to the number of female students (**F**) may easily be calculated by taking the ratio of the two units mentioned in orange in the diagram or, (**M/F**) = (5/3). *Again going through all these calculations is absolutely a waste of time once the concept has been mastered. The whole key lies in how quickly one realizes the CONFIRMATION of an answer with the least amount of calculations on paper.*

STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.169

Let Greta collect **G** bottles and Randy collect **R** bottles, then we're required to find a *unique* value of the variable **R**!

STATEMENT (1) alone: All this statement says mathematically is that **G** + **R** = 85, which is a SUMMATION equation and simply says that both **G** & **R** sum up to a total of 85, however we don't know how **G** & **R** are divided up individually in that SUM. *(For all we know **G** could be 45 and **R** 40 or **G** could be 40 and **R** 45)*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put says that **G** – **R** = 15, which is a difference equation and can similarly yield scores of paired values of **G** & **R** that yield a difference of 15. *(For all we know **G** could be 45 and **R** 30 or **G** could be 40 and **R** 25)*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have:

G + **R** = 85 – from statement (1) & **G** – **R** = 15 – from statement (2). This is nothing but a set of two linear equations in two variables that can appropriately be solved for a *unique* value of each of the variable **G** & **R**. It is absolutely a waste of time on the exam to try and actually solve for the two *unique* values of each of the variables in order to satisfy oneself about the sufficiency of the information. Only the knowledge that the two statements taken in conjunction will yield a *unique* value of the variable asked in the question stem suffices.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.170

The question stipulates the product of two numbers Z & T to be less than –3 saying that $Z*T < -3$. We're then asked if the number Z is < 4?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

<u>STATEMENT (1) alone</u>: This statement directly gives out a range of values that the variable Z conforms to saying that $Z < 9$. Now the whole scenario may be represented diagrammatically as follows:

The statement says that the value of the variable Z can lie regions I & II which gives us a YES/NO situation/scenario regarding the confirmation that Z lies in the region I definitively. Since we can't gather a definitive answer, the statement proves to be insufficient.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives out the range of values that the variable T can take on, saying that $T < -4$. We've also got the question stem telling us that the product $Z*T < -3$. Rather than working our heads in trying to battle with the algebraic form of the inequalities, it makes sense to quickly substitute values to see if we can discard this statement. We may choose a value of $T = -9$ *say*. Now Z can either be = 8, giving me $Z*T = -72$ which is < –3 giving me a **NO** answer as to whether $Z < 4$? OR Z can either be = 2, giving me $Z*T = -18$ which is again < –3 however, gives me a **YES** answer as to whether $Z < 4$? I therefore arrive at a YES/NO situation.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of information in the two statements together we have Z & T conforming to the following inequalities:
$Z*T < -3$ – question stem, $Z < 9$ – statement (1) & $T < -4$ – statement (2). Again instead of trying to riddle our minds with the algebraic aspect of it, it serves us better with respect to time to just plug in values and check. It helps a great deal to note that we can use the exact same values that we used in the analysis in statement (2) to fit all the criteria that both statements bring together here in this case. I am simply re-pasting it from above but we've essentially already proved in our analysis of statement (2) alone that even the two statements taken together are insufficient.
We may choose a value of $T = -9$ *say*. Now Z can either be = 8, giving me $Z*T = -72$ which is < –3 giving me a **NO** answer as to whether $Z < 4$? OR Z can either be = 2, giving me $Z*T = -18$ which is again < –3 however, gives me a **YES** answer as to whether $Z < 4$? I therefore arrive at a YES/NO situation
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.171

We're given a *POSITIVE* Integer **K** along with the information that the TENS digit of the Integer (**K** + 5) is 4. We're next asked for a confirmation on the TENS digit of the Integer **K**. In other words we're required to seek a *unique* value of the TENS digit of the integer **K** *(It is completely normal/common/usual of our thinking to pick up a 2 – digit number and as a representation of the Integer **K**. By proceeding such, we end up assuming that **K** actually is a two digit number, thereby overlooking the fact that **K** may also be a three or a four or a higher digit number)*
Since we're supposed to find a definitive/*unique* answer to the enquiry in the question stem, a targeted approach at finding multiple values *(at least two)* should work well here!

STATEMENT (1) alone: This statement stipulates a range on the value that the variable **K** can take on saying that **K** > 35 or we can also relate that **K** = {36, 37, 38,…so on}. Now remember that the question stem stipulates the tens digit of the integer **K** + 5 as 4. We'll take up some pretty simple values to try and see if we can arrive at a YES/NO situation. **K** + 5 = 47 *say* fits the criteria by having its tens digit as 4 for which the integer **K** = 42 has a tens digit = **4**. However, another number value, that the integer **K** + 5 can take on is 43 fitting the criteria by having its tens digit = 4, gives us a number value of the integer **K** = 38 thereby giving us answer of **3**. The exercise above makes it clear that we cannot get a definitive fix on the value of the tens digit of the integer **K**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Let us assume a mathematical form of the integer **K** to make things easier on ourselves. Let **K** be of the form **K** = (100***C** + 10**X* + *Y*), where *X* & *Y* are tens and the units digit values respectively ranging from 0 to 9 (inclusive) and **C** is any positive integer *(we include **C** to keep open the possibility that **K** is a three or a four or a higher digit number)*. According to this statement *Y* (or the units digit of **K**) > 5 or *Y* = {6, 7, 8, 9}. Now let's take a look at what **K** + 5 turns out to be: **K** + 5 = (100***C** + 10**X* + *Y*) + 5. Notice that since *Y* = {6, 7, 8, 9}, *Y* + 5 can take on the following four values {11, 12, 13, 14} which can also be written as {(10 + 1), (10 + 2), (10 + 3), (10 + 4)} or in general *Y* + 5 = 10 + *Z*, where *Z* = {1, 2, 3, 4}. Substituting this back in the form (100***C** + 10**X* + *Y*) + 5, we can write **K** + 5 as **K** + 5 = 100***C** + 10**X* + 10 + *Z*, where *Z* = {1, 2, 3, 4} or **K** + 5 = 100***C** + 10*(*X* + 1) + *Z*, where *Z* now forms the units digit and (*X* + 1) forms the tens digit. According to the question stem this value *X* + 1 is fixed and is equal to 4, therefore *X* is fixed and is equal to 3 – a *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.172

We're given two ***non-zero*** numbers A & B. We're asked if 0 lies between A & B *(not necessarily mid-way between A & B but anywhere between A & B)*. In other words we're asked confirmation on whether A & B lie on the opposite sides of the number 0 in the number line!

A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

<u>STATEMENT (1) alone</u>: This statement simply says that A is farther away from Origin (regardless of the direction from the origin – i.e. left or right of Origin) than B on the number line. Since the mathematical representation of distance between two points X & Y on the number line is using the MOD representation $|X – Y|$, we can write the above scenario mathematically as $|A – 0| > |B – 0|$ or $|A| > |B|$.

OR diagrammatically,

For both positive A & B OR both negative A & B, the green and the orange dots lie to one side of the origin on the number line (i.e. both to the right OR both to the left respectively), giving us a **NO** answer. However, for A & B bearing opposite signs, they will lie on opposite sides of the origin giving us a **YES** answer. We thus have with us a YES/NO scenario considering this statement alone.

STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: Since the mathematical representation of distance between two points X & Y on the number line is using the MOD representation $|X – Y|$, we can put the entire information given in this statement as: $|A – 0| + |B – 0| > |(A + B) – 0|$ or, $|A| + |B| > |(A + B)|$. Recounting the definition of the MOD or the absolute *(or the positive)* value of a number Z, which says that the MOD of Z or $|Z|$ is $= Z$ *(if the number Z is non-negative)* and is $= –Z$ *(if the number Z is negative)*, we can figure that for the inequality $|A| + |B| > |(A + B)|$ to hold true A & B must be of opposite signs or must exist as a positive/negative pair. In other words $A*B$ should be < 0, or that A & B must li on the opposite side of ORIGIN on the number line.
Or diagrammatically again,

OR

We can thus definitively say that the ORIGIN or 0 must lie between A & B on the number line – a CONFIRMED YES answer.

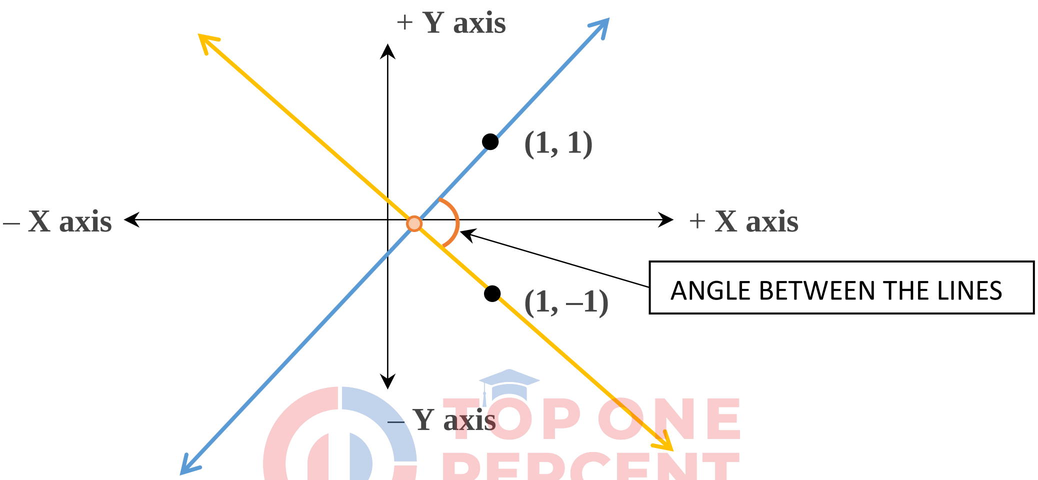
STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.173

We're given two lines (K & M) on an XY (coordinate) plane passing or containing the points (1, 1) & (1, –1) respectively. We're required to comment with confirmation on whether the angle between the two lines *(at their point of intersection of course)* is 90 degrees?

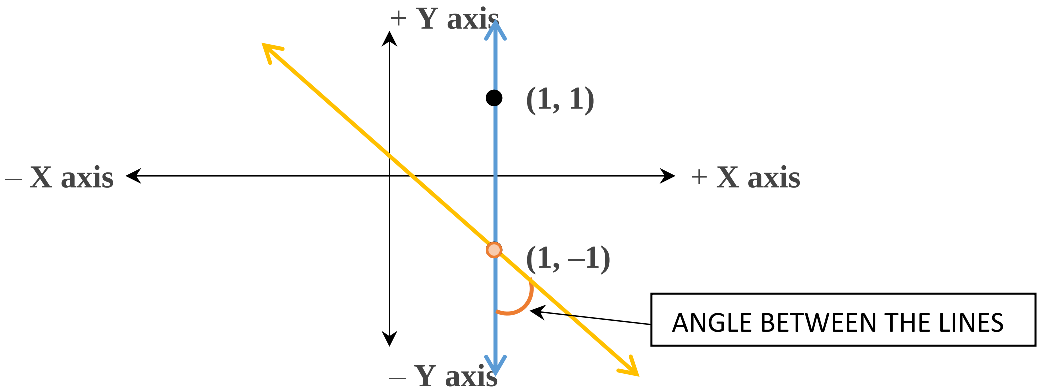
Now again I understand the sudden urge to plunge in and write down the equation of the lines in the form Y = M*X + C and try and attempt this question algebraically, but how about if we go about this question in a completely different manner and that is DIAGRAMMATICALLY! Here's how! Let the lines K (the one in blue) & M (the one in yellow) passing through (1, 1) & (1, –1) respectively be the ones shown below!



In our diagrammatic approach we will go by a YES/NO targeted framework where we will try and generate each of the two cases for we have an aim to prove every piece of info that comes our way insufficient.

STATEMENT (1) alone: This statement gives out the point of intersection (the orange point in the diagram) of the lines K & M as the point (1, –1) a point through which the line M (yellow line) already passes as per the question stem. However, for line K (the blue line) this becomes a second point through which it passes *(the question stem already stipulating that it passes through (1, 1))*. Therefore, in a way this statement sort of fixes *(since there is only one unique line that can pass through two given/fixed points)* the position of line K (the blue line) on the XY plane. Diagrammatically the situation becomes:

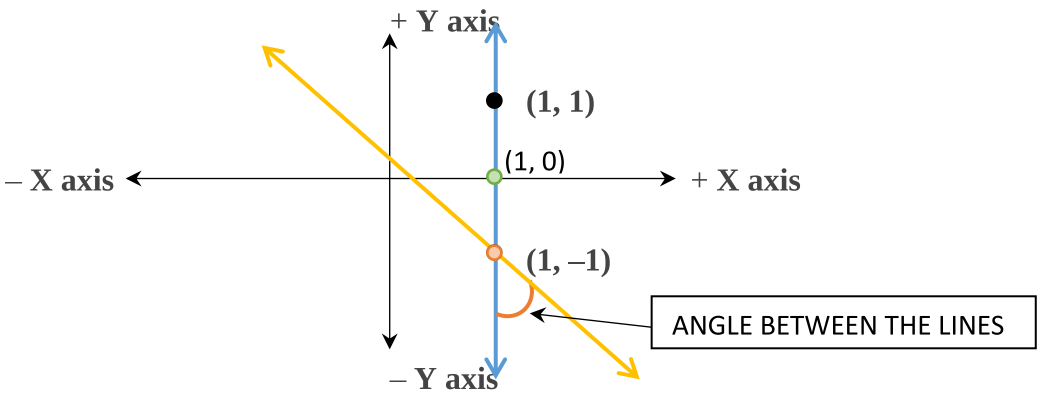
INTENTIONALLY BLANK



As is clear from the diagram above, the blue line that passes through two points such that both the points have the same X – Coordinate (points (1, 1) & (1, –1) → X – Coordinate = 1) will always be a line that will be parallel to the Y – Axis. Anyway, it is sufficient to know that the position of the blue line, because it passes through 2 distinct points (1, 1) & (1, –1), is fixed. However, the yellow line above was already said (in the question stem) to pass through the point of intersection of the two lines, therefore we still have the yellow line passing through only one point, and keeping that point as a point at which the line is hinged, we can rotate the yellow line about the 'hinged point' *(the point of intersection)* and thus have multiple/infinite orientations/positions of the yellow line. Only one such orientation – the one in which the yellow line becomes parallel to the X – axis (horizontal) – will give us a **YES** answer as to whether the lines are perpendicular or not and all the rest of the orientations of the yellow line will give us a **NO** answer. We clearly have a YES/NO situation here!

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out the point of intersection (the green point in the diagram below) of the line K with the X – axis as the point (1, 0). Now for line K (the blue line) this becomes a second point through which it passes *(the question stem already stipulating that it passes through (1, 1))*. Therefore, in a way this statement too sort of fixes *(since there is only one unique line that can pass through two given/fixed points)* the position of line K (the blue line) on the XY plane. Diagrammatically the situation becomes:



As is clear from the diagram above, the blue line that passes through two points such that both the points have the same X – Coordinate (points (1, 1) & (1, 0) → X – Coordinate = 1) will always be a line that will be parallel to the Y – Axis. Anyway, again it is sufficient to know that the position of the blue line, because it passes through 2 distinct points (1, 1) & (1, 0), is fixed. However, the yellow line above is said to pass through just one point (1, –1), which coincidentally here becomes the point of intersection of the two lines. This is because the point (1, –1) is a point with X – coordinate = 1 and therefore must lie on the line (blue line) that passes through all points with one common property which is that each of the points have an X – Coordinate = 1. Again as discussed in Statement (1) analysis, we can keep this point as a point at which the line is hinged, and hence generate multiple possible positions or orientations of the yellow line about the 'hinged point'. Again, only one such orientation – the one in which the yellow line becomes parallel to the X – axis (horizontal) – will give us a **YES** answer as to whether the lines are perpendicular or not and all the rest of the orientations of the yellow line will give us a **NO** answer. We clearly have the same YES/NO situation as above!
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Before we begin, notice how the two statements above have us arrive at the exact same picture (diagram) each time. In other words we can infer what one statement has to say from the other statement, or really all the two statements are, are two different ways of saying the same thing! Therefore, there is nothing new that may be achieved by combining them in any way possible *(the position of the yellow line remains variable)*. They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.174

We're described the structure of Connie's salary as:
Total Salary = Base Salary (*say* **B**) + (20/100)*{Total Sales (*say* **S**) – 1500}
We're given the value of the variable **B** (= \$500) and are asked to seek the *unique* value of the variable **S** for last week.

STATEMENT (1) alone: We're in a way given the value of the total salary she received last week (= \$1200). Note how we can plug this value back into the equation giving out her total salary structure – Total Salary = Base Salary (*say* **B**) + (20/100)*{Total Sales (*say* **S**) – 1500} – and having the value of **B** known *(from up top)*, we get a single linear equation in ONE variable **S** that can appropriately be solved for a *unique* value of the variable **S**.

*This right here is the end of the analysis of this statement info. Any indulgence beyond this is a complete waste of your time on the exam →the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (**S**) is enough to label this statement sufficient and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.*

We can substitute the value of the total salary in the salary structure equation up top to get to the following:
1200 = 500 + (20/100)*(**S** – 1500) → **S** – 1500 = 3500 or **S** = \$5000 – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement too out rightly gives us the value of the expression (20/100)*{Total Sales (*say* **S**) – 1500} = \$700 which again is nothing but a single linear equation in ONE variable which can be solved for a *unique* value of the variable **S**. Again as per the purple text in the previous statement, this right here is all we need to know to label this statement sufficient and move on. Calculations here too bring out the value of the variable **S** to be = \$5000.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.175

It proves beneficial to assign variables to the various fruits in order to get a clearer picture of what's going on! Let the number of apples, oranges, pears, mangoes, and bananas that Ann bought be **A**, **O**, **P**, **M** & **B** respectively. We now relate to the information in the question stem as follows:

A = 2*__O__ & **P** = **A** + **O** or **P** = 2*__O__ + **O** = 3*__O__. We're required to seek a *unique* value of the following expression – **P**/(**A** + **O** + **P** + **M** + **B**). Now given the above relation **A** = 2*__O__ & **P** = 3*__O__, we can further reduce this expression to the form 3*__O__/(2*__O__ + **O** + 3*__O__ + **M** + **B**) or to the form 3*__O__/(6*__O__ + **M** + **B**)

STATEMENT (1) alone: This statement gives out the value of the denominator of the expression we're supposed to seek a *unique* value of or gives out the value of the following SUM – (6*__O__ + **M** + **B**) = 18. However, this statement alone is a single linear equation in THREE variables and can thus give out multiple values of the variable **O** in particular whose value we would need up in the numerator to get a *unique* value of the ratio 3*__O__/(6*__O__ + **M** + **B**). Since **O** can either be = 1 or = 2, we cannot get a fix on a *unique* value of the ratio.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement does is give out the absolute value of the variable **B** (= 5). It is pretty clear that this part alone does quite little to fetch us a *unique* value of the ratio 3*__O__/(6*__O__ + **M** + **B**). All this information reduces this ratio down to is 3*__O__/(6*__O__ + **M** + 5). Since even under this scenario there are multiple values that the ratio can assume depending on what we choose as our **O** & **M**, we cannot again arrive at a *unique* value of the mentioned ratio.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we've got an absolute value of the variable **B** = 5 – from statement (2) and an absolute value of the SUM (6*__O__ + **M** + **B**) = 18 – from statement (1). We can substitute the value of **B** in in the SUM expression to get (6***O** + **M**) = 13 at most. Even this reduced form of the sum is a single LINEAR equation in two variables **O** & **M** and can thus generate multiple values of both the variables which will then end up giving us more than two values of the ratio whose *unique* value we're asked to seek in the main question. *(Assuming **O** = 2 gives a ratio value of 1/3 and **O** = 1 gives us a ratio value of 1/6)* We therefore still are clueless as to what the *unique* value of the ratio might be.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.176

Reading through the question along with the statements given for the question the case seems a perfect case scenario to view things via the *Combined mean* interpretation result:
We'll use the diagrammatic representation of the *Combined mean* interpretation result which works equally for **Fractions or Ratios** as well:

$$\frac{NA}{NB} = \frac{RB - R}{R - RA} = \frac{DB}{DA}$$

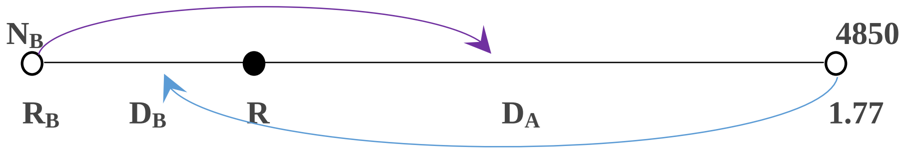
Diagrammatically, this may be represented as follows:

Where,
N_A = Total number of Customers serviced by Division A of company X
N_B = Total number of Customers serviced by Division B of company X
R_A = Service-error rate for division A of company X
R_B = Service-error rate for division B of company X
R = Net Service-error rate for division A & B of company X combined
D_A = ($R – R_A$) = Deviation distance of R_A from the combined service-error rate figure **R**
D_2 = ($R_B – R$) = Deviation distance of R_B from the combined service-error rate figure **R**

Kindly Note that the above scenario and the consequent results are only valid for mutually exclusive SETS N_A & N_B. Simply put the two groups and in this case the two divisions should NOT have any element or customers serviced that are common to both!

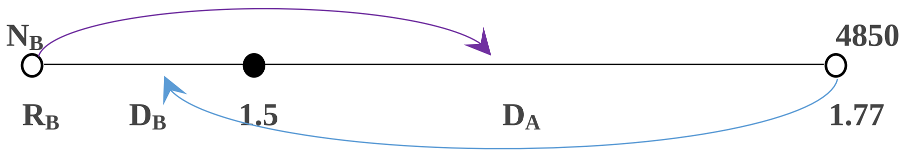
Now according to the question the service error rate of Division A of company X may be calculated as (85/4850)*100 ~ 1.77

Now with this background info we can present the information given in the question stem as follows:



As per the question stem we're required to find out a *unique* value of the variable $\mathbf{R_B}$.

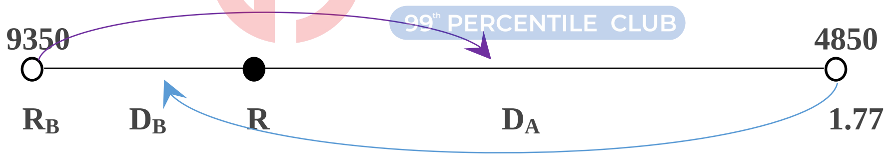
STATEMENT (1) alone: The statement presents us with some additional information that we can fill in the above diagram to get the below drawn diagram: *(we're basically given the value of the variable **R** = 1.5)*



However, note here that we neither know the value of the variable $\mathbf{R_B}$ nor of the variable $\mathbf{N_B}$ to be able to know how far to the left of 1.5 do the measurements for division B of the company X extend. Moreover, since realistically speaking there can be an overlap of customers in the sense that there may be customers that may be taken up by both divisions of the company X, we're still not explicitly told to rule this possibility out. This makes things rather unreliable to move forward with the combined ratio model above, especially since we're also not provided the degree of overlap between the customers that division A handled and those that division B handled.

STATEMENT (1) alone – INSUFFICIENT

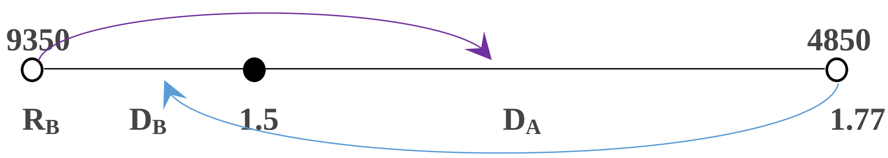
STATEMENT (2) alone: This statement gives out the absolute value of the variable $\mathbf{N_B}$ = 9350 and also provides that one crucial key that validates the usage of the combined ratio model *(the one mentioned in red above)*. We can plot the information from this statement on the diagram as follows:



Therefore, using the ratio of ($\mathbf{N_A}$/ $\mathbf{N_B}$) = (4850/9350) from the diagram above we can get a ratio of ($\mathbf{D_B}$/$\mathbf{D_A}$) = ($\mathbf{N_A}$/ $\mathbf{N_B}$) = (4850/9350) = ((**R** – $\mathbf{R_B}$)/(1.77 – **R**)). However, since we're unaware of both the values of the variables (**R** & $\mathbf{R_B}$, the above equation, which is a single LINEAR equation in two variables (**R** & $\mathbf{R_B}$), can generate multiple values of the variable $\mathbf{R_B}$, the one that is asked in the main question up top.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we've got ourselves the following diagram below:



Along with the most essential key to make sure the above model is applicable → that the two divisions have no customers in common. We can pick up from where we left off at in our statement (2) analysis. We had arrived at the following ratio from the diagram above (4850/9350) = ((**R** – $\mathbf{R_B}$)/(1.77 – **R**)), using the statement (1) we also know the value of **R** as well. The above equation then becomes (4850/9350) = ((1.5 – $\mathbf{R_B}$)/(1.77 – 1.5)) which clearly is a single linear equation in one variable that can be appropriately solved for the *unique* value of the variable $\mathbf{R_B}$.

This right here is the end of the analysis of this statement info. Any indulgence beyond this is a complete waste of your time on the exam → the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required ($\mathbf{R_B}$*) is enough to label this info sufficient and mark C and move on. Any further CALCULATIONS that follow from this stage on are for demonstration purposes only and once again are a complete waste of time on the examination.*

The equation in $\mathbf{R_B}$ can be solved to get $\mathbf{R_B}$ = 1.36 – a *unique* value obtained.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.177

We're given *POSITIVE* **integers** X & Y. We're asked to confirm if X is EVEN?
A YES/NO targeted approach by making cases/plugging in values seems to be a good option of going about this question.

STATEMENT (1) alone: This statement stipulates **the multiplication of two integers X & (Y + 5) to be even**. This implies that at least one of the two X & (Y + 5) must definitely be even. The word at least makes it easy to see the YES/NO scenario exist. We can either have an EVEN X and an EVEN (Y + 5) giving us a **YES** answer to the question up top or we could have an ODD X and an EVEN (Y + 5) giving us a **NO** answer to the question up top. We thus arrive at a YES/NO situation.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement relates information purely in terms of the variable Y. Having neither any mention nor any connection with the variable X, this statement is out rightly insufficient in our course to get a fix on the ODD/EVEN polarity of the variable X. We would still however, like to go a bit forward to interpret what this statement has to say keeping in mind that we might need the information that we draw out of this statement analysis in our analysis of both statements together.

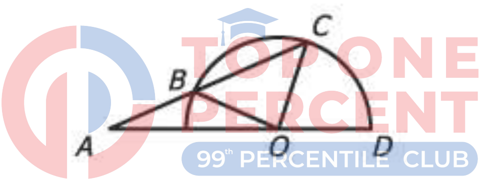
The statement says that ($6*Y^2$ + 41*Y + 25) is an EVEN integer. Notice that in the expression above $6*Y^2$ is an already EVEN quantity because of the presence of 6. Now since only an EVEN ($6*Y^2$) + EVEN integer can yield an EVEN integer ($6*Y^2$ + 41*Y + 25), therefore (41*Y + 25) must also be EVEN. Now 25 is an ODD integer therefore for an EVEN SUM 41*Y must definitely be ODD or **Y must definitely be ODD**. Therefore, as we can clearly see all this statement does is get a fix on the ODD/EVEN polarity of the integer Y.

STATEMENT (2) alone – INSUFFICIENT

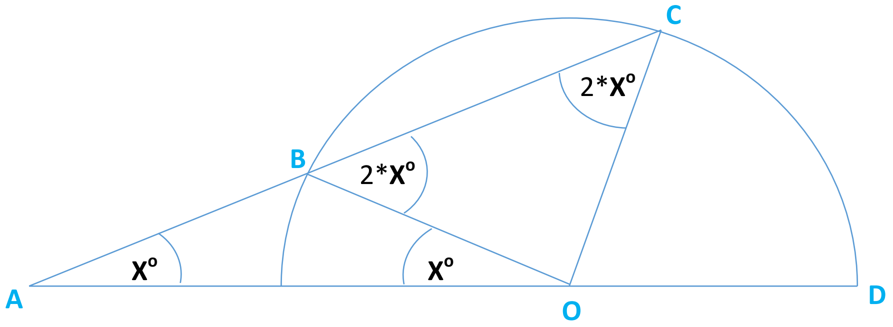
<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of information in the two statements together we've got ourselves the following:
The multiplication of the two integers X & (Y + 5) is even – statement (1)
Y must definitely be ODD – statement (2)
Y being ODD implies that (Y + 5) must definitely be EVEN. Now since we've already got an EVEN integer (Y + 5) in our multiplication of the integers X & (Y + 5) which yields an EVEN product, X need not necessarily be even. We may pick up the same cases formed in the statement (1) analysis to show the insufficiency of the info above in getting a fix on the ODD/EVEN polarity of the integer X. I'm simply re-pasting the case analysis from statement (1):
We can either have an EVEN X and an EVEN (Y + 5) giving us a **YES** answer to the question up top or we could have an ODD X and an EVEN (Y + 5) giving us a **NO** answer to the question up top. We thus arrive at a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.178

We're given the following geometrical figure:

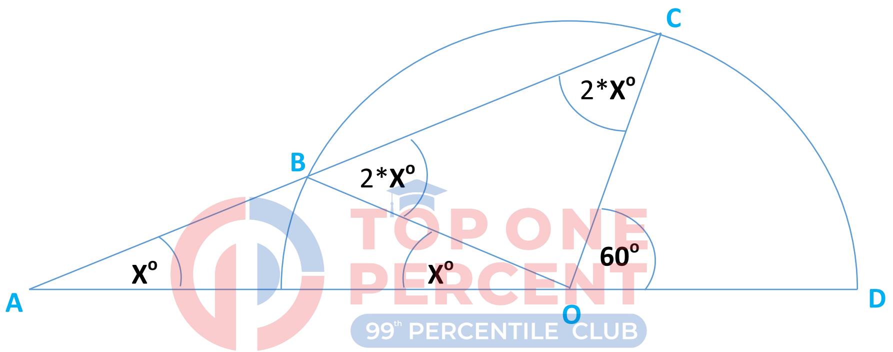


In which point O is the centre of the semicircle and points B, C, and D lie on the semicircle. We're also given that the length of line segment AB is equal to the length of line segment OC. We're asked to seek a *unique* value of the measure of angle(BAO).
Let's make a few inferences from the information given above about the figure before we proceed further with our statements.
Notice how OC and OB both form the radius of the semicircle and are therefore equal. ΔOBC thus becomes an isosceles triangle with OB = OC. We're also given that AB = OC which is = OB or AB = OB → that ΔBAO is isosceles with AB = OB. If we assume angle(BAO) measures X^o, then because AB = OB in ΔBAO, ang(BAO) = ang(BOA) = X^o. *(angles opposite equal sides of an isosceles Δ are equal in measure)*. Also Notice how ang(OBC) forms the exterior angle of the ΔBAO, therefore the measure of ang(OBC) is nothing but SUM of the measures of two opposite interior angles – ang(BAO) & ang(BOA). Thus ang(OBC) = ang(BAO) + ang(BOA) = X^o +X^o = 2*X^o. Now ΔOBC is isosceles with OB = OC, therefore ang(OBC) = ang(OCB) = 2*X^o *(angles opposite equal sides of an isosceles Δ are equal in measure)*. It's better if we jot down all our inferences on the diagram above for the sake of clarity.



The question now reduces to finding a *unique* value of the variable X as shown in the diagram above.
We'll take up the statements one by one!

STATEMENT (1) alone: This statement gives out the absolute measure of the angle COD saying ang(COD) = 60^o. The information may be added to the diagram above to present the following picture:



Note that in the diagram above ang(COD) = 60^o is nothing but the exterior angle for the larger ΔAOC. It therefore must be equal to the SUM of the measures of two opposite interior angles – ang(CAO) & ang(ACO). Therefore, using the variables that mark the angles in the above diagram we may write that 60^o = ang(CAO) + ang(ACO) or that
$60^o = X^o + 2*X^o = 3*X^o$ or $X^o = 20^o$ – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the absolute measure of the angle BCO saying ang(BCO) = 40^o. Considering the diagram up top ang(BCO) in terms of the variable X measures $2*X^o$. Therefore, all this statement really says is $2*X^o = 40^o$ or $X^o = 20^o$ – a *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.179

Let pump X take **X** minutes to fill up the empty tank with water working ALONE at its own constant rate and similarly let pump Y take **Y** take **Y** minutes to fill up the empty tank with water working ALONE at its own constant rate.

Note that if pump X takes **X** minutes to fill up 1 empty tank with water working alone then, it implies that the pump X fills up (1/**X**)th of the tank in 1 minute *(by simple unitary method)*. In other words we may define pump X's rate of filling up the tank working alone as (1/**X**)th per minute (= R_X *say*). On the exact similar lines pump Y's rate of filling up the tank working alone will be (1/**Y**)th per minute (= R_Y *say*). Therefore, working together the pumps fill up {(1/**X**)th + (1/**Y**)th} of the tank per minute. In other words the net rate of filling up is simply the SUM of the two individual rates ($R_X + R_Y$). Working together the pumps fill up {(**X** + **Y**)/**X*Y**}th of the tank per minute or [1/{ **X*Y**/(**X** + **Y**)}]th of the tank per minute.

*Therefore, the two tanks, that working alone fill up the empty tank in **X** & **Y** minutes, working together will fill up the tank in (**X*Y**)/(**X** + **Y**) minutes. This may be noted as a general result.*

Therefore, the question gives us the value of the following expression: **X*Y**/(**X** + **Y**) = 48. Now let's see what the question requires from our side. The rate of water fill by the tank is (1/**X**)th of the water tank **per minute**. Therefore, in 48 minutes *(which is the time in which both tanks working together fill the empty tank entirely)* the pump X's contribution to the filling up of the tank would be 48*(1/**X**)th of the entire tank. In other words pump X's contribution in the 48 minutes *(the time in which both working together fill up the tank entirely)* (48/**X**).

The question thus requires us to seek a *unique* value of the expression (48/**X**) or simply of the variable **X**.

STATEMENT (1) alone: This statement straight out/directly gives out the value of precisely whose *unique* value we're seeking saying that **X** = 80 minutes – a *unique* value obtained.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement gives out the value of the variable **Y** (= 120 minutes). Using this value in conjunction with the equation we developed up top – for the time it takes them to fill up the tanks together – i.e. **X*Y**/(**X** + **Y**) = 48, we can substitute **Y** = 120 to get (120***X**)/(120 + **X**) = 48 which is a single linear equation in ONE variable and can thus be solved for a *unique* value of that variable (i.e. **X**). The actual solving on the exam for the value for any further convincing beyond this point is ill advised, since we're confident we will get a *unique* value of the variable **X**.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.180

The question requires us to seek a *unique* value of the expression ($V^3 - K^3$), where V & K are real numbers on the number line. I realize the sudden urge to plunge in and use the expanded form of the $A^3 - B^3$ to expand our expression up top. However, we will see how effectively and quickly we can sometimes disprove an information of its sufficiency by plugging in simple values.

STATEMENT (1) alone: All this statement says is that both numerals V & K are of the same sign *(i.e. either both positive or both negative)*. Taking V = K = 1 gives me the value of the expression ($V^3 – K^3$) = 0 AND taking V = 2, K = 1 gives me a value of the expression ($V^3 – K^3$) = 7. Two distinct values are enough to comment confidently on the fact that a *unique* value of the expression asked does NOT exist.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement gives out the value of the following expression V – K = 6, which is a difference equation and can generate multiple pair values of the sort (V, K) that will satisfy the equation. One such pair (V, K) = (7, 1) gives me the value of the expression ($V^3 – K^3$) = 342 and another such pair (V, K) = (8, 2) gives me the value of the same expression ($V^3 – K^3$) = 504. The two distinct values thus obtained are enough to substantiate that a *unique* value of the expression ($V^3 – K^3$) does not exist.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we've got ourselves the following:

V*K > 0 – statement (1)

V – K = 6 – statement (2)

Notice how our analysis of statement (2) also has the values of V and K that we chose conforming to the condition laid out in statement (1). We may pick up the same cases formed in the statement (2) analysis to show the insufficiency of the info above in getting a fix on the value of the expression ($V^3 – K^3$). I'm simply re-pasting the case analysis from statement (2): One such pair (V, K) = (7, 1) gives me the value of the expression ($V^3 – K^3$) = 342 and another such pair (V, K) = (8, 2) gives me the value of the same expression ($V^3 – K^3$) = 504. Both the pairs chosen here give me a positive product V*K. The two distinct values thus obtained are enough to substantiate that a *unique* value of the expression ($V^3 – K^3$) does not exist.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.181

Let Rasheed's purchase consist of **C packages** (or 2***C** chocolate bars in total) of chocolate bars and **T packages** (or 2***T** toffee bars in total) of Toffee bars. Rasheed is said to hand out (2/3)*2***C** chocolate bars and (3/5)*2***T** toffee bars. We're required to find us a *unique* value of the variable **C**.

STATEMENT (1) alone: This statement alone simply gives us a difference between the packages of chocolate bars and the packages of toffee bars. Mathematically the statement may be put as **T** – **C** = 1. However, this is nothing but a difference equation or a single linear equation in two variables **T** and **C** and can thus generate multiple values of the variable **C**. *(We'll have to bear in mind that the values of the **T** & **C** that we may choose have to be consecutive integers such that the value of **T** we choose has to be divisible by 5 – for the simple reason that he handed out (3/5)*2***T** toffee bars and that number has to be an integer*

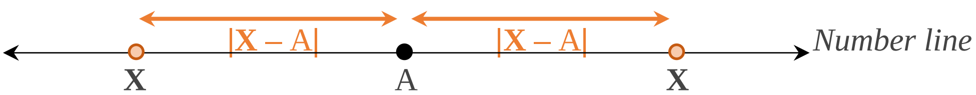
*– and the value of **C** that we choose has to be divisible by 3 – for the simple reason that he handed out (2/3)*2*C chocolate bars and again that particular number has to be an integer)*
We may choose **C** = 9 and **T** = 10 or we may choose **C** = 39 and **T** = 40 to fit the equation **T – C** = 1 while making sure that the number of bars of each candy handed out is an integer. This clearly shows us two distinct possible values of the integer **C**. We thus cannot get a *unique* value of the variable **C**.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement equates the number of bars of each candy handed out. Mathematically this can be put as: (2/3)*2***C** = (3/5)*2***T** or that **C** = (9/10)***T**. Again this is a single linear equation in two variables **T** & **C** which can generate scores of paired values of the variables (**C**, **T**) and thus multiple values of the variable **C**. *(**T** = 10 and **C** = 9 AND **T** = 20 and **C** = 18 are two such values that satisfy the equation above)* We thus cannot get a *unique* value of the variable **C**.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: piecing the info in the two statements together we've got the variables **C** & **T** conforming to the following conditions:
T – C = 1 – from statement (1), and
C = (9/10)***T** – from statement (2).
The above can be seen as a system or a set of two linear equations in two variables that can be appropriately solved for a *unique* value of each of the two variables **C** & **T**. The solving is absolutely unnecessary and one need not waste precious time on the exam trying to solve for a *unique* value of the variables **C** & **T** in order to convince oneself that a *unique* value of the variable **C** indeed exists. For the sake of mentioning **C** comes out to be 9 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.182

We're given two numbers **M** & **R** on the number line and are asked the *unique* value of the number **R**.
Before we begin we'll just quickly run ourselves through the link between MOD functions and what they *(MOD functions of the form |X – a|)* represent on the number line in general. An expression of the sort |**X** – A|, where A is a constant on the number line, (a line representing all the real number values that variable **X** can take on) represents the absolute value or the ***distance between*** the unknown **X** and a fixed point A on the number line as shown below:



By the above diagram, the point I wish to make is that regardless of which side of A the unknown **X** is on the moment we take the MOD of their difference we switch over to talking

in terms of the absolute (positive) value of the ***distance between*** **X** & A. In other words since the distance between two points on the number line can never be negative, the expression |**X** – A| will always assume a positive value.
Having said that we'll now move on to the statements: *(All figures not drawn to scale)*

<u>STATEMENT (1) alone</u>: Using the above the information that describes distance representation using the MOD function we may spell out the information that this statement contains as follows: |**R** – 0| = 3*|**M** – 0|. Or |**R**| = 3*|**M**|. Before we even begin to represent this on the number line, we may note that this is a linear relation (even if it's a MOD relation) in two variables (**M** & **R**) and can thus generate umpteen number of values of the variable pair (**M**, **R**). *(just keep feeding in the different values of* ***M*** *to keep getting different values of* ***R****)* We thus do NOT have a *unique* value of the variable **R**.
STATEMENT (1) alone – INSUFFICIENT

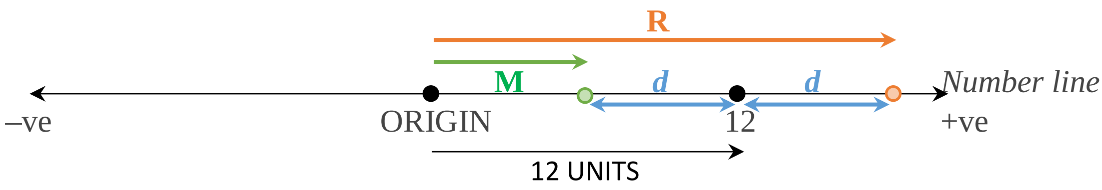
<u>STATEMENT (2) alone</u>: This statement can also be understood as saying that both **M** & **R** are equidistant from the fixed point 12 on the number line and lie on opposite sides (but not fixed as in which lies to the right and which to the left) of the point 12 on the number line. This may be diagrammatically represented as follows:

However, unknown with the value of the Distance d (i.e. how far do points **M** & **R** lie from the point 12 on the number line) we cannot get a fix on the points **M** & **R** on the number line. *The distance could be 1 unit for instance with* ***M*** *= 11 &* ***R*** *= 13 say, or vice versa (****M*** *= 13 &* ***R*** *= 11) OR the distance could ne 2 units with* ***M*** *= 10 &* ***R*** *= 14 say or vice versa (****M*** *= 14 &* ***R*** *= 10) again.*
We thus do NOT again have a *unique* value of the variable **R**.
STATEMENT (2) alone – INSUFFICIENT

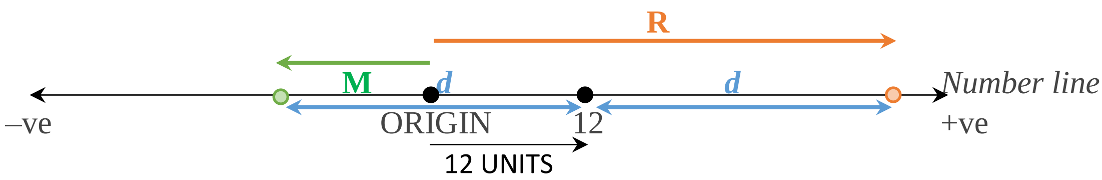
<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of information in the two statements together we've got the following restrictions on the variables **M** & **R**.
|**R**| = 3*|**M**| – Statement (1) &

– Statement (2).
We'll now try and generate at least two cases to try and gauge the sufficiency of the statement. Now, |**R**| = 3*|**M**| may be diagrammatically represented as shown below:

We'll try and club this together to at least try and generate two distinct values of the variable **R** in an attempt to prove that a *unique* value does not exist. Let's begin with a case where both **M** & **R** lie to the right of the ORIGIN. This case may be chalked out as follows:



|**R**| = 3*|**M**| which is a distance relation and can be interpreted as: the length of the orange arrow is three times the length of the green arrow, or mathematically put:
(Length of orange arrow) = 3*(Length of green arrow). As can be seen from the diagram above, (Length of green arrow) comes out to be = (Length of black arrow – Length of blue arrow) = 12 – ***d*** and (Length of orange arrow) comes out to be = (Length of black arrow + Length of blue arrow) = 12 + ***d***. Substituting these values in (Length of orange arrow) = 3*(Length of green arrow), we get 12 + ***d*** = 3*(12 – ***d***) or ***d*** = 6 OR **R** = 12 + 6 = **18**.
However, we may have another case where **M** & **R** lie to the opposite sides of ORIGIN.



As can be seen from the diagram above, here, (Length of green arrow) comes out to be = (Length of blue arrow – Length of black arrow) = ***d*** – 12 and (Length of orange arrow) comes out to be = (Length of black arrow + Length of blue arrow) = 12 + ***d***. Substituting these values in (Length of orange arrow) = 3*(Length of green arrow), we get 12 + ***d*** = 3*(***d*** – 12) or ***d*** = 24 OR **R** = 12 + 24 = **36**.
We thus arrive at the variable **R** taking on two distinct possible values 18 & 36.
We thus, even towards the end, do NOT again have a *unique* value of the variable **R**.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.183

We're given that **M** is *POSITIVE* ODD integer between the integers 2 & 30. We're asked to confirm the number of prime factors of the integer **M**. Note that the **number** of primes that can completely divide off **M** has to be *unique* for us to be able to comment on the sufficiency of the information.

STATEMENT (1) alone: This statement stipulates that **M** is not a multiple of 3. Since **M** is stipulated by the main question up top to be ODD, **M** can also NOT be a multiple of 2. **M** not being a multiple of either 2 or 3 can therefore be written down as a list of the following possible numbers {5, 7, 11, 13, 19, 23, 25, 29}. Notice that each of the values in the list is prime except for 25 which is nothing but = 5^2 or = (a prime number)^2, and therefore also has only one prime factor = 5. We can thus definitively confirm that for each of the values that **M** might take on the answer to the question up top (as to the number of prime factors) will always be 1 – *unique* answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement stipulates that **M** is not a multiple of 5. Again, since **M** is stipulated by the main question up top to be ODD, **M** can also NOT be a multiple of 2. **M** not being a multiple of either 2 or 5 can therefore be written down as a list of the following possible numbers {3, 7, 9, 11, 13, 19, 21, 23, 27, 29}. Notice that each of the values in the list is prime except for 9, 21 & 27. 9 & 27 are nothing but = 3^2 & 3^3 respectively or = (a prime number)^2 & (a prime number)^3 respectively, and therefore also have only one prime factor = 3. However, the number 21 can be broken down as 21 = 3*7 and is thus divisible by 2 primes (3 & 7) or thus has 2 prime factors. We thus CANNOT definitively confirm, for each of the values that **M** might take on, what the answer to the question up top (as to the number of prime factors) will be. – No *unique* answer.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.184

We're given that **K** is an integer greater than 1 and are asked if **K** can be written purely in the form of a multiplication of the integer 2. Which is to say whether **K** can be written in the form where **K** = 2^R, where R is a positive integer. Notice here that for **K** to be written purely in the form **K** = 2^R which is nothing but = 2 x 2 x 2 x…R number of times, **K** must be such that it has only ONE prime factor which is 2, or **K** must be divisible by no prime number save the prime number 2.

STATEMENT (1) alone: This statement in a way says that the **K** is a multiple of 2^6. We may thus write **K** as **K** = *P**2^6, where *P* is an integer. This implies that *P* can take on values such as {1, 2, 3,…so on}. This means that *P* may have a value = 2 whereby **K** comes out to be = 2^7 giving us a **YES** answer to the question up top OR *P* may have a value = 3, whereby **K** comes out to be =3*2^6 giving us a **NO** answer to the question up top. We thus arrive at a YES/NO situation.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement stipulates that **K** is NOT divisible by any ODD *POSITIVE* integer. Since all the prime number except 2 are ODD, this means that **K** is not divisible by any prime number except 2, or has no other prime factor save 2. **K**, when broken down as a multiplication of primes (some that every integer > 1 can be written as), can thus be written only as the multiplication of the prime number two (with itself of course), OR **K** is definitely of the form **K** = 2 x 2 x 2…so on. Thus **K** can definitely be written in the form **K** = 2^R – a COMFIRMED YES answer.

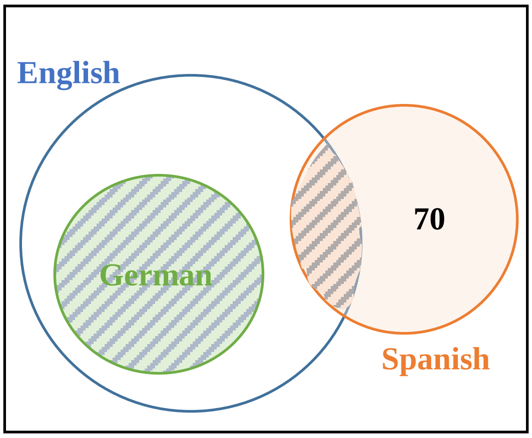
STATEMENT (2) alone – SUFFICIENT

ANSWER – (B).

Q.185

The question introduces three **variable sets** with the possibility/certainty of an overlap. Such language is typical of three variable sets questions and these questions are best tackled by chalking out the information on a Venn diagram *(further reference – solution to Q.12).*

Using the information given only in the question we can begin by creating our own Venn diagram and filling in the information we have till this point.

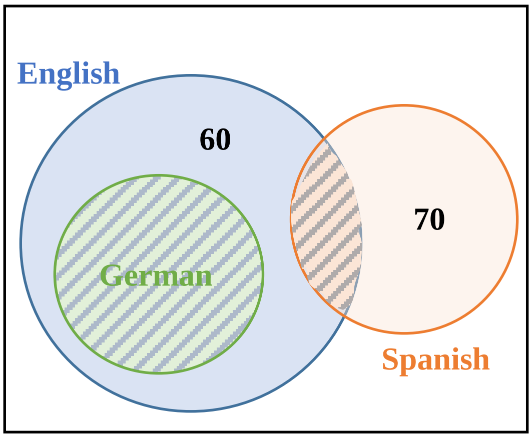


As shown in the above diagram, since every German speaker also speaks English, the green circle is encapsulated in the bigger blue (English) circle. Since No member speaks all three languages, the orange circle does not intersect the green circle inside the blue one. The pure orange coloured region (excluding the shaded/striped region) represents 70 members.

We're required to find the number of members that lie in the **shaded regions** shown above.

The required members are → (German + English) speakers + (Spanish + English) speakers. Note that you can't have Spanish + German speakers only, since every German speaker also speaks English and thus German + Spanish would mean that the person speaks all three which according to the question is no member's capability.

STATEMENT (1) alone: According to this statement the diagram can further be filled out as follows:

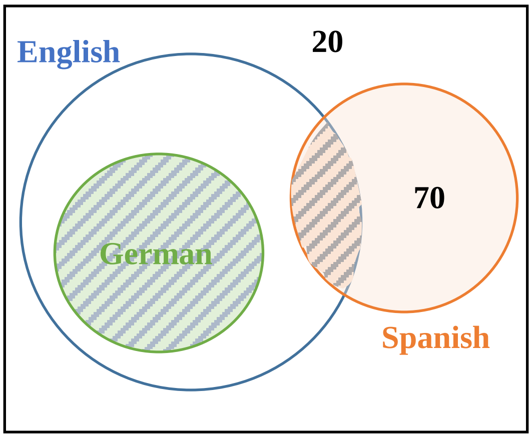


This statement thus only says that the pure blue coloured region (excluding the shaded/striped region) represents 60 members. However we are supposed to find the number that the striped/shaded region represents. Since we do NOT know the total number of English speakers *(the number from which the 60 members when subtracted gives us the answer that* *we're looking for)*, we CANNOT get a fix on the number of people speaking only two Languages (given by the striped/shaded region).

Also even if we know that the total number of members is 200, we do not know how many of the 200 members speak at least one of the three languages *(the number from which the 60 + 70 members when subtracted gives us the answer that we're looking for).*

STATEMENT (1) alone – INSUFFICIENT

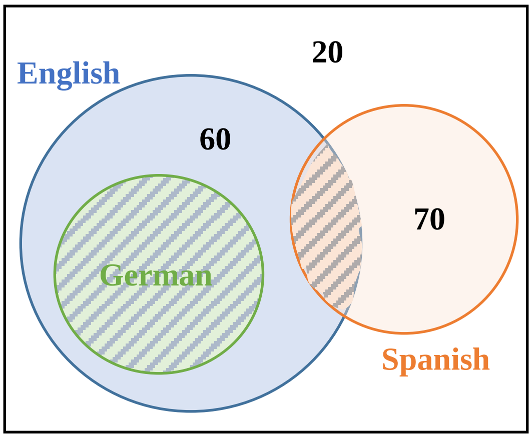
STATEMENT (2) alone: According to this statement 20 of the members do NOT speak any of the three languages. This may be added to the diagram up top as follows:



We can know from the above diagram that the number of members that speak only English is {200 – (20 + 70)} = 110. However, since we do NOT know the number of members that speak English only *(the number which when subtracted from 110 gives us the answer that we're looking for)*, this statement serves to be inadequate for us to be able to get to a *unique* value of the number of members speaking only two languages.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together fill out the diagram as completely as follows:



Note that, from the above diagram it is clear that if we subtract the three figures from the GRAND TOTAL of 200 we are left with the number of members representing the SHADED region in the diagram and that is exactly what we're looking for. Thus, the number of members that speak only two languages (striped/shaded region) = {200 – (20 + 70 + 60)} = 50 – a *unique* value answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.186

We're given integers A, B & C out which we're asked the value of the integer A.

STATEMENT (1) alone: According to this statement (A – 7)*(B – 7)*(C – 7) = 0. This alone is a pretty vague picture. EITHER A = 7 and B & C can take on any values, OR at least one of B & C is zero at which A can take on any values. We therefore end up with hordes of values of the variable A.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement B*C = 18. However, no information about the integer A leaves us absolutely clueless as to what its value could be.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
(A – 7)*(B – 7)*(C – 7) = 0 – as per statement (1) &
B*C = 18 – as per statement (2).
Note how the second statement restricts both B & C from taking on the value 7. C can be written as C = (18/B), since C is an integer, B CANNOT be = 7 ((18/7) is not an integer). Similarly, B can be written as B = (18/C), since B is an integer, C CANNOT be = 7. Thus the only way in which statement (1) holds true is for A to be = 7 – a *unique* value answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.187

Let the Cost for the coffee table be denoted by CP and let the sale price of the coffee table be SP. We're required to seek a *unique* value of the variable SP.

Let's try and remember as a rule that dealing with profit questions we keep the following relation in the back of our minds ready to be applied whenever needed:

Gross Profit = Total Revenues – Total Costs

STATEMENT (1) alone: According to this statement CP = $340. However, this alone has no connection to the SP of the coffee table.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement profit = (15/100)*SP = (3/20)*SP. This implies SP – CP = (3/20)*SP or CP = (17/20)*SP or SP = (20/17)*CP. However, unaware of

the value of the variable CP leaves us clueless as to what the value of the variable SP could be.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together say:
CP = $340 – as per statement (1) &
SP = (20/17)*CP – as per statement (2).
Clearly, we may substitute the 1st statement in the 2nd to get SP = (20/17)*340 = $400 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.188

We're asked to confirm whether $X^4 + Y^4 > Z^4$?

Inequality questions like these are best solved by plugging in values with a targeted approach towards making a YES/NO case scenario and disproving the sufficiency of the statement. The entire onus thus lies on the SELECTION of appropriate values that might lead us to two conflicting answers.

STATEMENT (1) alone: According to this statement $X^2 + Y^2 > Z^2$. Making a **YES** case scenario is pretty easy in that all we require is to choose some large values of both X & Y keeping Z small – for instance X = 100, Y = 101 with Z = 1. The entire trick is to choose values that give us a NO scenario in case one exists. For a NO case we require values that just pass for $X^2 + Y^2 > Z^2$ however fail to satisfy the relation $X^4 + Y^4 > Z^4$. We'll therefore try with the smallest values that just happen to pass the $X^2 + Y^2 > Z^2$ test. Note that (3, 4, 5) is a commonly known Pythagorean triplet that satisfies $X^2 + Y^2 = Z^2$. Now all we need to do is to slightly raise the left hand side, for which we'll go with the values (X = 4, Y = 4 & Z = 5). Substituting these values in $X^4 + Y^4 > Z^4$ gives us 256 + 256 > 625 or 512 > 625 which is a contradiction. The values (X = 4, Y = 4 & Z = 5) thus give us a **NO** case scenario. With the YES/NO scenario at hand, we can confidently mark this statement insufficient.
STATEMENT (1) alone – INSUFFICIENT

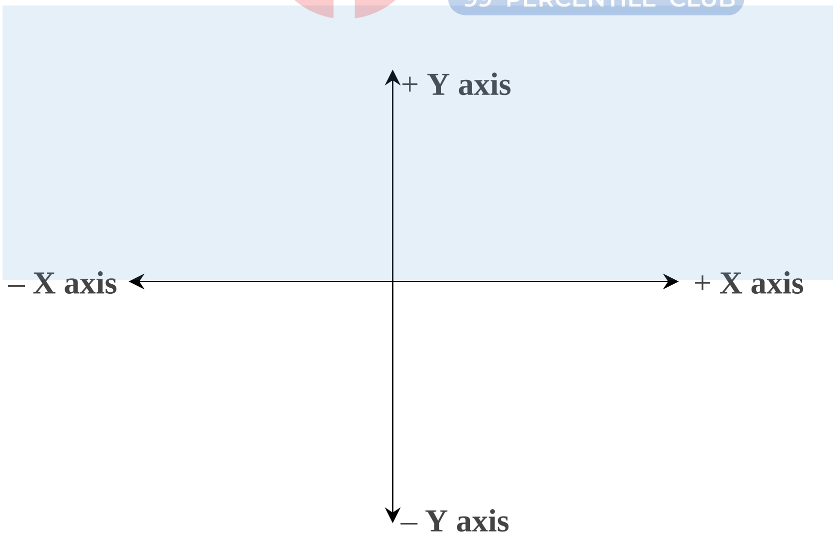
STATEMENT (2) alone: According to this statement X + Y > Z. Making a **YES** case as shown previously is easy in that all we require are fairly large values of X & Y keeping Z small. We can keep the same values that we chose for a **YES** case in statement (1). Again the trick or the challenge here is to choose appropriate values for a NO case. NOTE that it makes sense to try out the set of values that we used for a NO case in the above statement analysis – *the reason I say this is that in case we've got the same set of values making us a NO case here as well, then we have absolutely no work while considering the two statements together for the same values may again be chosen to disprove the sufficiency of the two statements together too.*
The values (X = 4, Y = 4 & Z = 5) conform to the statement inequality X + Y > Z and as shown in statement (1) above give us a contradiction when trying to substitute in $X^4 + Y^4 > Z^4$. We therefore, get a **NO** answer with the same set of values in both the statements.

With the YES/NO scenario at hand, we can confidently mark this statement insufficient.
STATEMENT (2) alone – INSUFFICIENT

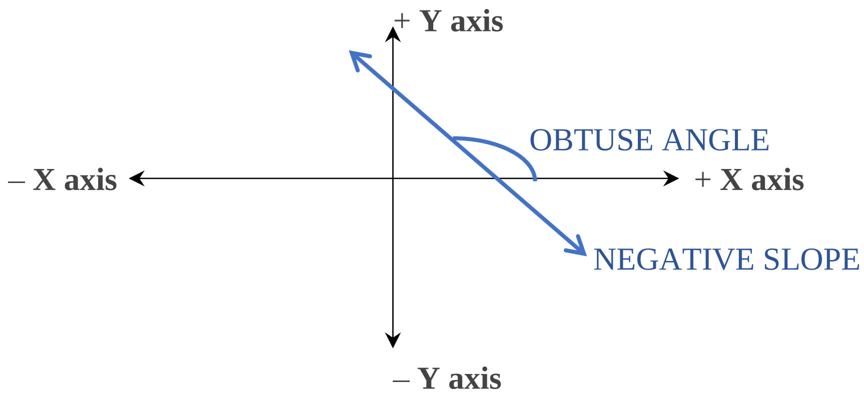
STATEMENT (1) & (2) together: The two statements together say:
$X^2 + Y^2 > Z^2$ – as per statement (1) &
$X + Y > Z$ – as per statement (2).
However, our work here is effortless since we've used the same set of values to disprove the sufficiency of both the statements independently. In other words, the set of values (X = 100, Y = 101 & Z = 1) conform to both the conditions laid out by the two statements above and give us a **YES** answer to the main question up top. However, then set of values (X = 4, Y = 4 & Z = 5) also conform to both the conditions laid out by the two statements above yet give us a **NO** answer to the main question up top. We thus still have with us a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.189

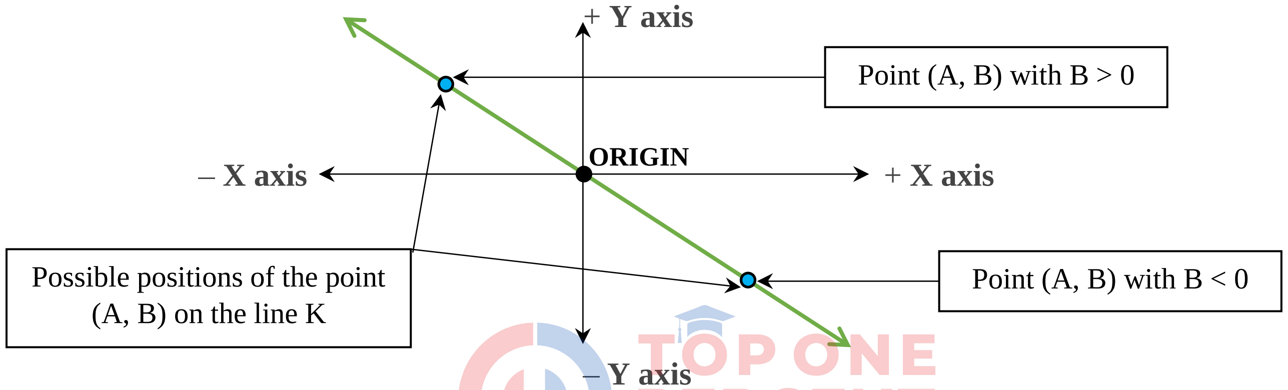
I understand the sudden urge to plunge in and write down the equation of the line in the form Y = M*X + C and try and attempt this question algebraically, but how about if we go about this question in a completely different manner and that is DIAGRAMMATICALLY!
We're given a point (A, B) *(such that neither of A or B is = 0)* on a line passing through origin and we're asked if B is positive. On the XY plane this translates into asking whether the point (A, B) lies in the upper half of the X – axis (i.e. in the slightly shaded area shown)



STATEMENT (1) alone: According to this statement, the line is negatively sloped.
Let's just recapitulate what a negative slope looks like on an XY plane or a coordinate plane *(i.e. its diagrammatic representation).*
A negative sloped line is one that will always subtend an obtuse angle with the +ve (→ direction) **X** axis.



Therefore, bearing the above in mind the line K may be drawn out as:



Clearly, as shown by the two blue dots in the diagram above, point (A, B) may lie on the line such that B is > 0 or such that B is < 0. NO CONFIRMATION.

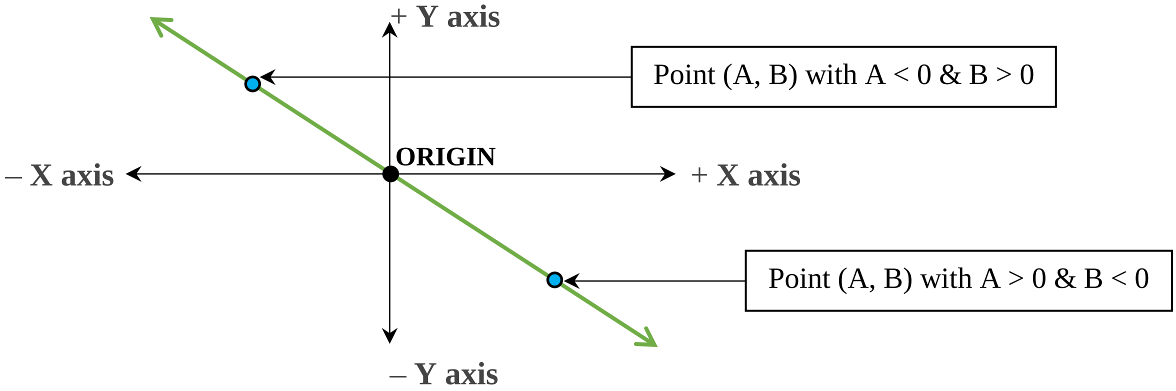
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: According to this statement A < B. However, this statement alone simply implies that the point (A, B) is such that A < B. With no restrictions on the position of the line except for the fact that it passes through origin, we can assume the point (A, B) as (3, 4) with B > 0 or as (–10, –9) with B < 0. The line K can simply be rotated such that it passes through the points taken up to create YES/NO case scenarios.

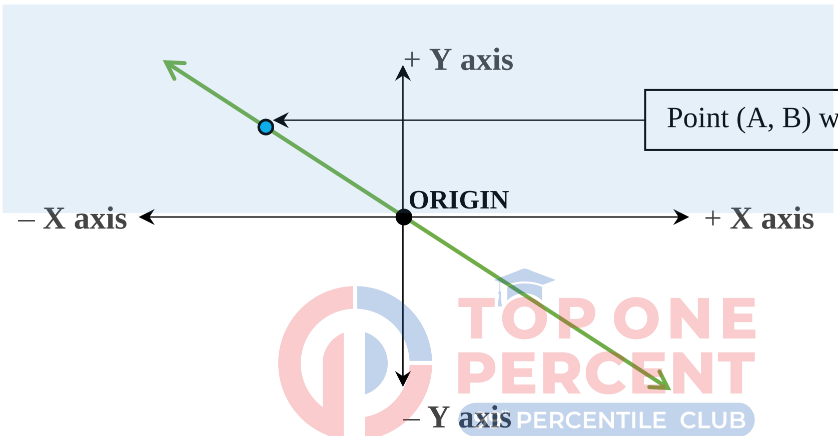
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: The two statements together say:
K is a negatively sloped line – as per statement (1) &
A < B – as per statement (2).
We'll again pick up the diagram that we drew in the first statement analysis:

INTENTIONALLY BLANK



Clearly as seen from the diagram above any point lying below the X – axis will not conform to the condition laid out by the second statement (A < B) *(since a positive quantity can never ever be less than a negative quantity)*. Thus the only possibility for the point (A, B) to lie on the line is to lie above the origin or the X – axis (in the blue region) as shown:



Thus, according to the conditions in the two statements taken together, point (A, B) will be such that B is > 0 – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Top 1% expert replies to student queries (can skip) (Link)

Q.190

Let us just take a quick relook into the formula for calculating the range of a SET of elements. If I have a SET of elements S = {X_1, X_2, X_3,…so on} then the range of the SET S is simply defined as Range = (X_{MAX} – X_{MIN})
= {(Max Value of the element in SET S) – (Min Value of the element in SET S)}.

Coming back to the question we're given a SET X *say* of 7 non-negative integers (number of books read) such that X = {10, 5, P, Q, R, 29, 20}, where P, Q, R are unknown non-negative integers in the SET. We're asked to confirm the value of the range of the SET X.
Note that in the SET X above, the lowest value so far is 5 and the highest value so far is 29.

STATEMENT (1) alone: This statement alone says that the integers P & Q are both greater than the element 5. We're given the following inequality relation Q > P > 5. However, since

both Q and P can assume any higher than 5 value, we can have a value of Q = 50 or a value Q = 51 and assuming that 5 is the lowest (because we still don't know anything about the integer R) value in the SET, we get two different answers to the value of the Range of the SET → (50 – 5) & (51 – 5). Clearly we can make a whole bunch of similar cases all of which will prove the same thing that the above two cases are proving and that is that a *unique* value of the range of the SET does NOT exist.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement alone says that the integers P & R are both less than the element 15. We're given the following inequality relation P < R < 15. However, since both P and R can assume any lower than 15 value, we can have a value of P = 1 or a value P = 2 and assuming that 29 is the greatest (because we still don't know anything about the integer Q) value in the SET, we get two different answers to the value of the Range of the SET → (29 – 1) & (29 – 2). Clearly we can make a whole bunch of similar cases all of which will prove the same thing that the above two cases are proving and that is that a *unique* value of the range of the SET does NOT exist.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together, we have ourselves the following scenario:
5 < P < Q – according to statement (1) &
P < R < 15 – according to statement (2). Note how statement (2) puts a ceiling on the values of the integers P & R. However, the statement (1) says that the integer P is > 5, thus we may write a combined form to give us the following: 5 < P < R < 15. Thus the combined info does give us a sort of a fix on the integers P & R saying that their values are such that they lie between two elements of the SET (5 & 15). However, note that even in the clubbed info analysis Q somehow escapes a ceiling cap on the values that it can take. I may therefore have a value of the integer Q such that Q is ≤ 29, giving me a Range value of the SET = 29 – 5 =24 or I may have a Q value of 30 *say* for which the SET assumes a Range value of 30 – 5 = 25. We thus arrive at at least two distinct values of the quantity asked up top in the main question.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.191

We're given two *POSITIVE* **integers** J & K. We're asked to compare the number of distinct prime factors of the integers J & K. In other words we're asked to confirm whether the number of distinct prime factors of the integer J is greater than the number of distinct prime factors of the integers K.

STATEMENT (1) alone: This statement says that the integer J is divisible by 30. We may want to break up 30 to see the prime factors that it is composed of:
30 = 2 x 3 x 5. Since 30 is a factor of J, *(i.e. it divides off J completely)*, we may also say that J in a way is a multiple of 30 and hence may be written as: J = 30**M*, where *M* is a positive integer. Or J = 2 x 3 x 5 x *M*. Therefore J is divisible by **at least 3** prime factors. However,

the statement mentions nothing about what the integer K might possibly be. This being a comparison question *(between the number of prime factors of J & K)*, it is necessary for us to know at least something about the value of the integer K in order to make any inferences necessary.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement out rightly says/gives out the value of the integer K = 1000. 1000 may be broken down to write K = 2^3 x 5^3. Therefore, K has **exactly 2** prime factors. However, the statement mentions nothing about what the integer J might possibly be. This being a comparison question *(between the number of prime factors of J & K)*, it is necessary for us to know at least something about the value of the integer J in order to make any inferences necessary.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Clubbing the inferences, derived from the two pieces of information, together:
J is divisible by **at least 3** prime factors – as per statement (1) &
K is divisible by **exactly 2** prime factors – as per statement (2).
Since J has at least 3 prime factors, it will always have a greater number (> 2) of prime factors *(or the number of different primes that divide it off completely)* than integer K – a CONFIRMED YES answer.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.192

The question asks us to confirm whether the product X*Y is > 0? In other words the question requires us to confirm whether X & Y are numbers bearing the signs?

STATEMENT (1) alone: The statement gives out the following inequality: X – Y > –2. However, this is an inequality relation that the numerals X & Y are required to conform to. Such an inequality relation easily allows us to choose values of X and Y that will give conflicting answers to the question up top. *(X = 1, Y = –1 conforms to the inequality and gives us a **NO** answer to the question above however X = 1, Y = 1 also conforms to the inequality yet gives a **YES** answer)* The YES/NO scenario proves the insufficiency of the statement!

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: The statement gives out the following inequality: X – 2*Y < –6. However, this is again an inequality relation that the numerals X & Y are required to conform to. Such an inequality relation easily allows us to choose values of X and Y that will give conflicting answers to the question up top. *(X = –1, Y = 10 conforms to the inequality and gives us a **NO** answer to the question above however X = 1, Y = 1 also conforms to the inequality yet gives a **YES** answer)* The YES/NO scenario proves the insufficiency of the statement!

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: The two statements together present us with the following two inequalities that must be simultaneously met with:
$X - Y > -2$ – as per statement (1) &
$X - 2*Y < -6$ – as per statement (2). We may rearrange *(take the X and the Y terms to the right and the constant term to the left)* the inequality in statement (2) to get us:
$-X + 2*Y > 6$ – adding this to the inequality $X - Y > -2$ we get $Y > 4 \rightarrow$ Y is definitely positive. Rearranging the inequality $X - Y > -2$, we get $Y < X + 2$. Taking this along with $Y > 4$, we get $4 < Y < X + 2$ or $X + 2$ must definitely be > 4, or $X > 2 \rightarrow$ X is definitely positive. This implies $X*Y$ is definitely positive – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.193

We're given the following inequality relation to which X and Y conform to $\rightarrow X - Y > 10$?

We're asked to confirm whether $X - Y > X + Y$ or whether $2*Y < 0$ or whether $Y < 0$?

STATEMENT (1) alone: The statement says $X = 8$. Substituting in $X - Y > 10$, we get $Y < -2$. Therefore Y is definitely < 0 – a CONFIRMED YES answer.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: The statement says $Y = -20$. This is the most direct answer in itself to the confirmation question above.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

Q.194

The question asks us to find the *unique* value of the **remainder** when the *POSITIVE* **integer** N is divided by 7.

STATEMENT (1) alone: Kindly note that 21 is a multiple of 7. The information in this statement can be mathematically presented as $N = 21*K + P$, where K is a positive integer & P is an ODD positive integer < 21. Assuming P to be less than 7 as well *(say 3 or 5)*, then N may be written as $N = 21*K + 3$, in which case N divided by 7 gives us the **remainder** 3 OR as $N = 21*K + 5$, in which case N divided by 7 gives us the **remainder** 5. Two distinct values of the **remainder** are enough to prove the insufficiency of the statement.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement N may be written as $N = 28*M + 3$. Clearly this expression divided by 7 gives us a **remainder** 3 – a *unique* value answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.195

We're given the following integers in this question → W, X, Y, Z, (W/X) & (Y/Z). We're asked to confirm whether (W/X) + (Y/Z) is ODD?

STATEMENT (1) alone: The expression W*X + Y*Z is given to be ODD. This means **either** W*X is ODD and Y*Z is EVEN **or** W*X is EVEN and Y*Z is ODD. Considering the former case, W*X is ODD implies both the integers W and X are also ODD. This means that the integer (W/X) is also ODD. Y*Z being EVEN implies that at least one of Y & Z is EVEN. Now, if Y = 4 & Z = 2, (Y/Z) = (4/2) = 2 comes out to be EVEN and the sum (W/X) + (Y/Z) comes out to be ODD + EVEN = ODD giving us a **YES** answer to the question up top in the main question. However, if Y = 6 & Z = 2, (Y/Z) = (6/2) = 3 comes out to be ODD and the sum (W/X) + (Y/Z) comes out to be ODD + ODD = EVEN giving us a **NO** answer to the question up top in the main question. We thus arrive at a YES/NO situation.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We'll just take up the SUM expression whose ODD/EVEN polarity we're asked to confirm in the main question: (W/X) + (Y/Z). This may be written as (W*Z + X*Y)/(X*Z), which does happen to be an integer by the way because an integer + integer will always yield an in integer. This statement says that the numerator of the expression (W*Z + X*Y)/(X*Z) is ODD. Since, the entire expression is an integer *(i.e. the numerator is completely divisible by the denominator)* the denominator must also be ODD giving us an ODD value of the integer (W*Z + X*Y)/(X*Z) or (W/X) + (Y/Z) – a CONFIRMED YES answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.196

Let there be M members and G guests attending the lunch meeting. Then we're required to seek a *unique* value of the variable M.

STATEMENT (1) alone: Mathematically put, this statement says: **M + G = 20**. However this is a SINGLE linear equation in TWO variables and thus generates multiple values of the pair (M, G) that will each satisfy the equation in this statement.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Mathematically put, this statement says that **(4*M + 8*G) = $92**. However this is again a SINGLE linear equation in TWO variables and thus generates multiple values of the pair (M, G) that will each satisfy the equation in this statement.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two statements together, we have with us the following:
M + G = 20 – statement (1) &
(4*M + 8*G) = $92 – statement (2). Or M + 2*G = 23.

The above is a system of TWO linear equations in TWO variables that can be solved to get individually *unique* values of the two variables involved (M & G).

This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variables required (M & G) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination and are for demonstration purposes only.*

We may solve the set of linear equations to get M = 17 & G = 3 – a *unique* value obtained.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.197

We're given two integers M & P conforming to the following 2 < M < P. We're told that P divided by M has a non-zero **remainder** and are asked whether the **remainder** is > 1?

STATEMENT (1) alone: According to this statement we may write M & P as M = 2**K*, where *K* is an integer > 2, and P = 2**I*, where *I* is an integer > 2. Since 2 is the GCD (greatest common (to both) divisor) of M & P, it implies that the integers *K* & *I* have absolutely NO common factors except 1. Therefore, *I* will never be divisible by the integer *K* and the division will always thus yield a non-zero **remainder**. The lowest non-zero **remainder** when *I* is divided by *K* will thus be 1. Now note the following result:

*If R is the remainder when the Dividend Q is divided by the divisor D, then the remainder when the Dividend 2*Q is divided by the divisor 2*D will always and always be 2*R.*

With the above result in mind, the lowest **remainder** when 2**I* is divided by 2**K* will thus be 2. In other words the lowest **remainder** when P is divided by M will be 2. Thus the **remainder** indeed is > 1 – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement says that the LCM of the two integers M & P is 30. If we take a look at 30 in terms of its constituent factors, then 30 = 2 x 3 x 5. Thus M & P can EITHER be 2 x 3 = 6 & 2 x 5 = 10 respectively giving us a **remainder** value of 4 which is greater than 1 – a **YES** answer OR be 5 & 2 x 3 = 6 respectively giving us a **remainder** value of 1 – a **NO** answer.

STATEMENT (2) alone – INSUFFICIENT

ANSWER – (A).

Q.198

We're given that the symbol @ represents one of the four arithmetic operations (addition, subtraction, multiplication or division, but which one → that's unknown)

We're asked the absolute value of 1 @ 2? *(based on what the symbol could/may represent)*

Since we're supposed to find a definitive/*unique* answer to the enquiry in the question stem, a targeted approach at finding multiple values *(at least two)* should work well here! *It's useless to riddle your minds with what the exact operation represented by the symbol could be. It proves easier to just concentrate on seeing whether a unique solution to the question asked exists.*

STATEMENT (1) alone: We're given that the operation represented by the symbol @ conforms to the following identity N @ 0 = N for all integers N. Based on this identity we can rule out *division* as well as *multiplication*. We're therefore left with the symbol @ representing ADDITION & SUBTRACTION. SUBTRACTION *(however here this does not mean that we're getting multiple values. Kindly remember that the question is not concerned with finding what @ represents but with whether 1 @ 2 yields a unique answer)*. We'll check for both operations one by one:
ADDITION: 1@ 2 = 3
SUBTRACTION: 1@ 2 = –1
We're clearly getting two distinct possible values that the operation 1 @ 2 could yield – no *unique* answer.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: We're given that the operation represented by the symbol @ conforms to the following identity N @ N = 0, for all integers N. Based on this identity we can rule out *addition, division & multiplication* here. We're therefore left with the symbol @ representing only SUBTRACTION *(this pretty much does the job for us as we've narrowed our search down to a single operation that the symbol represents and since a single operation will always yield a unique answer, we can confidently let go of any further analysis and label this as sufficient)*. Only for the sake of mentioning, 1 @ 2 = –1 – a *unique* answer.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (B).

Q.199

We'll keep in mind the following formula before proceeding forth with this question.

Total Revenue = (No. of items sold)*(Price of each item) – *assuming the price for each item considered is the same.*

Let for our convenience N_P & N_C be the number of sofas sold in the previous and the current year respectively. And let SP_P & SP_C be the previous year and the current year sale price per sofa.
Then we're asked to seek the unique value of the following expression:
$\{(N_C*SP_C) – (N_P*SP_P)\}/(N_P*SP_P)$ or of
$\{(N_C*SP_C)/(N_P*SP_P)\} – 1$ or simply of the ratio
$\{(N_C*SP_C)/(N_P*SP_P)\}$

STATEMENT (1) alone: According to this statement: $N_C = N_P*\{1 + (10/100)\}$. However, this is just one piece of the puzzle required to solve for the ratio required in the question stem.

We do also require the ratio of the sale price in the two years to get a *unique* value of the ratio that we require.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: According to this statement: $SP_C = SP_P + 30$. Or $SP_C – SP_P = 30$. This is a difference equation which simply tells us the difference in values of the two sale prices (such equations are least helpful in evaluating ratios of the two variables in the difference equation). This equation can give out multiple value pairs of the sort (SP_C, SP_P) that will each give out a different value of the ratio of the variables (SP_C/SP_P). Moreover, we don't have any information on the relation between N_C & N_P.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Statement gives out the following ratio $(N_C/N_P) = (11/10)$.
$SP_C = SP_P + 30$ can best give us $(SP_C/SP_P) = 1 + (30/SP_P)$.
Therefore,
$\{(N_C*SP_C)/(N_P*SP_P)\}$ becomes $= (11/10)*\{1 + (30/SP_P)\}$. The value of the expression that is asked in the main question is thus dependent on the value of the variable SP_P. As we assume different values of this variable we will get varying values of the expression asked in the main question up top – still no *unique* value answer.

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.200

We're **F** as a product of the first 30 *POSITIVE* integers. The product of the first 30 *POSITIVE* integers can also be called the factorial of 30 OR 30!. Thus in a way we're given that **F** = 30!. We're given another *POSITIVE* integer **D** whose *unique* value we're supposed to seek!

STATEMENT (1) alone: This statement gives us a sort of a rule to which the integer **D** conforms. We're given that 10^D is a factor of **F** or of 30! OR we can say that we're given that **D** is such that 10^D completely divides off 30!. Off the top of our mind we can see that the product would contain a 10, 20 (= 2*10) & a 30 (= 3*10) at least and thus would be divisible by 10, 10^2 & 10^3 or that at least 10, 10^2 & 10^3 can completely divide off 30!. Thus **D** can have a value of 1, 2 or 3 at least and is thus not *unique*. Our job here with this statement is done in the sense that we've proved that a *unique* value does NOT exist. But if we we're to look into the complete range or set of values that the integer **D** can take on, then we would require to know the highest value of the integer **D** for which 10^D is a factor of 30!. Have a look into the following results: *(the below is an excerpt from the GMAT Quant Concepts document by Sandeep Gupta page 28)*

INTENTIONALLY BLANK

Power of a Prime Number in a Factorial. If we have to find the power of a prime number p in n!, it is found using a general rule, which is

$\left[\frac{n}{p}\right]+\left[\frac{n}{p^2}\right]+\left[\frac{n}{p^3}\right]+\cdots\cdots$, where $\left[\frac{n}{p}\right]$ denotes the greatest integer less than or equal to $\left[\frac{n}{p}\right]$ etc.

For example power of 3 in 100 ! = $\left[\frac{100}{3}\right]+\left[\frac{100}{3^2}\right]+\left[\frac{100}{3^3}\right]+\left[\frac{100}{3^4}\right]+\left[\frac{100}{3^5}\right]+\cdots$

$= 33 + 11 + 3 + 1 + 0 = 48.$

For example power of 5 in 200 ! = $\left[\frac{200}{5}\right]+\left[\frac{200}{5^2}\right]+\left[\frac{200}{5^3}\right]+\cdots$

$= 40 + 8 + 1 + 0 = 49.$

Number of Zeroes at the end of a Factorial. It is given by the power of 5 in the number. Actually, the number of zeroes will be decided by the power of 10, but 10 is not a prime number, we have 10 = 5 × 2, and hence we check power of 5.

For example, the number of zeroes at the end of 100 ! = $\left[\frac{100}{5}\right]+\left[\frac{100}{5^2}\right]+\cdots = 20 + 4 = 24.$

The number of zeroes at the end of 500 ! = $\left[\frac{500}{5}\right]+\left[\frac{500}{5^2}\right]+\left[\frac{500}{5^3}\right]+\cdots = 100 + 20 + 4 = 124.$

The number of zeroes at the end of 1000 ! = $\left[\frac{1000}{5}\right]+\left[\frac{1000}{5^2}\right]+\left[\frac{1000}{5^3}\right]+\left[\frac{1000}{5^4}\right]\cdots = 200 + 40 + 8 + 1$

$= 249.$

Indices

Now using the above results, the highest power of the integer 10 in 30! can be found as shown below:
Power of 10 in 30! = $[30/5] + [30/5^2] + [30/5^3] = 6 + 1 + 0 = 7$. Thus according to the first statement **D** may take on the following values: **D** = {0, 1, 2, 3, 4, 5, 6, 7} – clearly not a *unique* answer.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement prescribes is a range of values that **D** can take on. According to this statement **D** may take on the following integer values **D** = {7, 8, 9,…so on} – clearly not a *unique* answer.
STATEMENT (2) alone – INSUFFICIENT

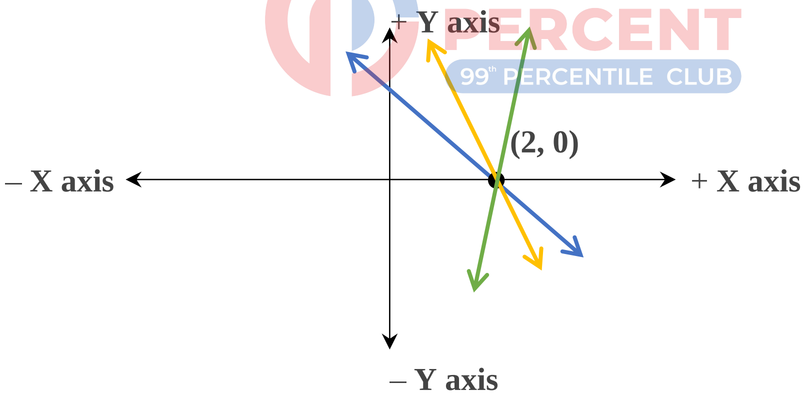
STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we get have with us the following:
Statement (1) stipulates the following values that **D** may take on:
D = {0, 1, 2, 3, 4, 5, 6, 7}
Statement (2) stipulates the following values that **D** may take on:
D = {7, 8, 9,…so on}

The only value of the integer **D** that conforms to both the individual restrictions laid out by the two statements individually is the integer 7 – and thus a *unique* value of **D**.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.201

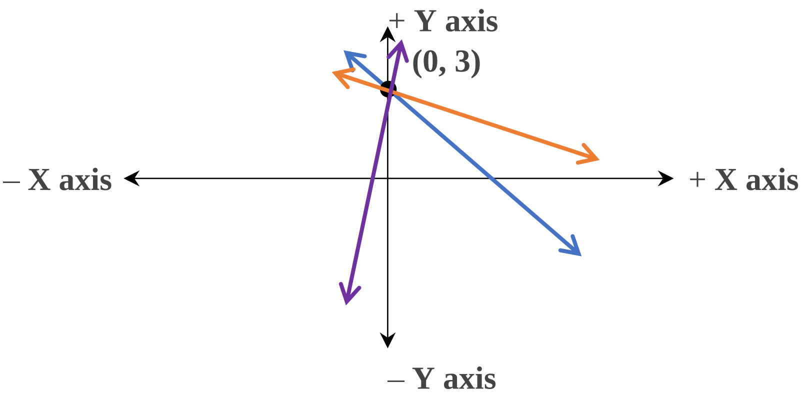
I understand the sudden urge to plunge in and write down the equation of the line in the form Y = M*X + C and try and attempt this question algebraically, but how about if we go about this question DIAGRAMMATICALLY! Here's how! Forget arriving at a *unique* value of the slope of the line K. We know that if get a FIXED position of the line on the XY or the Co-ordinate plane we can definitively say that the slope is *unique* and fixed. *(for a unique line can only assume one value of its slope)* Our entire focus therefore now shifts to gauging whether the information at hand allows the position of the line to be fixed or variable.

STATEMENT (1) alone: This statement FIXES the X – intercept *(which is nothing but the actual point of intersection of the line with the X – axis)* of the line K to be = +2. However, this is just one property of the line that we've got a FIX on. In other words, this is just one fixed point (2, 0) that we know of that the line passes through. A line mandated to pass through just one point can assume multiple positions on the XY plane as shown in the diagram below:



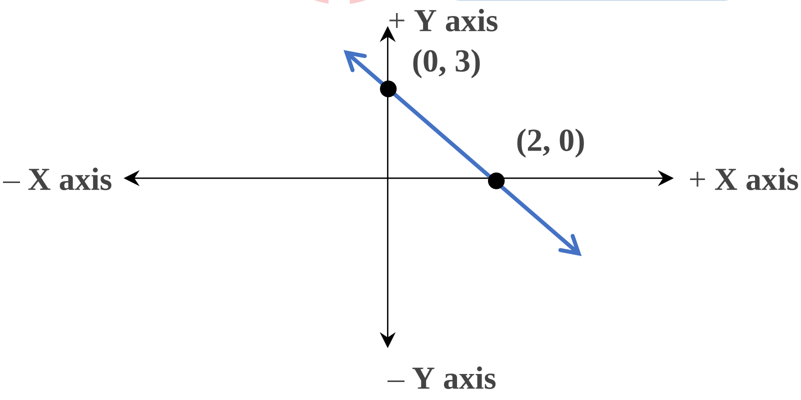
No fixed position of the line K implies no *unique* value of the slope *(which is nothing but a derivation of the angle the line makes with the +X axis)* of line K.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement on the other hand FIXES the Y – intercept *(which is nothing but the actual point of intersection of the line with the Y – axis)* of the line K to be = +3. However, again, this is just one property of the line that we've got a FIX on. In other words, this is just one fixed point (0, 3) that we know of that the line passes through. A line mandated to pass through just one point can assume multiple positions on the XY plane as shown in the diagram below:



No fixed position of the line K implies no *unique* value of the slope *(which is nothing but a derivation of the angle the line makes with the +X axis)* of line K.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we can say that line K is such that:
The X – intercept *(which is nothing but the actual point of intersection of the line with the X – axis)* of the line K is = +2 – Statement (1) – the line is thus said to pass through (2, 0)
The Y – intercept *(which is nothing but the actual point of intersection of the line with the Y – axis)* of the line K is = +3 – Statement (2) – the line is thus said to pass through (0, 3)
Thus, together the line has got TWO attributes or properties FIXED. Any line with TWO of its properties fixed will always assume a *unique* position on the XY plane as shown below:



As can be seen above there is only one *unique* line that can pass through two given/fixed points. The statements together thus FIX the position of the line and hence yield a *unique* value of the slope of the line K.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.202

We're given two non-integer values X & Y.

The question pretty much has the same concept that decimal rounding off has lying underneath it. Instead of rounding off to the nearest hundredths or tenths, we're in a way here asked to round off to the nearest units digit or the nearest integer. Under such a scenario, as the one mentioned in the question stem, any number, between two consecutive integers *(say 3 & 4)*, that is **at or beyond** the halfway point *(3.5)* is said to be closer to the integer 4 and similarly any number that lies **prior** to the halfway point *(3.5)* is said to be closer to the integer 3.

Having said all that, we're required to seek that one *unique* integer value to which the value of the number *(the non-integer)* X is closest to.

STATEMENT (1) alone: This statement sort of tends to give us a range of values that the sum of the two non-integer values (X & Y) can take on. By the statement we're supposed to pen down a range of values that the sum (X + Y) can take on so that when rounded off to the nearest integer, as per the rule described at the beginning of this solution, it may yield an integer value of 4. We can thus write that for the sum (X + Y) to yield a closest integer value of 4, (X + Y) must lie in the following range → **$3.5 \leq (X + Y) < 4.5$**. However this is what the Sum (X + Y) conforms to, we have no idea what the individual values of X & Y might be. *(We may have X = 1.7 & Y = 2.2 giving us an answer 2 as integer to which the number X is closest OR we may have X = 2.7 & Y = 1.2 giving us an answer 3 as integer to which the number X is closest)* We thus cannot get a FIX on the integer value to which X is closest.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement sort of tends to give us a range of values that the difference of the two non-integer values (X & Y) can take on. By the statement we're supposed to pen down a range of values that the difference (X – Y) can take on so that when rounded off to the nearest integer, as per the rule described at the beginning of this solution, it may yield an integer value of 1. We can thus write that for the sum (X – Y) to yield a closest integer value of 1, (X – Y) must lie in the following range → **$0.5 \leq (X - Y) < 1.5$**. However this is what the Difference (X – Y) conforms to, we again have no idea what the individual values of X & Y might be. *(We may have X = 3.7 & Y = 2.9 giving us an answer 4 as integer to which the number X is closest OR we may have X = 5.7 & Y = 4.9 giving us an answer 6 as integer to which the number X is closest)* We thus cannot get a FIX on the integer value to which X is closest.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have the following ranges of the values that each of (X + Y) & (X – Y) can take on:
$3.5 \leq (X + Y) < 4.5$ – as per statement (1), and
$0.5 \leq (X - Y) < 1.5$ – as per statement (2).
We may easily see that adding up the two pieces of information in the two statements we can dispose of the non-integer Y. Thus, adding the two above we reach $4 \leq 2*X < 6$ or $2 \leq X < 3$. Since X is a non-integer and cannot be = 2, the range above may be slightly refined to write $2 < X < 3$. However, It is quite clear from the range that even the combined statements eventually ends up stipulating to X, that X can either take on a value of *say* 2.2 answering us

with 2 as the answer to our question up top or take on a value of *say* 2.9 answering us with 3 as the answer to the question up top. We therefore still do not arrive at a *unique* value (we're getting both 2 and 3 as answers) of the quantity asked in the question stem.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.203

The question pretty much involves the concept of decimal rounding off. I'll just briefly go through the rules that govern decimal rounding off on the GMAT exam. To round off a decimal to the nearest **tenths**, ALL we look at is the **hundredths** digit, no matter how long the decimal is (may extend on to 10 decimal places). Similarly, to round off a decimal to the nearest **hundredths**, ALL we look at is the **thousandths** digit. In a more generic sense the decimal place to which we're rounding off *(say the **tenths**)*, ALL we look at is the digit to the IMMEDIATE right of the decimal place we want to round off to. Another rather familiar rule is that after rounding, the digit in the place we are rounding will either stay the same, referred to as rounding down, or increase by 1, referred to as rounding up. The question now becomes, when do we round up or down?
Rounding up means that we increase the terminating digit by a value of 1 and drop off the digits to the right. If the next place beyond where we are terminating the decimal is greater than or equal to five, we round up. For example, if we round 5.47 to the tenths place, it can be can be rounded up to 5.5. If the number to the right of our terminating decimal place is four or less (4, 3, 2, 1, 0), we round down. This is done by leaving our last decimal place as it is given and discarding all digits to its right. For example, if we round 6.734 to the hundredths place, it can be rounded down to 6.73.
Here's also a quick recap of the decimal representation that may come in handy.
A decimal may be represented as:
0.THTT... and so on, where:
T → the **tenths** digit of the decimal.
H → the **hundredths** digit of the decimal.
T → the **thousandths** digit of the decimal.
T → the **ten thousandths** digit of the decimal.

Having said all that, we're asked for the *unique* value of the number X when X is rounded off to the nearest hundredths. This implies that we must know what the immediately next or the thousandths digit of the ORIGINAL *(not any rounded off form of the decimal)* decimal is.

STATEMENT (1) alone: This statement gives us the result when X is rounded off to the nearest thousandths = 0.45**5**. However, the information keeping us from proceeding further is whether the 5 in the current thousandths place *(the one in the red)* is a rounded up or a rounded down *(kindly see definitions above)* digit. We can make the following cases accordingly:
CASE I: Assuming that the digit 5 in the thousandths place *(the one in the red)* is a rounded DOWN digit, i.e. to say that that the digit in the hundredths place of the ORIGINAL decimal was taken as it is. This would mean that the hundredths digit of the ORIGINAL decimal is

indeed 5 and therefore the rounded off value (of the original decimal) to the nearest hundredths becomes **0.46** – *as per the given rules above.*
CASE II: Assuming that the digit 5 in the thousandths place *(the one in the red)* is a rounded UP digit, i.e. to say that that the digit in the hundredths place of the ORIGINAL decimal was incremented by 1. This would mean that the hundredths digit of the ORIGINAL decimal is indeed 5 – 1 = 4 and therefore the rounded off value (of the original decimal) to the nearest hundredths becomes **0.45** – *as per the given rules above.*
The two cases above give us two DISTINCT values of the main question asked. We thus cannot obtain a *unique* value.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: All this statement gives us is the thousandths digit of the decimal X. Sure that's useful info in the sense that we know we've got to round up the hundredths digit while rounding off to the nearest hundredths, however we don't know a lick more than this little piece of information. We DO NOT know what the actual decimal is or might be. Clearly this is too little a piece of information to arrive at anything substantially conclusive.
STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Together we've got the two cases that arise while we're considering the statement (1) alone (we are given the value of the decimal in this statement) as well as a fix on the thousandths digit of the decimal. Remember how in statement (1) we were unsure of what the thousandths digit of the ORIGINAL decimal might be (whether 4 or 5), and because of that very fact we had to come up with two cases. The second statement gets us rid of this little piece of uncertainty saying that the thousandths digit in the ORIGINAL decimal is indeed 5. Therefore, the original decimal is probably something like 0.455XYZ…so on, where X is a digit between 0 & 4 (inclusive). Thus the rounded off value (of the original decimal) to the nearest hundredths becomes **0.45 –** a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.204

This question is a time distance question for which the formula that we can keep at the back of our minds is *Distance = Speed x Time.*
We're asked for a *unique* value of the time taken by Mary to get to her workplace on FRIDAY – *pay heed to the time period discussed*.

STATEMENT (1) alone: This statement gives us the time it took Mary to reach her workplace on THURSDAY. We're supposed to find out the time it took her on FRIDAY. Since neither this statement nor the main question gives off any relation between her times taken to reach her workplace on THURSDAY & FRIDAY, we're left stranded in the middle of nowhere in our course to find out a *unique* value for our question.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: Since we're talking in terms of average speeds here, it makes sense to assume the distance that she travelled on each of the days THURSDAY & FRIDAY as **D**.

let V_T & V_F be her average speeds for the journey on THURSDAY & FRIDAY respectively. As per the distance formula written up top and the question stem we're required to find a *unique* value of the ratio (D/V_T), which is nothing but the time it took her on Thursday. Now all this statement says is that $V_T = (1 + (25/100))*V_F$ or $V_T = (5/4)*V_F$. We may thus write (D/V_T) as $(D/V_T) = \{D/((5/4)*V_F)\} = (4/5)*(D/V_F)$. We may also write this down as (Time taken on Thursday) = 0.8*(Time taken on Friday). Since we DO NOT know the absolute value of either the time it took her on Friday or the absolute value of her speed on Friday, we're left with a relative comparison either in terms of speed $V_T = (5/4)*V_F$ or in terms of time taken (Time taken on Thursday) = 0.8*(Time taken on Friday), which may otherwise be seen as a single linear relation in two variables and can thus generate multiple values of the variable we're seeking a *unique* value of.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have the following information at hand:
Time taken on Friday = 20 minutes – as per statement (1), and
(Time taken on Thursday) = 0.8*(Time taken on Friday) – as per statement (2).
Substituting the first piece of information in the second we get that
Time taken on Thursday = 0.8*20 = 16 minutes – a *unique* value obtained.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.205

Let's try and remember as a rule that dealing with profit questions we keep the following relation in the back of our minds ready to be applied whenever needed:
Gross Profit = Total Revenues – Total Costs
With that in mind we're asked the *unique* value of a company's revenue last year.

STATEMENT (1) alone: This statement says that the company's Gross Profit last year was \$4,100. However, unless and until we know the value of the Total Costs incurred by the company – a value that we need to add to the Gross Profit figure to get to revenues – we cannot be anywhere near to commenting on the *unique* value of the total revenues of the company for the previous year.

STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put spells out the following:
Total Revenues *(last year)* = {1 + (50/100)}*(Total Expenses) = 1.5*(Total Expenses). At most we can use the relation given in the beginning ***Gross Profit = Total Revenues – Total Costs*** to get a relation between Total Revenues and Gross profit. We may write Total Expenses as Total Expenses = Total Revenues – Gross Profit and substitute in
Total Revenues = 1.5*(Total Expenses) to get
Total Revenues = 1.5*(Total Revenues – Gross Profit) Or rearranging to get
Total Revenues = 3*(Gross Profit). However, since we DO NOT know the absolute value of either the Total Revenues or the absolute value of the Gross Profit, we're left with a relative

comparison in the form of Total Revenues = 3*(Gross Profit), which may otherwise be seen as a single linear relation in two variables and can thus generate multiple values of the variable we're seeking a *unique* value of.

STATEMENT (2) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have the following information at hand:
Gross Profit = $4100 – as per statement (1), and
Total Revenues = 3*(Gross Profit) – as per statement (2).
Substituting the first piece of information in the second we get that
Total Revenues = 3*4100 = $12,300 – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.206

We're given a total union membership of 15,600 in the year 1984. The scenario includes two more years that the question takes into consideration – 1985 & 1986. We're asked confirmation on whether the percentage increase in the union membership was greater for the period of 1984 to 1985 than for the period 1985 to 1986. It would be highly recommended that we pen this information down mathematically and have a clear picture, in terms of variables, of what the question requires from us!
Let $\mathbf{P}_{1984}$, $\mathbf{P}_{1985}$ & $\mathbf{P}_{1986}$ represent the union membership in the years 1984, 1985 & 1986 respectively, then all the question's asking us is:
Is $\{(\mathbf{P}_{1985} - \mathbf{P}_{1984})/\mathbf{P}_{1984}\}*100 > \{(\mathbf{P}_{1986} - \mathbf{P}_{1985})/\mathbf{P}_{1985}\}*100$? Or
Is $\{(\mathbf{P}_{1985} - \mathbf{P}_{1984})/\mathbf{P}_{1984}\} > \{(\mathbf{P}_{1986} - \mathbf{P}_{1985})/\mathbf{P}_{1985}\}$? Or
Is $\{(\mathbf{P}_{1985}/\mathbf{P}_{1984}) - 1\} > \{(\mathbf{P}_{1986}/\mathbf{P}_{1985}) - 1\}$? Or
Is $(\mathbf{P}_{1985}/\mathbf{P}_{1984}) > (\mathbf{P}_{1986}/\mathbf{P}_{1985})$?
In other words we're required to confirm the above ratio relation between the union memberships in 1984, 1985 & 1986.

STATEMENT (1) alone: Note that the main question already gives us the value of the variable $\mathbf{P}_{1984}$ = 15,600. Add to that this statement hands out the absolute value of the increases in each of the subsequent years and the absolute value of the other two variables $\mathbf{P}_{1985}$ = 15, 600 + 781 = 16,381 & $\mathbf{P}_{1985}$ = 16,381 + 781 = 17,162. Instead of plunging in to substitute values in the reduced ratio form of the main question that we've derived up top, notice that the question tests us on sufficiency of the information at hand. Now since we already know the individual values of $\mathbf{P}_{1984}$, $\mathbf{P}_{1985}$ & $\mathbf{P}_{1986}$, we know that we can get *unique* values of the percentage increases in each of 1984 to 1985 and 1985 to 1986 and thus a definitive fix or a confirmation on which ratio turns out to be greater. Notice how we are absolutely unconcerned with the actual result *(as in which ratio does turn out to be greater)* and are only concerned with how confident at a particular step of analysis of a statement we can be that a definitive answer or a CONFIRMED YES or a NO exists.
STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: Note that the main question already gives us the value of the variable $\mathbf{P}_{1984}$ = 15,600. Add to that this statement hands out the absolute value of the other two variables $\mathbf{P}_{1985}$ = 16,381 & $\mathbf{P}_{1985}$ = 17,162. Instead of plunging in to substitute values in the reduced ratio form of the main question that we've derived up top, notice that the question tests us on sufficiency of the information at hand. Now since we already know the individual values of $\mathbf{P}_{1984}$, $\mathbf{P}_{1985}$ & $\mathbf{P}_{1986}$, we know that we can get *unique* values of the percentage increases in each of 1984 to 1985 and 1985 to 1986 and thus a definitive fix or a confirmation on which ratio turns out to be greater. Notice again how we are absolutely unconcerned with the actual result *(as in which ratio does turn out to be greater)* and are only concerned with how confident at a particular step of analysis of a statement we can be that a definitive answer or a CONFIRMED YES or a NO exists.

STATEMENT (2) alone – SUFFICIENT

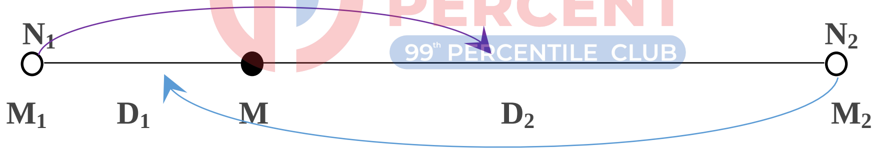
ANSWER – (D).

Q.207

This is a perfect case scenario to view things via the *Combined mean* interpretation result: We'll use the diagrammatic representation of the *Combined mean* interpretation result which is a lot easier to work with:

$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:



Where,

N₁ = Total number of children's tickets sold

$\mathbf{N_2}$ = Total number of Adults' tickets sold

$\mathbf{M_1}$ = Average cost of children's tickets sold at the theatre

$\mathbf{M_2}$ = Average cost of adults' tickets sold at the theatre

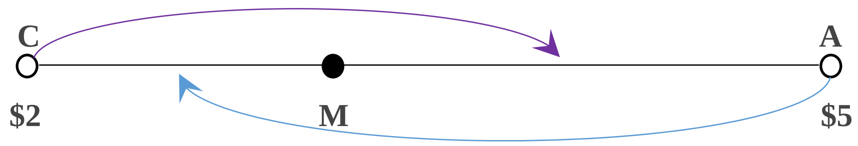
M = Average cost of all the adults' and children's tickets sold at the theatre

$\mathbf{D_1}$ = ($\mathbf{M – M_1}$) = Deviation distance of $\mathbf{M_1}$ from the *combined mean* figure for all tickets

$\mathbf{D_2}$ = ($\mathbf{M_2 – M}$) = Deviation distance of $\mathbf{M_2}$ from the *combined mean* figure for all tickets

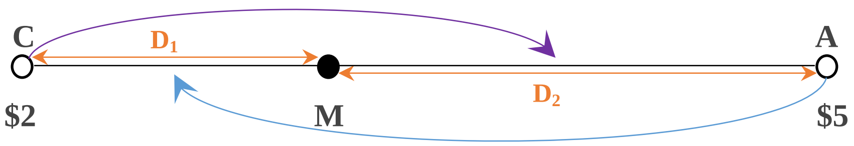
Now with this background info we can present the information given in the question stem as follows:

If **C** & **A** are the number of number of children's tickets & and the number of adults' tickets sold at the theatre.



We're asked the *unique* value of the *Combined Mean* (**M**) of all the tickets sold at the theatre.

<u>STATEMENT (1) alone</u>: This statement gives me the value of the ratio of the number of children's tickets sold at the theatre to the number of adults' tickets sold at the theatre. In other words this statement gives me the value of the ratio (**N_1/ N_2**) in the formula up top or the value of (**C/A**) in the diagram below. This ratio, as directed by the arrows in the diagram, is equal to the ratio of (**D_2/ D_1**). So we may say that (**C/A**) = (**D_2/ D_1**) = (3/2).



Now allow me to have you view this entire scenario diagrammatically from here on. If the right extreme represents $5 and the left extreme represents $2, this implies that the length of the segment (on which **M** is a point) is $(5 – 2) = $3. Now the $3 segment is to be split into two parts (by the point **M**) such that the two segments are in the ratio (**D_1/ D_2**) = (2/3). Follow the following procedure to do the above mentioned splitting of the $3 segment. Add the numerator and the denominator of the ratio in which you're required to divide the segment (2 + 3 = **5**). Then the first segment **D_1** *(the numerator)* simply becomes = (2*(the numerator)*/5)*3*(the segment length)* = (2/5)*3 = $(6/5) and similarly the second segment **D_2** *(the denominator)* simply becomes = (3/5)*3 = $(9/5). Thus, the point **M** can be found either by adding the first segment **D_1** to $2 → $2 + $(6/5) = $3.2 or be found by subtracting the second segment **D_2** from $5 → $5 – $(9/5) = $3.2 – we thus get a *unique* value of the *Combined Mean*.

STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement only gives out the absolute value of **A** = 80. However, I'm still absolutely unaware of what the value of the variable **C** because of which I do not know the ratio in which I have to divide my $5 – $2 = $3 segment and hence plot my point on the $3 segment. Unaware of the ratio thus renders this statement insufficient to substantiate a *unique* value of the *Combined Mean* or of the variable (**M**).

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.208

This question is a pure plug and play platform where the only way to disprove the sufficiency of the statements is to choose the plug in values intelligently and do away with the piece of information as soon as possible.

Let's first try and understand what the question requires of us. We're given that 5 notepads (each bearing the same price) and 3 markers (each bearing the same price) cost less than or equal to $10. We're then asked whether 4 notepads and 4 markers would also cost less than or equal to $10? Notice here that all we're doing is replacing a notepad in our earlier purchase with a marker.

We'll aim for a YES/NO scenario with the help of plugging in intelligently picked out values.

STATEMENT (1) alone: The statement stipulates that the price of a notepad is less than $1. Let us choose a value of $0.5 *say* as the price of a notepad. Now 5 notepads will cost me $2.5. We'll now begin making our cases by exercising our freedom granted by this statement which is in choosing an appropriate value of the price of a marker in order to make a YES and a NO case.
CASE I: *(this one's easy)* Let the price of a marker be $1 such that the cost of 5 notepads and 3 markers is = $2.5 + $3 = $5.5 which is less than or equal to $10. The price of 4 markers and 4 notepads is = $2 + $4 = $6 which is also less than or equal to $10. This case gives us a **YES** answer.
CASE II: *(this one's a bit tricky)* Before I proceed further I'd like to shed some light into my thinking that underlies the choosing of values for this particular question. Notice that in the main question a notepad is being swapped for a marker. Now this statement has fixed the price of the notepad to be under $1, however has made no such restrictions on the price of a marker. Thus this is the price (the marker's price) that we can vary according to our need. In generating a NO answer, I have to make sure that the moment I swap 1 notepad with a marker, the price of the marker be high enough to exceed my bill above $10. In other words I'm looking for a marker price tag that takes the bill of 5 notepads and 3 markers to slightly under $10 and the moment I return a notepad (the cheaper item) to buy an additional marker (the costlier item) I exceed my bill limit of $10. We'll begin with the case making now:

The cost of 5 notepads comes out to be $2.5 (considering each is $0.5) this means I have $7.5 for my three markers. Thus let my marker price be such that each costs $(7.5/3) = $2.5. Under such a scenario the cost of 5 notepads and 3 markers is = $2.5 + $7.5 = $10 which is less than or equal to $10. However, the price of 4 markers and 4 notepads is = $2 + $10 = $12 which is NOT less than or equal to $10. This case gives us a **NO** answer. We thus arrive at a YES/NO scenario and can thus discard this piece of information.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement in saying what it has to say conforms the value of the value of the price of a notepad to certain range of values that it may take on. By saying that $10 is enough to buy 11 notepads, it is simply saying that 11 notepads cost less than or equal to $10 or that 1 notepad costs less than or equal to $(10/11) or less than or equal to $0.91. Thus this statement just as statement (1) does stipulates a pretty similar range on the value that the price of the notepad can take on. Notice that we may again choose the same value of the price of the notepad = $0.5 and, because we have the same freedom that we had in choosing the price of a marker, can choose the EXACT same values of the price of a marker to generate the same YES/NO cases as generated in statement (1) analysis. It thus proves futile to proceed any further with this statement for it pretty much says the same thing as the statement (1) does.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have the following information at hand:
Price of a notepad < $1 – as per statement (1), and
Price of a notepad ≤ (10/11) or < $0.91 *(as 0.91 is slightly > (10/11))* – as per statement (2).

Notice that the price of a notepad that we chose in the statement (1) was $0.5 and using this price we proved the insufficiency of the information. Since combining the two statements together there is no NEW restriction that has been placed on the prices of either the notepad or the marker, even the combination falls prey to the EXACT same YES/NO analysis that we did in statement (1).

STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.209

This is a perfect case scenario to view things via the *Combined mean* interpretation result: We'll use the diagrammatic representation of the *Combined mean* interpretation result which is a lot easier to work with:

$$\frac{N1}{N2} = \frac{M2 - M}{M - M1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:

Where,

$\mathbf{N_1}$ = Total number of children's tickets purchased

$\mathbf{N_2}$ = Total number of Adults' tickets purchased

$\mathbf{M_1}$ = Average cost of children's tickets purchased

$\mathbf{M_2}$ = Average cost of adults' purchased

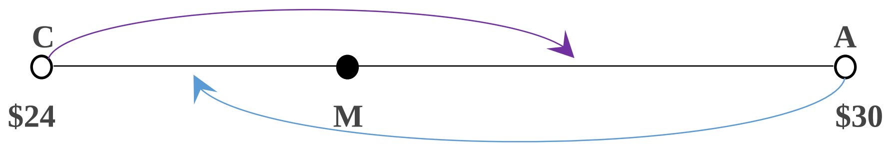
M = Average cost of all the adults' and children's purchased

$\mathbf{D_1}$ = $(\mathbf{M - M_1})$ = Deviation distance of $\mathbf{M_1}$ from the *combined mean* figure for all tickets

$\mathbf{D_2}$ = $(\mathbf{M_2 - M})$ = Deviation distance of $\mathbf{M_2}$ from the *combined mean* figure for all tickets

Now with this background info we can present the information given in the question stem as follows:

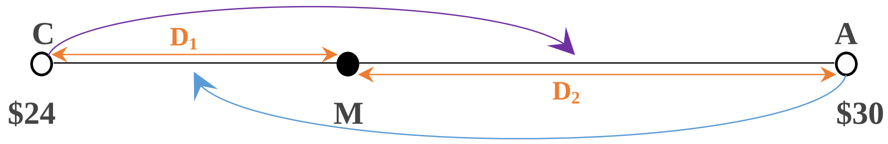
If **C** & **A** are the number of number of children's tickets & and the number of adults' tickets purchased.



We're asked the *unique* value of the *Combined Mean* (**M**) of all the tickets purchased by Hannah.

<u>STATEMENT (1) alone</u>: This statement gives me the value of the ratio of the number of children's tickets purchased to the number of adults' tickets purchased. In other words this statement gives me the value of the ratio $(\mathbf{N_1/\ N_2})$ in the formula up top or the value of (**C/A**)

in the diagram below. This ratio, as directed by the arrows in the diagram, is equal to the ratio of (**D_2**/ **D_1**). So we may say that (**C/A**) = (**D_2**/ **D_1**) = (2/1).



Now allow me to have you view this entire scenario diagrammatically from here on. If the right extreme represents $30 and the left extreme represents $24, this implies that the length of the segment (on which **M** is a point) is $(30 – 24) = $6. Now the $6 segment is to be split into two parts (by the point **M**) such that the two segments are in the ratio (**D_1**/ **D_2**) = (1/2). Follow the following procedure to do the above mentioned splitting of the $6 segment. Add the numerator and the denominator of the ratio in which you're required to divide the segment (1 + 2 = **3**). Then the first segment **D_1** *(the numerator)* simply becomes = (1*(the numerator)*/3)*6*(the segment length)* = (1/3)*6 = $2 and similarly the second segment **D_2** *(the denominator)* simply becomes = (2/3)*6 = $4. Thus, the point **M** can be found either by adding the first segment **D_1** to $24 → $24 + $2 = $26 or be found by subtracting the second segment **D_2** from $30 → $30 – $4 = $26 – we thus get a *unique* value of the *Combined Mean*.

STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement only gives out the absolute value of **C** = 4. However, I'm still absolutely unaware of what the value of the variable **A** because of which I do not know the ratio in which I have to divide my $30 – $24 = $6 segment and hence plot my point on the $6 segment. Unaware of the ratio thus renders this statement insufficient to substantiate a *unique* value of the *Combined Mean* or of the variable (**M**).

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.210

Let the bookseller's processing fee on a mail-order be $P and let his shipping fee per book in the mail order be $S. Now for the five orders that he's placed, he's charged a total processing fee of $(5*P) and a total shipping fee of $(1 + 2 + 3 + 4 + 5)*S or of $(15*S). Thus the total of Rajeev's processing and shipping fee is $(5*P + 15*S). We are thus required to seek a *unique* value of the expression $(5*P + 15*S) or in other words seek the individual *unique* values of the variables P & S.

STATEMENT (1) alone: We may write:
Total of shipping + processing fee for the month of January = $(P + S)
Total of shipping + processing fee for the month of March = $(P + 3*S)
The statement can now be mathematically put as follows:
(P + 3*S) – (P + S) = $1 or 2*S = 1 or S = $0.5. However, this statement still leaves us stranded in terms of getting a *unique* value of the variable P and hence of the expression asked in the question up top.

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement may be mathematically penned down as follows: $(1 + 2 + 3 + 4 + 5)*S = $7.50 or 15*S = 7.5 or S = $0.5. However, again, this statement still leaves us stranded in terms of getting a *unique* value of the variable P and hence of the expression asked in the question up top.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Individually both the statements arrive at the same result or the same thing and there is nothing new that may be achieved by combining them in any way possible (certainly not the value of the variable P). They're both just two different ways of saying the same thing.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.211

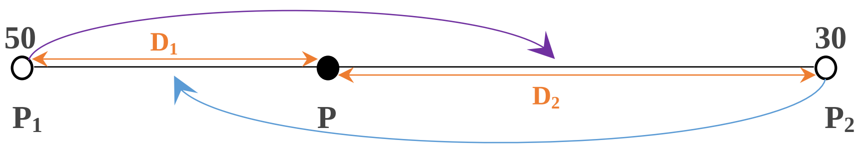
This is a perfect case scenario to view things via the *Combined mean* interpretation result:
We'll use the diagrammatic representation of the *Combined mean* interpretation result which works equally well for **percentages** as well:

$$\frac{N1}{N2} = \frac{P2 - P}{P - P1} = \frac{D2}{D1}$$

Diagrammatically, this may be represented as follows:

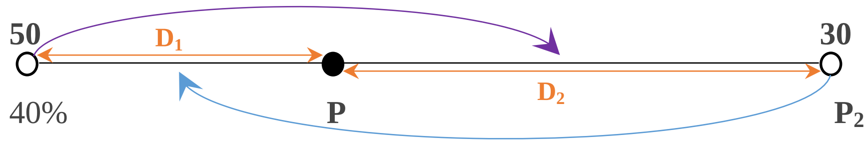
Where,
N_1 = Total number of Female students in the class
N_2 = Total number of Male students in the class
P_1 = Percentage of Female students that are business majors
P_2 = Percentage of Male students that are business majors
P = Net Percentage of students that are business majors
D_1 = (**$P - P_1$**) = Deviation distance of **P_1** from the combined percentage figure for all students
D_2 = (**$P_2 - P$**) = Deviation distance of **P_2** from the combined percentage figure for all students

Now with this background info we can present the information given in the question stem as follows:
If **M** & **F** are the number of male and female employees at the company



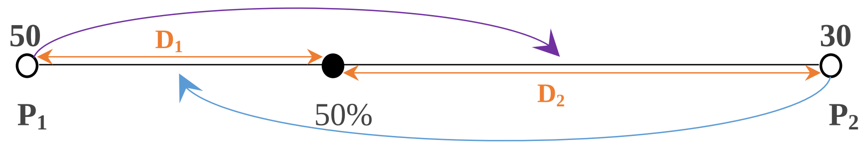
We're asked the NUMBER of MEN in the class that are business majors. In other words we're required to find the *unique* value of the expression (**P_2**/100)*30 which requires a *unique* value of the variable **P_2**.
Note that since we have the number of Men and Women in the class we can write out the ratio of (**D_1**/ **D_2**) *(as per the arrows shown in the diagram)* = (30/850) = (3/5). We thus have the ratio split of the line segment *(representing percentages values)* of length **P_2 – P_1**.

STATEMENT (1) alone: This statement gives out the absolute value of the percentage of women in the class who are business majors. In other words the statement gives out the value of the variable **P_1** = 40%. This may be added to the diagram above to give us the following:



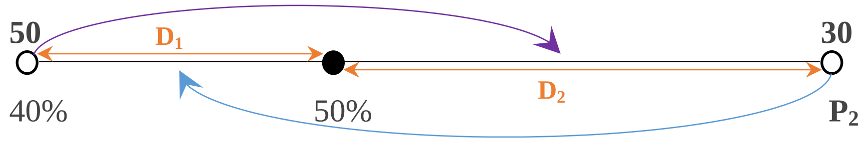
However, unaware of the value of either **P** or **P_2** makes multiple possible cases or values that the variable **P_2** may take on with the second variable **P** adjusting such that the ratio of (**D_1**/ **D_2**) is maintained at a value (3/5) – as stipulated by the question stem. *(For the sake of explanation **P_2** can be = 48% with **P** adjusting at a value of 43% OR **P_2** can be = 56% with **P** adjusting at a value of 46%)* Thus no *unique* value obtained.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement gives out the absolute value of the COMBINED percentage of all the students in the class who are business majors. In other words the statement gives out the value of the variable **P** = 50%. This may be added to the diagram above to give us the following:



However, unaware of the value of either **P_1** or **P_2** again makes multiple possible cases or values that the variable **P_2** may take on with the second variable **P_1** *(in this case)* adjusting such that the ratio of (**D_1**/ **D_2**) is maintained at a value (3/5) – as stipulated by the question stem. *(For the sake of explanation **P_2** can be = 55% with **P_1** adjusting at a value of 47% OR **P_2** can be = 60% with **P_1** adjusting at a value of 44%)* Thus no again *unique* value obtained.
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Using the two statements together we can gather ourselves the following information:
P_1 = 40% – statement (1) &
P = 50% – statement (2). We may add these two pieces of information to the diagram up top to get the following complete picture:



The two statements together give us a fix on two points on the percentage line (segment). We now have the value of $\mathbf{D_1}$ = 50 – 40 = 10%. Thus there will only one *unique* point $\mathbf{P_2}$ on the percentage line such that the ratio of ($\mathbf{D_1}$/ $\mathbf{D_2}$) comes out to be at a value of (3/5). We may even solve for that value in case we're still in doubt.
($\mathbf{D_1}$/ $\mathbf{D_2}$) = (3/5) – as per the question stem
($\mathbf{D_1}$/ $\mathbf{D_2}$) = {(50 – 40)/($\mathbf{P_2}$ – 50)} – as per the diagram up above.
We may equate the two to get {(50 – 40)/($\mathbf{P_2}$ – 50)} = (3/5) or $\mathbf{P_2}$ = 66.67% – a *unique* value obtained.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.212

Let the number of Adults' tickets sold be **A** and let the number of children's tickets sold be **C**. We're given the individual price of the two tickets ($12 for an Adult ticket and $8 for a child ticket). We're asked to seek a *unique* value of the variable **C**.

STATEMENT (1) alone: The revenue out of the sales of a ticket is nothing but the price of the ticket times the number of tickets sold. Thus this statement info can be mathematically translated into saying:
8***C** + 12***A** = $5040 or 2***C** + 3***A** = 1260. However, note that this is a SINGLE linear equation in two variables (**A** & **C**) and can thus generate multiple paired solution values of the form (**C**, **A**) that will satisfy the equation. We will thus have multiple distinct values of the variable **C** generated from the information above. *(**C** = **A** = 250 & **C** = 150, **A** = 320 are two such possible solutions to the equation showing at least two distinct values of the variable **C**)*
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement can be mathematically penned down as to say:
A = (1/3)*(**C** + **A**) or **C** = 2***A**. which is again a SINGLE linear equation in two variables (**A** & **C**) and can thus generate multiple paired solution values of the form (**C**, **A**) that will satisfy the equation. We will thus have multiple distinct values of the variable **C** generated from the information above. *(**C** = 2, **A** = 1 & **C** = 4, **A** = 2 are two such possible solutions to the equation showing at least two distinct values of the variable **C**)*
STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have:
2***C** + 3***A** = 1260 – Statement (1)
C = 2***A** – Statement (2)

The above is clearly a SET or a system of two linear equations in two variables (**A** & **C**) and can thus be solved for a *unique* value of each of the variables (**A** & **C**). We can hence see ourselves arriving at a *unique* value of the variable **C** that has been asked in the question stem.

This right here is the end of the solution to this question → *the confident knowledge that using the info that we have at our disposal we can furnish a unique value of the variable required (**C**) is enough to mark option C and move on. Any further CALCULATIONS that follow from this stage on are a complete waste of time on the examination.*

Solving the set of two equations gives us **A** = 180 & **C** = 360 – a *unique* value obtained.

STATEMENT (1) & (2) together - SUFFICIENT

ANSWER – (C).

Q.213

Let Linda, Robert & Pat pack **L**, **R** & **P** boxes with books. Having assumed such we are then required to seek a *unique* value of the ratio (**R**/**P**).

STATEMENT (1) alone: Mathematically this statement says out the following:

L = (30/100)*(**L** + **R** + **P**) or we may rearrange to write 7***L** = 3*(**R** + **P**). However, this is a SINGLE linear equation in THREE variables which can in NO manner generate for us a *unique* value of any of the three variables. As an example use **L** = 3, which will give you **R + P** = 7, this alone can generate at least two distinct values of the ratio asked up top. *(**R** = 3, **P** = 4 gives a ratio answer of (3/4) to the question up top and **R** = 4, **P** = 3 gives a ratio answer of (4/3) to the question up top)*

STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement can be mathematically penned down as:

R – **P** = 10 → which is a difference equation and can again in NO manner confirm a *unique* value of either of the variables **R** or **P**. *(**R** = 11, **P** = 1 gives a ratio answer of (11/1) to the question up top and **R** = 12, **P** = 2 gives a ratio answer of (6/1) to the question up top)*

STATEMENT (2) alone - INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information in the two statements together we have:

7***L** = 3*(**R** + **P**) – Statement (1)

R – **P** = 10 – Statement (2)

However, the above is a SET or a system of TWO linear equations in THREE variables and can thus again in NO manner confirm a *unique* value of any of the variables **L**, **R** & **P**. No fixed value of the variables implies we do NOT have a *unique* value of the ratio asked for in the main question up top. *(Assuming **L** = 6 gives us the sum **R** + **P** = 14 together with **R** – **P** = 10 gives us **R** = 12, **P** = 2 thereby giving a ratio value of (6/1), similarly Assuming **L** = 12 gives us the sum **R** + **P** = 28 together with **R** – **P** = 10 gives us **R** = 19, **P** = 9 thereby giving a ratio value of (19/9))*

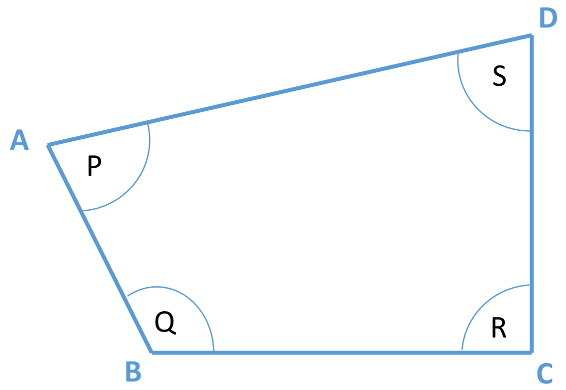
STATEMENT (1) & (2) together - INSUFFICIENT

ANSWER – (E).

Q.214

We're given a quadrilateral ABCD and are asked if one of the interior angles of the quadrilateral ABCD is 60^o?

We may draw out the quadrilateral as shown below *(figure not drawn to scale)*:



Let P, Q, R & S be the angles as shown in the diagram above. Then we're supposed to confirm if one of P, Q, R or S is 60^o.

STATEMENT (1) alone: This statement says that two of the values out of P, Q, R & S are definitively each equal to 90^o. Let P & Q each be equal to 90^o. Since the sum of all four interior angles of a quadrilateral must be = 360^o, this implies that the SUM of the remaining two angles (R & S) must be equal to {360 – (90 + 90)} = 180^o. Thus R + S = 180^o. However, we may have an (R, S) pair such that R = 60^o & S = 180 – 60 = 120^o giving us a **YES** answer to the main question asked up top, or we may simply have a pair (R, S) such that R = 100^o & S = 80^o *say* giving us a **NO** answer to the main question asked up top. We thus arrive at a YES/NO situation.
STATEMENT (1) alone - INSUFFICIENT

STATEMENT (2) alone: This statement mathematically put simply says that Q = 2*R, however, this is too little information to confirm whether one of the angels of P, Q, R & S is 60^o. We can easily have a **YES** answer by choosing any of the angle as 60^o and having the remaining three adjust accordingly. It is equally easily for us to generate a **NO** answer by choosing values such that none of the angles measure 60^o. We can thus easily arrive at a YES/NO situation.
STATEMENT (2) alone - INSUFFICIENT

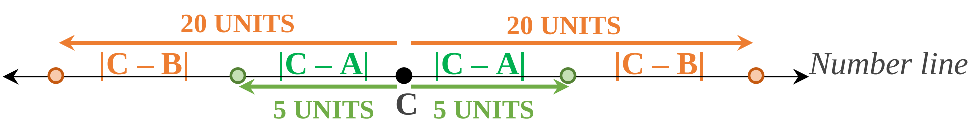
STATEMENT (1) & (2) together: Together the two statements lay out the following conditions to which the angles of the quadrilateral must conform to:
Two of the values out of P, Q, R & S are definitively each equal to 90^o – according to statement (1). Let P & S each be equal to 90^o to begin with.
Q = 2*R – according to statement (2)

Under the assumed scenario (P & S each be equal to 90^{o}), if P & S are each equal to 90^{o}, it implies that $P + S = 180^{o}$ and since the sum of all four interior angles is equal to 360^{o}, we can write that Q + R is also = 180^{o}. Using Q = 2*R stipulation from statement (2), we get that R = 60^{o} & Q = 120^{o}. Thus the measure of the angles that we obtain are P = 90^{o}, Q = 120^{o}, R = 60^{o} & S = 90^{o}. This SET of values gives us a **YES** answer to whether one of the interior angles of the quadrilateral measures 60^{o}.
However, if we assume P & Q each be equal to 90^{o}, then directly using the statement (2) relation – Q = 2*R – here, we may get the value of R = 45^{o}. S can then found by subtracting the known measures of angles from the total SUM of all the angles of the quadrilateral. Thus S = 360 – (90 + 90 + 45) = 135^{o}. Thus the measure of the angles that we obtain in this scenario are P = 90^{o}, Q = 90^{o}, R = 45^{o} & S = 135^{o}. This SET of values gives us a **NO** answer to whether one of the interior angles of the quadrilateral measures 60^{o}. Even combining the two separate pieces of information gets us to a YES/NO situation.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.215

The clearer we are in representing the information diagrammatically, the easier it is for us to interpret results and see all the cases through.
The question stem deals with accurately predicting the positions of numbers **A**, **B** & **C** on the number line relative to each other. We're given that the distance between the points **A** and **C** is 5 units and that the distance between the points **B** and **C** is 20 units. *(algebraically this translates into |**A** – **C**| = 5 & |**B** – **C**| = 20, however, this sort of representation to work with makes things a bit tougher on us)*

With **C** as centre we'll try and represent the information above diagrammatically, *(diagram not drawn to scale)*

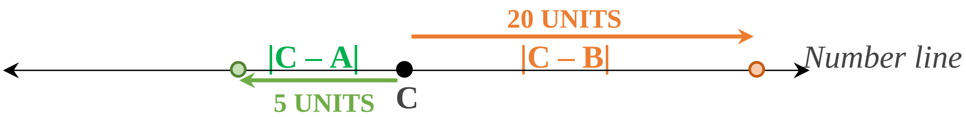


The above diagram, conforming to the conditions laid out by the question stem presents all possibilities of the relative placement of numbers **A**, **B** & **C** to each other. The Green dots represent the position possibilities of **A** relative to **C** & the Orange dots represent the position possibilities of **B** relative to **C**.

We're asked whether point **C** lies between points **A** and **B** on the number line? Or diagrammatically, does the black dot lie between the orange and the green dot? Or a rather more relevant to as would be DO THE GREEN AND THE ORANGE DOTS LIE ON OPPOSITE SIDES OF THE BLACK DOT?
A YES/NO targeted approach by making cases should work well here.

<u>STATEMENT (1) alone</u>: This statement gives out or rather FIXES the distance between the points **A** & **B**, or FIXES the distance between the green and the orange dots to a value of 25

units. Note in the diagram up above that in both the cases in which the orange and the green dots lie to the same side (either to the left or to the right of the black dot), the distance between them (the green and the orange dots) is fixed to a value of 15 units. Since the statement stipulates that the distance between the dots be 25 units, the only way this is possible is if the two dots (the green and the orange dots) lie to the opposite sides of the black dot. Or diagrammatically, the only possible cases that give us a distance of 25 units between the green and the orange dots are as follows:

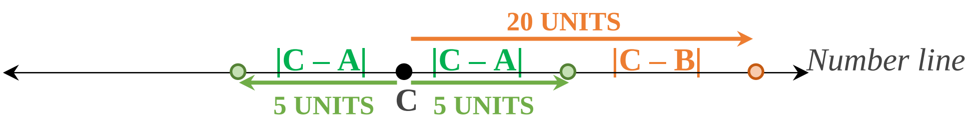


OR

As can be seen from even the diagrams up above, both the scenarios confirm that the black dot lies between the green and the orange dots or that point **C** lies in between the points **A** & **B** – a CONFIRMED YES answer.

STATEMENT (1) alone – SUFFICIENT

<u>STATEMENT (2) alone</u>: This statement stipulates that the point **A** lies to the left of the point **B**. In other words the green dot lies to the left of the orange dot. Having a look at the diagram way up above, we can make the following possible cases keeping in mind to respect the condition laid out by this statement.



Notice in the above diagram that for both the possible positions of the green dot, the dot will always lie to the left of the orange dot. However, If we consider that the point **A** is the green dot to the left of the point **C** (the black dot), we get a **YES** answer to the main question up top. Whereas, If we consider that the point **A** is the green dot to the right of the point **C** (the black dot), we get a **NO** answer to the main question up top. We thus have ourselves trapped in the YES/NO dilemma considering this statement alone.

STATEMENT (2) alone - INSUFFICIENT

ANSWER – (A).

Q.216

We're given a three digit number/integer *N* and are asked to confirm whether *N* is < 550?

<u>STATEMENT (1) alone</u>: This statement gives out the product of the three digits of the integer N to be = 30. We may write 30 as product of digits as 30 = 2 x 3 x 5 or 30 = 1 x 6 x 5. Thus we can have a whole range of values that the integer N may take on – {235, 532, 615,…so on}. Considering N = 235 gives us a **YES** answer to the main question up top, whereas considering N = 615 gives us a **NO** answer. We therefore arrive at a YES/NO scenario using this statement alone.
STATEMENT (1) alone – INSUFFICIENT

<u>STATEMENT (2) alone</u>: This statement gives out the sum of the three digits of the integer N to be = 10. We may write 10 as a sum of digits as 10 = 7 + 2 + 1 *say*. This consideration alone gives us two possible values of the integer N = 721 OR 127. N = 127 gives us a **YES** answer to the main question up top, whereas N = 721 gives us a **NO** answer. We therefore again arrive at a YES/NO scenario using this statement alone.
STATEMENT (2) alone – INSUFFICIENT

<u>STATEMENT (1) & (2) together</u>: Piecing the two bits of information contained in the two statements together we've got our digits conforming to the following restrictions:
The SUM of the digits must be = 10 – as said out by statement (2) &
The PRODUCT of the digits must be = 30 – as said out by statement (1)
Let's begin by working out the possible cases that give us a product of the digits as 30. As mentioned in statement (1) analysis, 30 as a possible product of digits may be written as: 30 = 2 x 3 x 5 or 30 = 1 x 6 x 5. Since 1 + 6 + 5 gives us a SUM of 12, we can rule out the possibility that the digits might be 1, 6 & 5. We're therefore left with only one scenario – the digits of the integer N are 2, 3 & 5. Now the three DISTINCT digits give us 3! *(after all, forming different numbers is nothing but rearranging the digits)* permutations or 3! values of the integer N. N may thus have the following 3! = 6 values – {235, 253, 325, 352, 523, 532}, ALL of which are < 550. Therefore with the two statements together we can definitively say that the three digit number N is < 550 – a CONFIRMED YES answer.
STATEMENT (1) & (2) together - SUFFICIENT
ANSWER – (C).

Q.217

We're given a three digit number/integer N and are asked to confirm a *unique* value of the SUM of the three digits of the integer N.

<u>STATEMENT (1) alone</u>: This statement says that the ratio of the hundreds to the units digit is 3 : 1. This however allows my hundreds and units digit to be either (3 & 1) or (6 & 2) or (9 & 3) respectively in each case. Add to this the fact that we're totally free to take up any value for the tens digit. We can obviously generate multiple distinct values of the SUM of the digits of the three digit integer N. We thus do NOT obtain a *unique* value of the SUM of the three digits of the integer N.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (2) alone: This statement says that the hundreds digit of the integer *N* is three more than the tens digit. This however allows my hundreds and tens digit to be either (3 & 0) or (4 & 1) or (5 & 2) and so on…respectively in each case. Add to this the fact that we're totally free to take up any value for the units digit. We can obviously generate multiple distinct values of the SUM of the digits of the three digit integer *N*. We thus do NOT obtain a *unique* value of the SUM of the three digits of the integer *N*.
STATEMENT (1) alone – INSUFFICIENT

STATEMENT (1) & (2) together: Piecing the two bits of information contained in the two statements together we've got our digits conforming to the following restrictions:
The ratio of the hundreds to the units digit is 3 : 1 – as mentioned in statement (1)
The hundreds digit of the integer *N* is three more than the tens digit – as mentioned in statement (2)
However, note that since the statement (2) does not place any restrictions on the units digit of the integer *N* we can take up all the three cases as taken up in statement (1) analysis. Reiterating, my hundreds and units digit can either be (3 & 1) or (6 & 2) or (9 & 3) respectively in each case. In each of the cases my statement (2) just gives me a value of the tens digit accordingly. I can thus have numbers 301, 632 & 963 all of which satisfy both the conditions mentioned in the two statements taken together. However each of the numbers above give me a SUM of their digits of 4, 11 & 18 respectively. We thus again do NOT obtain a *unique* value of the SUM of the three digits of the integer *N*.
STATEMENT (1) & (2) together - INSUFFICIENT
ANSWER – (E).

Q.218

Let RP & WP denote the Retail Price and the Wholesale Price of the refrigerator respectively. The question stipulates the following relation between the two variables introduced above:

RP = 1.6*(WP).

The question then requires us to seek a *unique* value of the expression *(difference)* (RP – WP) The expression, using the relation above, can be reduced to (RP – WP) = 1.6*(WP) – (WP) = 0.6*(WP). We are thus required by the question to seek a *unique* value of the variable WP.

STATEMENT (1) alone: This statement straight out throws at us the exact value that we're looking for saying that WP indeed is = $200 and hence is indeed a *unique* value.
STATEMENT (1) alone – SUFFICIENT

STATEMENT (2) alone: This statement throws at us the value of the variable RP = $320. We may use the relation given in the question stem (RP = 1.6*(WP)) to get WP = (RP/1.6) = (320/1.6) = $200 – *unique* value obtained.
STATEMENT (2) alone – SUFFICIENT
ANSWER – (D).

END OF SOLUTIONS

Expert replies to selected queries asked by students

Solutions to DS Collection 1 (Practice Test #1)

Q.64

Top 1% expert replies to student queries (can skip)

Are at least 10 percent of the people in Country X who are 65 years old or older employed?

Question: is at least 10% of some particular group of people employed? (Don't let the phrase "of the population 65 year old or older" confuse you, refer to it as to some particular group.)

(1) In Country X, 11.3 percent of the population is 65 years old or older. This particular group composes 11.3% of total population. Clearly insufficient, as no info about employment rates in this group.

(2) In Country X, of the population 65 years old or older, 20 percent of the men and 10 percent of the women are employed.
20% of the men in this group and 10% of the women in this group are employed. No matter how many men and women are in this group, more than 10% will be employed. This is because the weighted average of 2 individual averages (10% and 20%) must lie between these individual averages, so percent of employed people in this group is between 10% and 20%. Sufficient.

Q.90

Top 1% expert replies to student queries (can skip)

At the start of the month we have 600$. Somewhere in the middle 300$ is withdrawn. If we know the date when this happened or the average on a date after the amount is withdrawn. We can find a solution.
S1: We know now that the account had $600 for 20 days and $300 for the rest of the 10 days. You can easily find the average. Sufficient.
You don't need to since it is a DS question, but if you had to find the average, then Avg = (600*20 + 300*10)/30 = 500
S2: The average of the 25 days is $540. If the average were $600, only then can we say that the deduction was made after the 25th day. Since the average is less than $600, the deduction must have been made before the 25th day. Only then can the average be less than 600.
Now, it is simple to find the average (even though you don't need to).
For 25 days, the average balance was $540 and for 5 days, it was $300.
Avg = (540*25 + 300*5)/30 = 500. Sufficient

Hence D

Q.155

Top 1% expert replies to student queries (can skip)

Distance=rate*time --> rate and time are inversely proportional, which means that if you increase the rate then you'll need less time to cover the same distance and if you decrease the rate you'll need more time to cover the same distance. So, a rate is less than 6.4 kilometers per hour means that the time needed to cover 16 kilometers is more than 2.5 hours.

Alternate approach:
Did it take Pei more than 2 hours to walk a distance of 10 miles along a certain trail? (1mile = 1.6 Kilometers, rounded to the nearest tenth)
Basically the question asks whether the rate was less than 10/2=5 miles per hour: is rate<5 miles per hour? Because if it is less than 5 miles per hour, then time needed to cover 10 miles would be more than 2 hours.
(1) Pei walked this distance at an average rate of less than 6.4 kilometers per hour --> rate<6.4 kilometers per hour --> 6.4 kilometer = 6.4/1.6 = 4 miles --> rate<4 miles per hour. Sufficient.
(2) On average, it took Pei more than 9 minutes per Kilometers to walk this distance --> more than 9/60 hours to cover 1 kilometer --> rate<60/9 kilometers per hour (time more - rate less) --> 60/9 kilometers = (60/9)/1.6 = ~4.2 miles --> rate<4.2 miles per hour. Sufficient.
Answer: D.

Q.178

Top 1% expert replies to student queries (can skip)

Note that we are told that there are more than 2 numbers in the list.
(1) The product of any two numbers in the list is equal to 0 --> it's certainly possible all numbers to equal to 0 but it's also possible one number to be different from 0 and all other numbers to equal to 0 (in this case the product of ANY two numbers in the list will also be equal to 0). Not sufficient.
(2) The sum of any two numbers in the list is equal to 0 --> as there are more than 2 numbers in the list then all numbers must equal to 0 (if we were not told that there are more than 2 numbers in the list then it would be possible to have a list like {-1, 1} but as there are more than 2 numbers then in order the sum of ANY two numbers in the list to be equal to 0 all numbers must equal to zero). Sufficient.
ANSWER – (B).

Q.204

Top 1% expert replies to student queries (can skip)

Question states: Ratio w:c = 5:2

Statement 1) Ratio c:m = 5:11
Ratio of all the three:- w:c:m = 25:10:22
But this does not give us an exact number of men

Statement 2) w<30. This itself does not tell anything about the number of men.

Combine 1 & 2:
Since the number of women is less than 30 and since the number of people will always be an integer and also since 25:10:22 (w:c:m) cannot be reduced further, there will be 25 women. This leads to 22 men. Thus sufficient.

ANSWER (C)

Solutions to DS Collection 2 (Practice Test #2)

Q.93

Top 1% expert replies to student queries (can skip)

Symmetric about the mean means that the shape of the distribution on the right and left side of the curve are mirror-images of each other.

(1) 68% of the distribution lies in the interval from m-d to m+d, inclusive --> 100%-68%=32% is less than m-d and more than m+d. As distribution is symmetric about the mean then exactly half of 32%, or 16%, would be more than m+d. Sufficient.

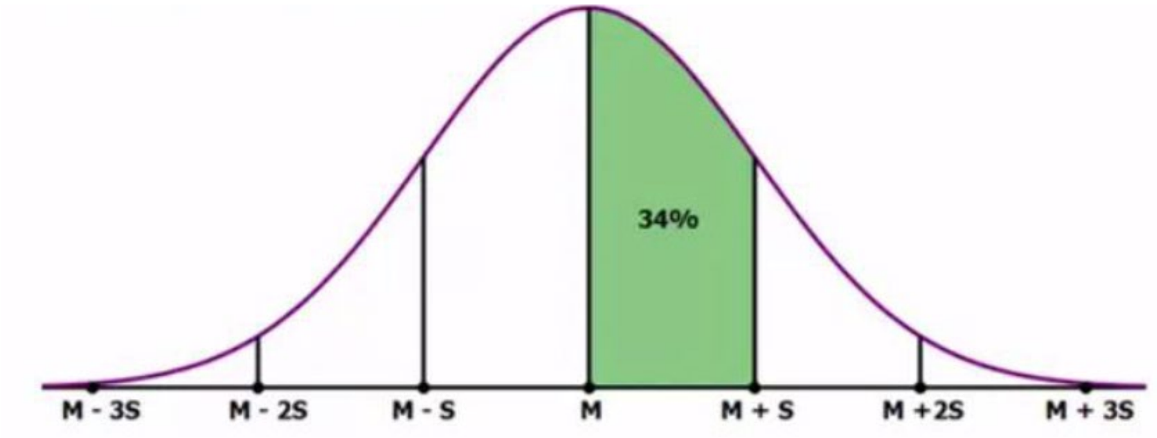
(2) 16% of the distribution is less than m-d --> again, as the distribution is symmetric about the mean then exactly 16%, will be more than m+d. Sufficient.

Answer: D.

OR

See the diagram attached below to understand the distribution. m+s=m+d (Replace s with d)
Statement 1) 68 percent of the distribution lies in the interval from m-d to m+d, inclusive
Standard deviation is a bell curve with m at the centre and +d on the right and -d not the left. (But remember standard deviation in itself can never be negative)
Also remember the graph of Standard deviation is the most symmetric graph that you will see in mathematics. It also has some unique properties related to (mean + deviation) and (mean + 2 * deviation) and so on but for this question this much info is enough.
Therefore if you assume m to be at point 0 then m+d=34% and m-d= 34 %
we want to know the value of m+d ; SUFFICIENT

2) 16 percent of the distribution is less than m-d
Since 16 % of distribution is less than m-d therefore 16 % of the distribution will be more than m+d ; a total of 32% of 100 leaving 68% to be distributed equally into m+d and m-d
therefore both m+d and m-d will be 68/2 = 34
Sufficient



Between M and M + S is 34% of the population.

ANSWER – (D).

Q.189

Top 1% expert replies to student queries (can skip)

If the line is passing through the origin, the equation can be either y=x or y=-x.
This is not true. How did you derive this?
(1) The slope of line k is negative. If slope is negative and the line passes through the origin, point (a,b) can be either in the II quadrant(a is negative and b is positive) or in the IV(a is positive and b is negative).. So, b can be positive or negative. Not sufficient.
(2) a < b. (it can be in any quadrant) Not sufficient by itself.
(1)+(2) a < b and they have opposite signs, meaning b is positive (point lies in the second quadrant). Sufficient.
Answer: C.