4 Problem Solving

In these questions you are to solve each problem and select the best of the five answer choices given The mathematics required to answer the questions does not extend beyond that assumed to be common to the mathematics background of all examinees

The following pages include test-taking strategies, sample questions, and explanations for all the problems These explanations present possible problem-solving strategies for the problems

Test-taking Strategies for Problem Solving

1 Pacing yourself is very important Consult the on-screen timer periodically Work as carefully as possible, but do not spend valuable time checking answers or pondering over problems that you find difficult

2 Scratchpaper is provided Working a problem out in writing may help you avoid errors in solving the problem If diagrams or figures are not presented, it may help if you draw your own

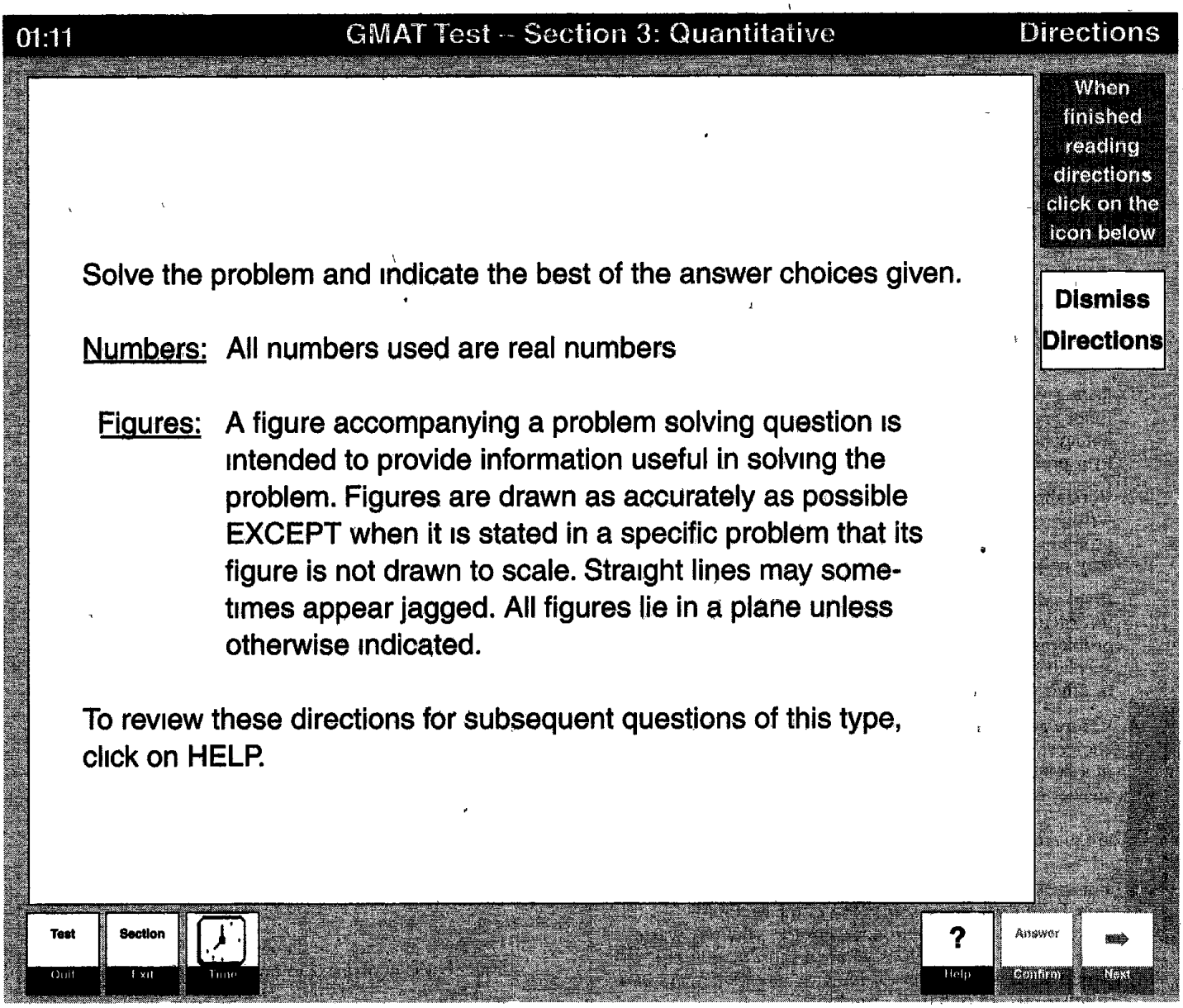
3. Read each question carefully to determine what information is given and what is being asked For word problems, take one step at a time, reading each sentence carefully and translating the information into equations or other useful mathematical representations

4 Before attempting to answer a question, scan the answer choices, otherwise you may waste time putting answers in a form that is not given (for example, finding the answer in decimal form, such as 0 25, when the choices are given in fractional form, such as $\frac{1}{4}$)

5 For questions that require approximations, scan the answer choices to get some idea of the required closeness of approximation, otherwise, you may waste time on long computations where a short mental process would serve as well (for example, taking 48 percent of a number instead of half the number)

6 Don't waste time trying to solve a problem that is too difficult for you Guess and move on to another question

PROBLEM SOLVING DIRECTIONS



PROBLEM SOLVING SAMPLE QUESTIONS

1 If Mario was 32 years old 8 years ago, how old was he x years ago?

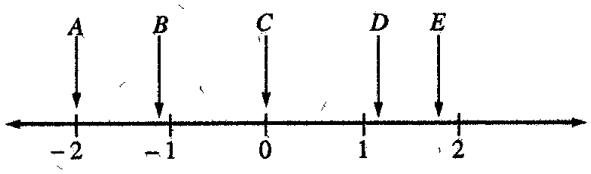
(A) $x - 40$
(B) $x - 24$
(C) $40 - x$
(D) $24 - x$
(E) $24 + x$

2 Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?

(A) 648
(B) 1,800
(C) 2,700
(D) 10,800
(E) 64,800

3 Three business partners, Q, R, and S, agree to divide their total profit for a certain year in the ratios 2 5 8, respectively If Q's share was $4,000, what was the total profit of the business partners for the year?

(A) $26,000
(B) $30,000
(C) $52,000
(D) $60,000
(E) $300,000



4 Of the five coordinates associated with points A, B, C, D, and E on the number line above, which has the greatest absolute value?

(A) A
(B) B
(C) C
(D) D
(E) E

5 A restaurant meal cost $35 50 and there was no tax. If the tip was more than 10 percent but less than 15 percent of the cost of the meal, then the total amount paid must have been between

(A) $40 and $42
(B) $39 and $41
(C) $38 and $40
(D) $37 and $39
(E) $36 and $37

6 Harriet wants to put up fencing around three sides of her rectangular yard and leave a side of 20 feet unfenced If the yard has an area of 680 square feet, how many feet of fencing does she need?

(A) 34
(B) 40
(C) 68
(D) 88
(E) 102

7 If $u > t$, $r > q$, $s > t$, and $t > r$, which of the following must be true?

I $u > s$
II $s \geq q$
III $u > r$

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

8 Increasing the original price of an article by 15 percent and then increasing the new price by 15 percent is equivalent to increasing the original price by

(A) 32 25%
(B) 31 00%
(C) 30.25%
(D) 30 00%
(E) 22 50%

9 If k is an integer and 0.0010101×10^k is greater than 1,000, what is the least possible value of k?

(A) 2
(B) 3
(C) 4
(D) 5
(E) 6

10. If $(b-3)\left(4+\frac{2}{b}\right)=0$ and $b \neq 3$, then $b =$

(A) -8

(B) -2

(C) $-\frac{1}{2}$

(D) $\frac{1}{2}$

(E) 2

11 In a weight-lifting competition, the total weight of Joe's two lifts was 750 pounds If twice the weight of his first lift was 300 pounds more than the weight of his second lift, what was the weight, in pounds, of his first lift?

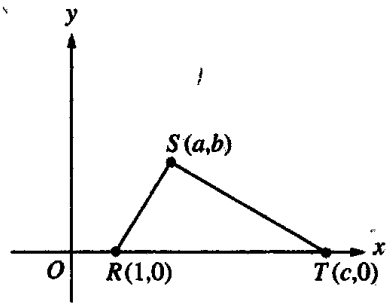
(A) 225
(B) 275
(C) 325
(D) 350
(E) 400

12 One hour after Yolanda started walking from X to Y, a distance of 45 miles, Bob started walking along the same road from Y to X If Yolanda's walking rate was 3 miles per hour and Bob's was 4 miles per hour, how many miles had Bob walked when they met?

(A) 24
(B) 23
(C) 22
(D) 21
(E) 19 5

13 The average (arithmetic mean) of 6 numbers is 8 5 When one number is discarded, the average of the remaining numbers becomes 7 2 What is the discarded number?

(A) 7.8
(B) 9 8
(C) 10 0
(D) 12 4
(E) 15 0



14 In the rectangular coordinate system above, the area of ΔRST is

(A) $\frac{bc}{2}$

(B) $\frac{b(c-1)}{2}$

(C) $\frac{c(b-1)}{2}$

(D) $\frac{a(c-1)}{2}$

(E) $\frac{c(a-1)}{2}$

15 Which of the following equations has a root in common with $x^2-6x+5=0$?

(A) $x^2+1=0$
(B) $x^2-x-2=0$
(C) $x^2-10x-5=0$
(D) $2x^2-2=0$
(E) $x^2-2x-3=0$

16 One inlet pipe fills an empty tank in 5 hours. A second inlet pipe fills the same tank in 3 hours If both pipes are used together, how long will it take to fill $\frac{2}{3}$ of the tank?

(A) $\frac{8}{15}$ hr

(B) $\frac{3}{4}$hr

(C) $\frac{5}{4}$hr

(D) $\frac{15}{8}$hr

(E) $\frac{8}{3}$hr

17 During the first week of September, a shoe retailer sold 10 pairs of a certain style of oxfords at $35 00 a pair If, during the second week of September, 15 pairs were sold at the sale price of $27 50 a pair, by what amount did the revenue from weekly sales of these oxfords increase during the second week?

(A) $62 50
(B) $75 00
(C) $112 50
(D) $137 50
(E) $175 00

18 The number 2 – 0.5 is how many times the number 1 – 0 5 ?

(A) 2
(B) 2 5
(C) 3
(D) 3 5
(E) 4

19 If $x = -1$, then $-(x^4 + x^3 + x^2 + x) =$

(A) –10
(B) – 4
(C) 0
(D) 4
(E) 10

20 Coins are dropped into a toll box so that the box is being filled at the rate of approximately 2 cubic feet per hour If the empty rectangular box is 4 feet long, 4 feet wide, and 3 feet deep, approximately how many hours does it take to fill the box?

(A) 4
(B) 8
(C) 16
(D) 24
(E) 48

21 $\left(\frac{1}{5}\right)^2 - \left(\frac{1}{5}\right)\left(\frac{1}{4}\right) =$

(A) $-\frac{1}{20}$
(B) $-\frac{1}{100}$
(C) $\frac{1}{100}$
(D) $\frac{1}{20}$
(E) $\frac{1}{5}$

22 A club collected exactly $599 from its members If each member contributed at least $12, what is the greatest number of members the club could have?

(A) 43
(B) 44
(C) 49
(D) 50
(E) 51

23 A union contract specifies a 6 percent salary increase plus a $450 bonus for each employee For a certain employee, this is equivalent to an 8 percent salary increase What was this employee's salary before the new contract?

(A) $21,500
(B) $22,500
(C) $23,500
(D) $24,300
(E) $25,000

24 If n is a positive integer and $k + 2 = 3^n$, which of the following could NOT be a value of k ?

(A) 1
(B) 4
(C) 7
(D) 25
(E) 79

25. Elena purchased brand X pens for $4 00 apiece and brand Y pens for $2 80 apiece If Elena purchased a total of 12 of these pens for $42 00, how many brand X pens did she purchase?

(A) 4
(B) 5
(C) 6
(D) 7
(E) 8

26. If the length and width of a rectangular garden plot were each increased by 20 percent, what would be the percent increase in the area of the plot?

(A) 20%
(B) 24%
(C) 36%
(D) 40%
(E) 44%

27 The population of a bacteria culture doubles every 2 minutes. Approximately how many minutes will it take for the population to grow from 1,000 to 500,000 bacteria?

(A) 10
(B) 12
(C) 14
(D) 16
(E) 18

28. When 10 is divided by the positive integer n, the remainder is $n - 4$. Which of the following could be the value of n?

(A) 3
(B) 4
(C) 7
(D) 8
(E) 12

29 For a light that has an intensity of 60 candles at its source, the intensity in candles, S, of the light at a point d feet from the source is given by the formula $S = \frac{60k}{d^2}$, where k is a constant. If the intensity of the light is 30 candles at a distance of 2 feet from the source, what is the intensity of the light at a distance of 20 feet from the source?

(A) $\frac{3}{10}$ candle
(B) $\frac{1}{2}$ candle
(C) $1\frac{1}{3}$ candles
(D) 2 candles
(E) 3 candles

30 If x and y are prime numbers, which of the following CANNOT be the sum of x and y?

(A) 5
(B) 9
(C) 13
(D) 16
(E) 23

31 Of the 3,600 employees of Company X, $\frac{1}{3}$ are clerical. If the clerical staff were to be reduced by $\frac{1}{3}$, what percent of the total number of the remaining employees would then be clerical?

(A) 25%
(B) 22 2%
(C) 20%
(D) 12 5%
(E) 11 1%

32 In which of the following pairs are the two numbers reciprocals of each other?

I. 3 and $\frac{1}{3}$

II $\frac{1}{17}$ and $\frac{-1}{17}$

III $\sqrt{3}$ and $\frac{\sqrt{3}}{3}$

(A) I only
(B) II only
(C) I and II
(D) I and III
(E) II and III

33 What is 45 percent of $\frac{7}{12}$ of 240?

(A) 63
(B) 90
(C) 108
(D) 140
(E) 311

34 If x books cost \$5 each and y books cost \$8 each, then the average (arithmetic mean) cost, in dollars per book, is equal to

(A) $\frac{5x + 8y}{x + y}$
(B) $\frac{5x + 8y}{xy}$
(C) $\frac{5x + 8y}{13}$
(D) $\frac{40xy}{x + y}$
(E) $\frac{40xy}{13}$

35 If $\frac{1}{2}$ of the money in a certain trust fund was invested in stocks, $\frac{1}{4}$ in bonds, $\frac{1}{5}$ in a mutual fund, and the remaining $10,000 in a government certificate, what was the total amount of the trust fund?

(A) $100,000
(B) $150,000
(C) $200,000
(D) $500,000
(E) $2,000,000

36 Marion rented a car for $18 00 plus $0 10 per mile driven Craig rented a car for $25 00 plus $0 05 per mile driven. If each drove d miles and each was charged exactly the same amount for the rental, then d equals

(A) 100
(B) 120
(C) 135
(D) 140
(E) 150

37 Machine A produces bolts at a uniform rate of 120 every 40 seconds, and machine B produces bolts at a uniform rate of 100 every 20 seconds. If the two machines run simultaneously, how many seconds will it take for them to produce a total of 200 bolts?

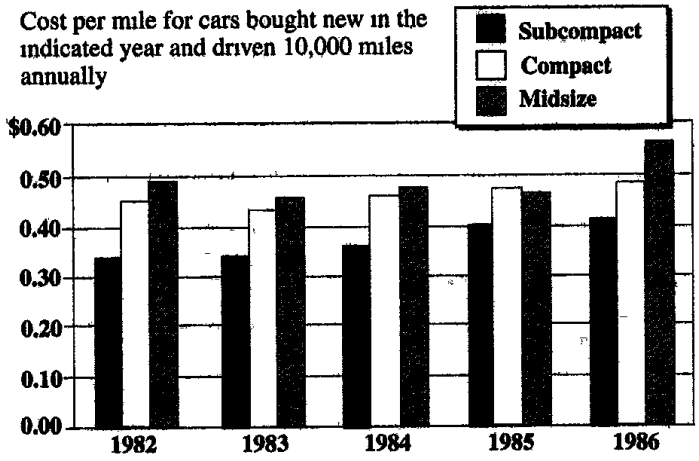
(A) 22
(B) 25
(C) 28
(D) 32
(E) 56

38 $\frac{3.003}{2.002} =$

(A) 1 05
(B) 1 50015
(C) 1 501
(D) 1 5015
(E) 1 5

Questions 39-41 refer to the following graph

AVERAGE COSTS OF OPERATING SUBCOMPACT, COMPACT, AND MIDSIZE CARS IN THE UNITED STATES, 1982-1986



39 In 1982 the approximate average cost of operating a subcompact car for 10,000 miles was

(A) $360
(B) $3,400
(C) $4,100
(D) $4,500
(E) $4,900

40 In 1984 the average cost of operating a subcompact car was approximately what percent less than the average cost of operating a midsized car?

(A) 12%
(B) 20%
(C) 25%
(D) 33%
(E) 48%

41 For each of the years shown, the average cost per mile of operating a compact car minus the average cost per mile of operating a subcompact car was between

(A) $0 12 and $0 18
(B) $0 10 and $0.15
(C) $0 09 and $0 13
(D) $0 06 and $0 12
(E) $0.05 and $0.08

42 What is the decimal equivalent of $\left(\frac{1}{5}\right)^5$?

(A) 0 00032
(B) 0 0016
(C) 0 00625
(D) 0 008
(E) 0 03125

43 Two hundred gallons of fuel oil are purchased at \$0 91 per gallon and are consumed at a rate of \$0 70 worth of fuel per hour At this rate, how many hours are required to consume the 200 gallons of fuel oil?

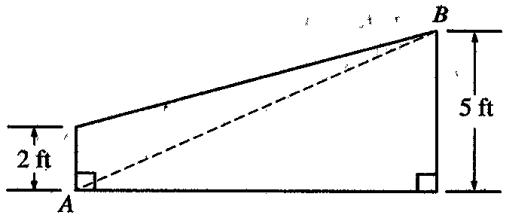
(A) 140
(B) 220
(C) 260
(D) 322
(E) 330

44 If $\frac{4-x}{2+x} = x$, what is the value of $x^2 + 3x - 4$?

(A) -4
(B) -1
(C) 0
(D) 1
(E) 2

45. If $b < 2$ and $2x - 3b = 0$, which of the following must be true?

(A) $x > -3$
(B) $x < 2$
(C) $x = 3$
(D) $x < 3$
(E) $x > 3$



46 The trapezoid shown in the figure above represents a cross section of the rudder of a ship. If the distance from A to B is 13 feet, what is the area of the cross section of the rudder in square feet?

(A) 39
(B) 40
(C) 42
(D) 45
(E) 46 5

47 $\frac{(-1\ 5)(1\ 2) - (4\ 5)(0\ 4)}{30} =$

(A) $-1\ 2$
(B) $-0\ 12$
(C) 0
(D) 0.12
(E) 1 2

48 If n is a positive integer, then $n(n+1)(n+2)$ is

(A) even only when n is even
(B) even only when n is odd
(C) odd whenever n is odd
(D) divisible by 3 only when n is odd
(E) divisible by 4 whenever n is even

49 If Jack had twice the amount of money that he has, he would have exactly the amount necessary to buy 3 hamburgers at \$0 96 apiece and 2 milk shakes at \$1 28 apiece How much money does Jack have?

(A) \$1 60
(B) \$2 24
(C) \$2 72
(D) \$3 36
(E) \$5.44

50 If a photocopier makes 2 copies in $\frac{1}{3}$ second, then, at the same rate, how many copies does it make in 4 minutes?

(A) 360
(B) 480
(C) 576
(D) 720
(E) 1,440

51 The price of a certain television set is discounted by 10 percent, and the reduced price is then discounted by 10 percent This series of successive discounts is equivalent to a single discount of

(A) 20%
(B) 19%
(C) 18%
(D) 11%
(E) 10%

52 If $\frac{2}{1+\frac{2}{y}} = 1$, then $y =$

(A) -2
(B) $-\frac{1}{2}$
(C) $\frac{1}{2}$
(D) 2
(E) 3

53 If a rectangular photograph that is 10 inches wide by 15 inches long is to be enlarged so that the width will be 22 inches and the ratio of width to length will be unchanged, then the length, in inches, of the enlarged photograph will be

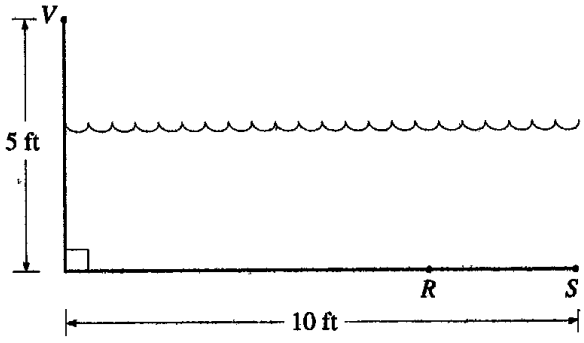
(A) 33
(B) 32
(C) 30
(D) 27
(E) 25

54 If m is an integer such that $(-2)^{2m} = 2^{9-m}$, then $m =$

(A) 1
(B) 2
(C) 3
(D) 4
(E) 6

55. If $0 \leq x \leq 4$ and $y < 12$, which of the following CANNOT be the value of xy ?

(A) -2
(B) 0
(C) 6
(D) 24
(E) 48



56 In the figure above, V represents an observation point at one end of a pool. From V, an object that is actually located on the bottom of the pool at point R appears to be at point S If $VR = 10$ feet, what is the distance RS, in feet, between the actual position and the perceived position of the object?

(A) $10 - 5\sqrt{3}$
(B) $10 - 5\sqrt{2}$
(C) 2
(D) $2\frac{1}{2}$
(E) 4

57 If the total payroll expense of a certain business in year Y was \$84,000, which was 20 percent more than in year X, what was the total payroll expense in year X?

(A) \$70,000
(B) \$68,320
(C) \$64,000
(D) \$60,000
(E) \$52,320

58. If a, b, and c are consecutive positive integers and $a < b < c$, which of the following must be true?

I $c - a = 2$

II abc is an even integer.

III $\frac{a + b + c}{3}$ is an integer

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

59 A straight pipe 1 yard in length was marked off in fourths and also in thirds. If the pipe was then cut into separate pieces at each of these markings, which of the following gives all the different lengths of the pieces, in fractions of a yard?

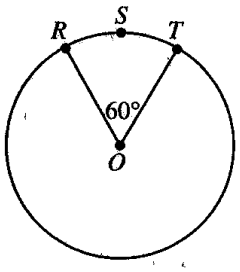
(A) $\frac{1}{6}$ and $\frac{1}{4}$ only
(B) $\frac{1}{4}$ and $\frac{1}{3}$ only
(C) $\frac{1}{6}$, $\frac{1}{4}$, and $\frac{1}{3}$
(D) $\frac{1}{12}$, $\frac{1}{6}$, and $\frac{1}{4}$
(E) $\frac{1}{12}$, $\frac{1}{6}$, and $\frac{1}{3}$

60 What is the least integer that is a sum of three different primes each greater than 20?

(A) 69
(B) 73
(C) 75
(D) 79
(E) 83

61 A tourist purchased a total of \$1,500 worth of traveler's checks in \$10 and \$50 denominations. During the trip the tourist cashed 7 checks and then lost all of the rest. If the number of \$10 checks cashed was one more or one less than the number of \$50 checks cashed, what is the minimum possible value of the checks that were lost?

(A) \$1,430
(B) \$1,310
(C) \$1,290
(D) \$1,270
(E) \$1,150



62 If the circle above has center O and circumference 18π, then the perimeter of sector $RSTO$ is

(A) $3\pi + 9$
(B) $3\pi + 18$
(C) $6\pi + 9$
(D) $6\pi + 18$
(E) $6\pi + 24$

63 If each of the following fractions were written as a repeating decimal, which would have the longest sequence of different digits?

(A) $\frac{2}{11}$
(B) $\frac{1}{3}$
(C) $\frac{41}{99}$
(D) $\frac{2}{3}$
(E) $\frac{23}{37}$

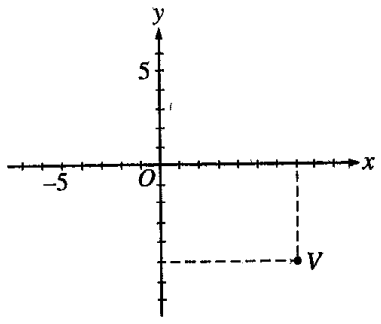
64 Today Rose is twice as old as Sam and Sam is 3 years younger than Tina If Rose, Sam, and Tina are all alive 4 years from today, which of the following must be true on that day?

I Rose is twice as old as Sam
II Sam is 3 years younger than Tina.
III Rose is older than Tina

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

65 The average (arithmetic mean) of 6, 8, and 10 equals the average of 7, 9, and

(A) 5
(B) 7
(C) 8
(D) 9
(E) 11



66 In the figure above, the coordinates of point V are

(A) (−7, 5)
(B) (−5, 7)
(C) (5, 7)
(D) (7, 5)
(E) (7, − 5)

67 Tickets for all but 100 seats in a 10,000-seat stadium were sold Of the tickets sold, 20 percent were sold at half price and the remaining tickets were sold at the full price of $2 What was the total revenue from ticket sales?

(A) $15,840
(B) $17,820
(C) $18,000
(D) $19,800
(E) $21,780

68 In a mayoral election, Candidate X received $\frac{1}{3}$ more votes than Candidate Y, and Candidate Y received $\frac{1}{4}$ fewer votes than Candidate Z If Candidate Z received 24,000 votes, how many votes did Candidate X receive?

(A) 18,000
(B) 22,000
(C) 24,000
(D) 26,000
(E) 32,000

69 René earns $8 50 per hour on days other than Sundays and twice that rate on Sundays Last week she worked a total of 40 hours, including 8 hours on Sunday. What were her earnings for the week?

(A) $272
(B) $340
(C) $398
(D) $408
(E) $476

70 In a shipment of 120 machine parts, 5 percent were defective In a shipment of 80 machine parts, 10 percent were defective For the two shipments combined, what percent of the machine parts were defective?

(A) 6.5%
(B) 7 0%
(C) 7 5%
(D) 8 0%
(E) 8 5%

71 $\dfrac{2\frac{3}{5}-1\frac{2}{3}}{\frac{2}{3}-\frac{3}{5}} =$

(A) 16
(B) 14
(C) 3
(D) 1
(E) −1

72 If $x = -1$, then $\frac{x^4 - x^3 + x^2}{x - 1} =$

(A) $-\frac{3}{2}$

(B) $-\frac{1}{2}$

(C) 0

(D) $\frac{1}{2}$

(E) $\frac{3}{2}$

73 Which of the following equations is NOT equivalent to $25x^2 = y^2 - 4$?

(A) $25x^2 + 4 = y^2$

(B) $75x^2 = 3y^2 - 12$

(C) $25x^2 = (y + 2)(y - 2)$

(D) $5x = y - 2$

(E) $x^2 = \frac{y^2 + 4}{25}$

74 A toy store regularly sells all stock at a discount of 20 percent to 40 percent If an additional 25 percent were deducted from the discount price during a special sale, what would be the lowest possible price of a toy costing $16 before any discount?

(A) $5 60
(B) $7 20
(C) $8 80
(D) $9 60
(E) $15 20

75 If there are 664,579 prime numbers among the first 10 million positive integers, approximately what percent of the first 10 million positive integers are prime numbers?

(A) 0 0066%
(B) 0 066%
(C) 0 66%
(D) 6.6%
(E) 66%

76 A bank customer borrowed $10,000, but received y dollars less than this due to discounting If there was a separate $25 service charge, then, in terms of y, the service charge was what fraction of the amount that the customer received?

(A) $\frac{25}{10{,}000 - y}$

(B) $\frac{25}{10{,}000 - 25y}$

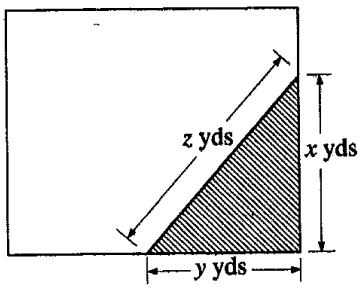
(C) $\frac{25y}{10{,}000 - y}$

(D) $\frac{y - 25}{10{,}000 - y}$

(E) $\frac{25}{10{,}000 - (y - 25)}$

77 An airline passenger is planning a trip that involves three connecting flights that leave from Airports A, B, and C, respectively The first flight leaves Airport A every hour, beginning at 8 00 a m , and arrives at Airport B $2\frac{1}{2}$ hours later The second flight leaves Airport B every 20 minutes, beginning at 8 00 a m , and arrives at Airport C $1\frac{1}{6}$ hours later The third flight leaves Airport C every hour, beginning at 8 45 a m What is the least total amount of time the passenger must spend between flights if all flights keep to their schedules?

(A) 25 min
(B) 1 hr 5 min
(C) 1 hr 15 min
(D) 2 hr 20 min
(E) 3 hr 40 min



78. The shaded portion of the rectangular lot shown above represents a flower bed If the area of the bed is 24 square yards and $x = y + 2$, then z equals

(A) $\sqrt{13}$
(B) $2\sqrt{13}$
(C) 6
(D) 8
(E) 10

79 How many multiples of 4 are there between 12 and 96, inclusive?

(A) 21
(B) 22
(C) 23
(D) 24
(E) 25

80 Jack is now 14 years older than Bill If in 10 years Jack will be twice as old as Bill, how old will Jack be in 5 years?

(A) 9
(B) 19
(C) 21
(D) 23
(E) 33

81 In Country X a returning tourist may import goods with a total value of $500 or less tax free, but must pay an 8 percent tax on the portion of the total value in excess of $500 What tax must be paid by a returning tourist who imports goods with a total value of $730 ?

(A) $58 40
(B) $40 00
(C) $24 60
(D) $18 40
(E) $16 00

82 Which of the following is greater than $\frac{2}{3}$?

(A) $\frac{33}{50}$
(B) $\frac{8}{11}$
(C) $\frac{3}{5}$
(D) $\frac{13}{27}$
(E) $\frac{5}{8}$

83 A rope 40 feet long is cut into two pieces If one piece is 18 feet longer than the other, what is the length, in feet, of the shorter piece?

(A) 9
(B) 11
(C) 18
(D) 22
(E) 29

84 If 60 percent of a rectangular floor is covered by a rectangular rug that is 9 feet by 12 feet, what is the area, in square feet, of the floor?

(A) 65
(B) 108
(C) 180
(D) 270
(E) 300

85 The Earth travels around the Sun at a speed of approximately 18 5 miles per second. This approximate speed is how many miles per hour?

(A) 1,080
(B) 1,160
(C) 64,800
(D) 66,600
(E) 3,996,000

86 A collection of books went on sale, and $\frac{2}{3}$ of them were sold for $2 50 each If none of the 36 remaining books were sold, what was the total amount received for the books that were sold?

(A) $180
(B) $135
(C) $90
(D) $60
(E) $54

87 If "basis points" are defined so that 1 percent is equal to 100 basis points, then 82 5 percent is how many basis points greater than 62.5 percent?

(A) 0 02
(B) 0 2
(C) 20
(D) 200
(E) 2,000

88 The amounts of time that three secretaries worked on a special project are in the ratio of 1 to 2 to 5 If they worked a combined total of 112 hours, how many hours did the secretary who worked the longest spend on the project?

(A) 80
(B) 70
(C) 56
(D) 16
(E) 14

89. If the quotient $\frac{a}{b}$ is positive, which of the following must be true?

(A) $a > 0$
(B) $b > 0$
(C) $ab > 0$
(D) $a - b > 0$
(E) $a + b > 0$

90 If $8^{2x+3} = 2^{3x+6}$, then $x =$

(A) -3
(B) -1
(C) 0
(D) 1
(E) 3

91 Of the following, the closest approximation to $\sqrt{\frac{5.98(601.5)}{15\ 79}}$ is

(A) 5
(B) 15
(C) 20
(D) 25
(E) 225

92 Which of the following CANNOT be the greatest common divisor of two positive integers x and y?

(A) 1
(B) x
(C) y
(D) $x - y$
(E) $x + y$

93 An empty pool being filled with water at a constant rate takes 8 hours to fill to $\frac{3}{5}$ of its capacity How much more time will it take to finish filling the pool?

(A) 5 hr 30 min
(B) 5 hr 20 min
(C) 4 hr 48 min
(D) 3 hr 12 min
(E) 2 hr 40 min

94. A positive number x is multiplied by 2, and this product is then divided by 3. If the positive square root of the result of these two operations equals x, what is the value of x?

(A) $\frac{9}{4}$
(B) $\frac{3}{2}$
(C) $\frac{4}{3}$
(D) $\frac{2}{3}$
(E) $\frac{1}{2}$

95 A tank contains 10,000 gallons of a solution that is 5 percent sodium chloride by volume If 2,500 gallons of water evaporate from the tank, the remaining solution will be approximately what percent sodium chloride?

(A) 1 25%
(B) 3 75%
(C) 6 25%
(D) 6 67%
(E) 11 7%

96 A certain grocery purchased x pounds of produce for p dollars per pound If y pounds of the produce had to be discarded due to spoilage and the grocery sold the rest for s dollars per pound, which of the following represents the gross profit on the sale of the produce?

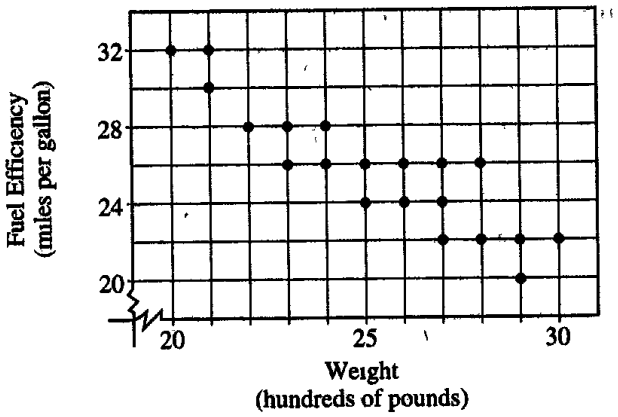
(A) $(x - y)s - xp$
(B) $(x - y)p - ys$
(C) $(s - p)y - xp$
(D) $xp - ys$
(E) $(x - y)(s - p)$

97. If $x + 5y = 16$ and $x = -3y$, then $y =$

(A) -24
(B) -8
(C) -2
(D) 2
(E) 8

98 An empty swimming pool with a capacity of 5,760 gallons is filled at the rate of 12 gallons per minute How many hours does it take to fill the pool to capacity?

(A) 8
(B) 20
(C) 96
(D) 480
(E) 720



99 The dots on the graph above indicate the weights and fuel efficiency ratings for 20 cars How many of the cars weigh more than 2,500 pounds and also get more than 22 miles per gallon?

(A) Three
(B) Five
(C) Eight
(D) Ten
(E) Eleven

100 $\dfrac{90 - 8(20 + 4)}{\frac{1}{2}} =$

(A) 25
(B) 50
(C) 100
(D) 116
(E) 170

101 If a, b, and c are nonzero numbers and $a + b = c$, which of the following is equal to 1 ?

(A) $\dfrac{a-b}{c}$

(B) $\dfrac{a-c}{b}$

(C) $\dfrac{b-c}{a}$

(D) $\dfrac{b-a}{c}$

(E) $\dfrac{c-b}{a}$

102. Bill's school is 10 miles from his home He travels 4 miles from school to football practice, and then 2 miles to a friend's house If he is then x miles from home, what is the range of possible values for x?

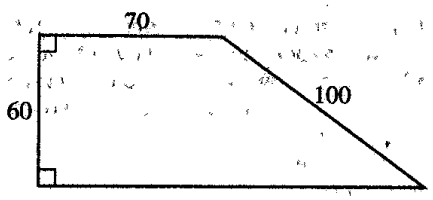
(A) $2 \leq x \leq 10$
(B) $4 \leq x \leq 10$
(C) $4 \leq x \leq 12$
(D) $4 \leq x \leq 16$
(E) $6 \leq x \leq 16$

103 Three machines, individually, can do a certain job in 4, 5, and 6 hours, respectively What is the greatest part of the job that can be done in one hour by two of the machines working together at their respective rates?

(A) $\frac{11}{30}$
(B) $\frac{9}{20}$
(C) $\frac{3}{5}$
(D) $\frac{11}{15}$
(E) $\frac{5}{6}$

104 In 1985, 45 percent of a document storage facility's 60 customers were banks, and in 1987, 25 percent of its 144 customers were banks What was the percent increase from 1985 to 1987 in the number of bank customers the facility had?

(A) 10 7%
(B) 20%
(C) 25%
(D) $33\frac{1}{3}\%$
(E) $58\frac{1}{3}\%$



105 What is the perimeter of the figure above?

(A) 380
(B) 360
(C) 330
(D) 300
(E) 230

106 A committee is composed of w women and m men. If 3 women and 2 men are added to the committee, and if one person is selected at random from the enlarged committee, then the probability that a woman is selected can be represented by

(A) $\frac{w}{m}$
(B) $\frac{w}{w+m}$
(C) $\frac{w+3}{m+2}$
(D) $\frac{w+3}{w+m+3}$
(E) $\frac{w+3}{w+m+5}$

107 Last year Carlos saved 10 percent of his annual earnings This year he earned 5 percent more than last year and he saved 12 percent of his annual earnings. The amount saved this year was what percent of the amount saved last year?

(A) 122%
(B) 124%
(C) 126%
(D) 128%
(E) 130%

108 Jan lives x floors above the ground floor of a high-rise building It takes her 30 seconds per floor to walk down the steps and 2 seconds per floor to ride the elevator If it takes Jan the same amount of time to walk down the steps to the ground floor as to wait for the elevator for 7 minutes and ride down, then x equals

(A) 4
(B) 7
(C) 14
(D) 15
(E) 16

109 A corporation that had \$115 19 billion in profits for the year paid out \$230.10 million in employee benefits Approximately what percent of the profits were the employee benefits? (1 billion = 10^9)

(A) 50%
(B) 20%
(C) 5%
(D) 2%
(E) 0 2%

Questions 110-111 refer to the following definition

For any positive integer n, $n > 1$, the "length" of n is the number of positive primes (not necessarily distinct) whose product is n For example, the length of 50 is 3 since $50 = (2)(5)(5)$.

110 Which of the following integers has length 3 ?

(A) 3
(B) 15
(C) 60
(D) 64
(E) 105

111 What is the greatest possible length of a positive integer less than 1,000 ?

(A) 10
(B) 9
(C) 8
(D) 7
(E) 6

112. A dealer originally bought 100 identical batteries at a total cost of q dollars. If each battery was sold at 50 percent above the original cost per battery, then, in terms of q, for how many dollars was each battery sold?

(A) $\frac{3q}{200}$

(B) $\frac{3q}{2}$

(C) $150q$

(D) $\frac{q}{100} + 50$

(E) $\frac{150}{q}$

113 Two oil cans, X and Y, are right circular cylinders, and the height and the radius of Y are each twice those of X. If the oil in can X, which is filled to capacity, sells for \$2, then at the same rate, how much does the oil in can Y sell for if Y is filled to only half its capacity?

(A) \$1
(B) \$2
(C) \$3
(D) \$4
(E) \$8

114 If x, y, and z are positive integers such that x is a factor of y, and x is a multiple of z, which of the following is NOT necessarily an integer?

(A) $\frac{x+z}{z}$

(B) $\frac{y+z}{x}$

(C) $\frac{x+y}{z}$

(D) $\frac{xy}{z}$

(E) $\frac{yz}{x}$

115 If $x + y = 8z$, then which of the following represents the average (arithmetic mean) of x, y, and z, in terms of z?

(A) $2z + 1$

(B) $3z$

(C) $5z$

(D) $\frac{z}{3}$

(E) $\frac{3z}{2}$

116 If the product of the integers w, x, y, and z is 770, and if $1 < w < x < y < z$, what is the value of $w + z$?

(A) 10
(B) 13
(C) 16
(D) 18
(E) 21

117 If the population of a certain country increases at the rate of one person every 15 seconds, by how many persons does the population increase in 20 minutes?

(A) 80
(B) 100
(C) 150
(D) 240
(E) 300

118 The value of $-3 - (-10)$ is how much greater than the value of $-10 - (-3)$?

(A) 0
(B) 6
(C) 7
(D) 14
(E) 26

119 For an agricultural experiment, 300 seeds were planted in one plot and 200 were planted in a second plot. If exactly 25 percent of the seeds in the first plot germinated and exactly 35 percent of the seeds in the second plot germinated, what percent of the total number of seeds germinated?

(A) 12%
(B) 26%
(C) 29%
(D) 30%
(E) 60%

120 If $\frac{a}{b}=\frac{2}{3}$, which of the following is NOT true?

(A) $\frac{a+b}{b}=\frac{5}{3}$

(B) $\frac{b}{b-a}=3$

(C) $\frac{a-b}{b}=\frac{1}{3}$

(D) $\frac{2a}{3b}=\frac{4}{9}$

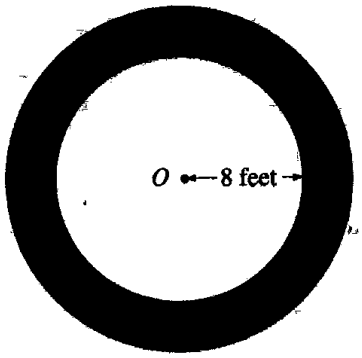
(E) $\frac{a+3b}{a}=\frac{11}{2}$

121 On the number line, if $r < s$, if p is halfway between r and s, and if t is halfway between p and r, then $\frac{s-t}{t-r}=$

(A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{4}{3}$ (D) 3 (E) 4

122 Coins are to be put into 7 pockets so that each pocket contains at least one coin At most 3 of the pockets are to contain the same number of coins, and no two of the remaining pockets are to contain an equal number of coins What is the least possible number of coins needed for the pockets?

(A) 7
(B) 13
(C) 17
(D) 22
(E) 28



123 The figure above shows a circular flower bed, with its center at O, surrounded by a circular path that is 3 feet wide. What is the area of the path, in square feet?

(A) 25π (B) 38π (C) 55π (D) 57π (E) 64π

	Brand X	Brand Y
Miles per Gallon	40	36
Cost per Gallon	\$0.80	\$0 75

124 The table above gives the gasoline costs and consumption rates for a certain car driven at 50 miles per hour, using each of two brands of gasoline How many miles farther can the car be driven at this speed on \$12 worth of brand X gasoline than on \$12 worth of brand Y gasoline?

(A) 20 (B) 24 (C) 84 (D) 100 (E) 104

125 If \$1 were invested at 8 percent interest compounded annually, the total value of the investment, in dollars, at the end of 6 years would be

(A) $(1.8)^6$
(B) $(1\ 08)^6$
(C) $6(1.08)$
(D) $1 + (0\ 08)^6$
(E) $1 + 6(0.08)$

126 A furniture store sells only two models of desks, model A and model B. The selling price of model A is \$120, which is 30 percent of the selling price of model B. If the furniture store sells 2,000 desks, $\frac{3}{4}$ of which are model B, what is the furniture store's total revenue from the sale of desks?

(A) \$114,000
(B) \$186,000
(C) \$294,000
(D) \$380,000
(E) \$660,000

127 How many minutes does it take John to type y words if he types at the rate of x words per minute?

(A) $\frac{x}{y}$ (B) $\frac{y}{x}$ (C) xy (D) $\frac{60x}{y}$ (E) $\frac{y}{60x}$

128 The weights of four packages are 1, 3, 5, and 7 pounds, respectively. Which of the following CANNOT be the total weight, in pounds, of any combination of the packages?

(A) 9
(B) 10
(C) 12
(D) 13
(E) 14

129 $\sqrt{(16)(20)+(8)(32)} =$

(A) $4\sqrt{20}$
(B) 24
(C) 25
(D) $4\sqrt{20}+8\sqrt{2}$
(E) 32

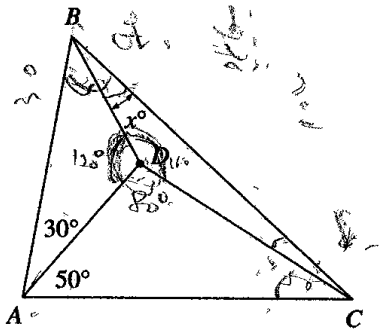
130 The positive integer n is divisible by 25. If $\sqrt{n}$ is greater than 25, which of the following could be the value of $\frac{n}{25}$?

(A) 22
(B) 23
(C) 24
(D) 25
(E) 26

131 If x and y are different integers and $x^2 = xy$, which of the following must be true?

I $x = 0$
II $y = 0$
III $x = -y$

(A) I only
(B) II only
(C) III only
(D) I and III only
(E) I, II, and III



Note Figure not drawn to scale

132. In the figure above, $DA = DB = DC$. What is the value of x?

(A) 10
(B) 20
(C) 30
(D) 40
(E) 50

133 If X and Y are sets of integers, $X \triangle Y$ denotes the set of integers that belong to set X or set Y, but not both. If X consists of 10 integers, Y consists of 18 integers, and 6 of the integers are in both X and Y, then $X \triangle Y$ consists of how many integers?

(A) 6
(B) 16
(C) 22
(D) 30
(E) 174

134 During the four years that Mrs. Lopez owned her car, she found that her total car expenses were $18,000. Fuel and maintenance costs accounted for $\frac{1}{3}$ of the total and depreciation accounted for $\frac{3}{5}$ of the remainder. The cost of insurance was 3 times the cost of financing, and together these two costs accounted for $\frac{1}{5}$ of the total. If the only other expenses were taxes and license fees, then the cost of financing was how much more or less than the cost of taxes and license fees?

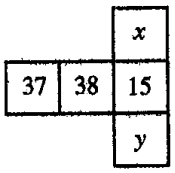
(A) $1,500 more
(B) $1,200 more
(C) $100 less
(D) $300 less
(E) $1,500 less

135. A car travels from Mayville to Rome at an average speed of 30 miles per hour and returns immediately along the same route at an average speed of 40 miles per hour. Of the following, which is closest to the average speed, in miles per hour, for the round-trip?

(A) 32.0
(B) 33.0
(C) 34.3
(D) 35.5
(E) 36.5

136. If $\frac{0.0015 \times 10^m}{0.03 \times 10^k} = 5 \times 10^7$, then $m - k =$

(A) 9
(B) 8
(C) 7
(D) 6
(E) 5

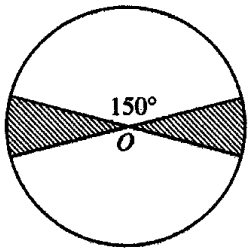


137 In the figure above, the sum of the three numbers in the horizontal row equals the product of the three numbers in the vertical column. What is the value of xy?

(A) 6
(B) 15
(C) 35
(D) 75
(E) 90

138 For telephone calls between two particular cities, a telephone company charges $0.40 per minute if the calls are placed between 5:00 a.m. and 9:00 p.m. and $0.25 per minute if the calls are placed between 9:00 p.m. and 5:00 a.m. If the charge for a call between the two cities placed at 1:00 p.m. was $10.00, how much would a call of the same duration have cost if it had been placed at 11:00 p.m.?

(A) $3.75
(B) $6.25
(C) $9.85
(D) $10.00
(E) $16.00



139 If O is the center of the circle above, what fraction of the circular region is shaded?

(A) $\frac{1}{12}$
(B) $\frac{1}{9}$
(C) $\frac{1}{6}$
(D) $\frac{1}{4}$
(E) $\frac{1}{3}$

140 If a compact disc that usually sells for \$12.95 is on sale for \$9 95, then the percent decrease in price is closest to

(A) 38%
(B) 31%
(C) 30%
(D) 29%
(E) 23%

141 $\dfrac{1}{1+\dfrac{1}{2+\dfrac{1}{3}}} =$

(A) $\frac{3}{10}$
(B) $\frac{7}{10}$
(C) $\frac{6}{7}$
(D) $\frac{10}{7}$
(E) $\frac{10}{3}$

142 A fruit-salad mixture consists of apples, peaches, and grapes in the ratio 6 . 5 2, respectively, by weight If 39 pounds of the mixture is prepared, the mixture includes how many more pounds of apples than grapes?

(A) 15
(B) 12
(C) 9
(D) 6
(E) 4

143 If $\frac{3}{x} = 2$ and $\frac{y}{4} = 3$, then $\frac{3+y}{x+4} =$

(A) $\frac{10}{9}$
(B) $\frac{3}{2}$
(C) $\frac{20}{11}$
(D) $\frac{30}{11}$
(E) 5

144 $(1+\sqrt{5})(1-\sqrt{5}) =$

(A) -4
(B) 2
(C) 6
(D) $-4-2\sqrt{5}$
(E) $6-2\sqrt{5}$

145 Starting from point O on a flat school playground, a child walks 10 yards due north, then 6 yards due east, and then 2 yards due south, arriving at point P How far apart, in yards, are points O and P ?

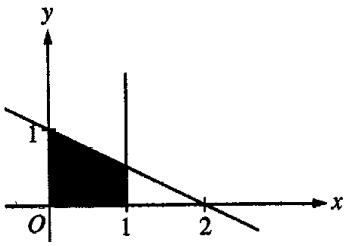
(A) 18
(B) 16
(C) 14
(D) 12
(E) 10

146 A certain car increased its average speed by 5 miles per hour in each successive 5-minute interval after the first interval If in the first 5-minute interval its average speed was 20 miles per hour, how many miles did the car travel in the third 5-minute interval?

(A) 1 0
(B) 1 5
(C) 2 0
(D) 2 5
(E) 3 0

147 Lois has x dollars more than Jim has, and together they have a total of y dollars Which of the following represents the number of dollars that Jim has?

(A) $\frac{y-x}{2}$
(B) $y-\frac{x}{2}$
(C) $\frac{y}{2}-x$
(D) $2y-x$
(E) $y-2x$



148 In the rectangular coordinate system above, the shaded region is bounded by straight lines Which of the following is NOT an equation of one of the boundary lines?

(A) $x = 0$
(B) $y = 0$
(C) $x = 1$
(D) $x - y = 0$
(E) $x + 2y = 2$

149 A certain population of bacteria doubles every 10 minutes If the number of bacteria in the population initially was 10^4, what was the number in the population 1 hour later?

(A) $2(10^4)$
(B) $6(10^4)$
(C) $(2^6)(10^4)$
(D) $(10^6)(10^4)$
(E) $(10^4)^6$

150 During a certain season, a team won 80 percent of its first 100 games and 50 percent of its remaining games If the team won 70 percent of its games for the entire season, what was the total number of games that the team played?

(A) 180
(B) 170
(C) 156
(D) 150
(E) 105

151 If Juan takes 11 seconds to run y yards, how many seconds will it take him to run x yards at the same rate?

(A) $\frac{11x}{y}$
(B) $\frac{11y}{x}$
(C) $\frac{x}{11y}$
(D) $\frac{11}{xy}$
(E) $\frac{xy}{11}$

152 Which of the following fractions has the greatest value?

(A) $\frac{6}{(2^2)(5^2)}$
(B) $\frac{1}{(2^3)(5^2)}$
(C) $\frac{28}{(2^2)(5^3)}$
(D) $\frac{62}{(2^3)(5^3)}$
(E) $\frac{122}{(2^4)(5^3)}$

153 Of 30 applicants for a job, 14 had at least 4 years experience, 18 had degrees, and 3 had less than 4 years experience and did not have a degree How many of the applicants had at least 4 years experience and a degree?

(A) 14
(B) 13
(C) 9
(D) 7
(E) 5

154 Which of the following CANNOT yield an integer when divided by 10?

(A) The sum of two odd integers
(B) An integer less than 10
(C) The product of two primes
(D) The sum of three consecutive integers
(E) An odd integer

155 A certain clock marks every hour by striking a number of times equal to the hour, and the time required for a stroke is exactly equal to the time interval between strokes At 6 00 the time lapse between the beginning of the first stroke and the end of the last stroke is 22 seconds At 12 00, how many seconds elapse between the beginning of the first stroke and the end of the last stroke?

(A) 72
(B) 50
(C) 48
(D) 46
(E) 44

156 If $k \neq 0$ and $k - \frac{3-2k^2}{k} = \frac{x}{k}$, then $x =$

(A) $-3-k^2$
(B) k^2-3
(C) $3k^2-3$
(D) $k-3-2k^2$
(E) $k-3+2k^2$

157 $\frac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{4}} =$

(A) $\frac{1}{12}$
(B) $\frac{5}{24}$
(C) $\frac{2}{3}$
(D) $\frac{9}{4}$
(E) $\frac{10}{3}$

158 John has 10 pairs of matched socks If he loses 7 individual socks, what is the greatest number of pairs of matched socks he can have left?

(A) 7
(B) 6
(C) 5
(D) 4
(E) 3

159 Last year's receipts from the sale of candy on Valentine's Day totaled 385 million dollars, which represented 7 percent of total candy sales for the year Candy sales for the year totaled how many million dollars?

(A) 55
(B) 550
(C) 2,695
(D) 5,500
(E) 26,950

160 How many minutes does it take to travel 120 miles at 400 miles per hour?

(A) 3
(B) $3\frac{1}{3}$
(C) $8\frac{2}{3}$
(D) 12
(E) 18

161 If $1 + \frac{1}{x} = 2 - \frac{2}{x}$, then $x =$

(A) -1
(B) $\frac{1}{3}$
(C) $\frac{2}{3}$
(D) 2
(E) 3

162 Last year, for every 100 million vehicles that traveled on a certain highway, 96 vehicles were involved in accidents If 3 billion vehicles traveled on the highway last year, how many of those vehicles were involved in accidents? (1 billion = 1,000,000,000)

(A) 288
(B) 320
(C) 2,880
(D) 3,200
(E) 28,800

163 If the perimeter of a rectangular garden plot is 34 feet and its area is 60 square feet, what is the length of each of the longer sides?

(A) 5 ft
(B) 6 ft
(C) 10 ft
(D) 12 ft
(E) 15 ft

164 What is the least positive integer that is divisible by each of the integers 1 through 7, inclusive?

(A) 420
(B) 840
(C) 1,260
(D) 2,520
(E) 5,040

165 Thirty percent of the members of a swim club have passed the lifesaving test Among the members who have not passed the test, 12 have taken the preparatory course and 30 have not taken the course How many members are there in the swim club?

(A) 60
(B) 80
(C) 100
(D) 120
(E) 140

166 For all numbers s and t, the operation $*$ is defined by $s * t = (s - 1)(t + 1)$ If $(-2) * x = -12$, then $x =$

(A) 2
(B) 3
(C) 5
(D) 6
(E) 11

167 In an increasing sequence of 10 consecutive integers, the sum of the first 5 integers is 560 What is the sum of the last 5 integers in the sequence?

(A) 585
(B) 580
(C) 575
(D) 570
(E) 565

168 A certain manufacturer produces items for which the production costs consist of annual fixed costs totaling $130,000 and variable costs averaging $8 per item If the manufacturer's selling price per item is $15, how many items must the manufacturer produce and sell to earn an annual profit of $150,000 ?

(A) 2,858
(B) 18,667
(C) 21,429
(D) 35,000
(E) 40,000

169. How many two-element subsets of {1, 2, 3, 4} are there that do not contain the pair of elements 2 and 4 ?

(A) One
(B) Two
(C) Four
(D) Five
(E) Six

170 In a certain company, the ratio of the number of managers to the number of production-line workers is 5 to 72 If 8 additional production-line workers were to be hired, the ratio of the number of managers to the number of production-line workers would be 5 to 74 How many managers does the company have?

(A) 5
(B) 10
(C) 15
(D) 20
(E) 25

171 If $(x - 1)^2 = 400$, which of the following could be the value of $x - 5$?

(A) 15
(B) 14
(C) – 24
(D) – 25
(E) – 26

172 Salesperson A's compensation for any week is $360 plus 6 percent of the portion of A's total sales above $1,000 for that week Salesperson B's compensation for any week is 8 percent of B's total sales for that week For what amount of total weekly sales would both salespeople earn the same compensation?

(A) $21,000
(B) $18,000
(C) $15,000
(D) $4,500
(E) $4,000

173 If a square region has area x, what is the length of its diagonal in terms of x?

(A) $\sqrt{x}$

(B) $\sqrt{2x}$

(C) $2\sqrt{x}$

(D) $x\sqrt{2}$

(E) $2x$

174 In a certain class consisting of 36 students, some boys and some girls, exactly $\frac{1}{3}$ of the boys and exactly $\frac{1}{4}$ of the girls walk to school. What is the greatest possible number of students in this class who walk to school?

(A) 9
(B) 10
(C) 11
(D) 12
(E) 13

175. The sum of the ages of Doris and Fred is y years. If Doris is 12 years older than Fred, how many years old will Fred be y years from now, in terms of y?

(A) $y - 6$

(B) $2y - 6$

(C) $\frac{y}{2} - 6$

(D) $\frac{3y}{2} - 6$

(E) $\frac{5y}{2} - 6$

1,234
1,243
1,324

+ 4,321

176 The addition problem above shows four of the 24 different integers that can be formed by using each of the digits 1, 2, 3, and 4 exactly once in each integer. What is the sum of these 24 integers?

(A) 24,000
(B) 26,664
(C) 40,440
(D) 60,000
(E) 66,660

177 If $x = -(2 - 5)$, then $x =$

(A) -7 (B) -3 (C) 3 (D) 7 (E) 10

178 What percent of 30 is 12?

(A) 2.5% (B) 3.6% (C) 25%

(D) 40% (E) 250%

179 On a 3-day fishing trip, 4 adults consumed food costing $60. For the same food costs per person per day, what would be the cost of food consumed by 7 adults during a 5-day fishing trip?

(A) $300
(B) $175
(C) $105
(D) $100
(E) $84

180 In a poll of 66,000 physicians, only 20 percent responded, of these, 10 percent disclosed their preference for pain reliever X. How many of the physicians who responded did <u>not</u> disclose a preference for pain reliever X?

(A) 1,320
(B) 5,280
(C) 6,600
(D) 10,560
(E) 11,880

181 If $\frac{15}{0.2+x}=5$, then $x=$

(A) −3 7
(B) 0 1
(C) 0 3
(D) 0 5
(E) 2 8

182 If a basketball team scores an average (arithmetic mean) of x points per game for n games and then scores y points in its next game, what is the team's average score for the $n+1$ games?

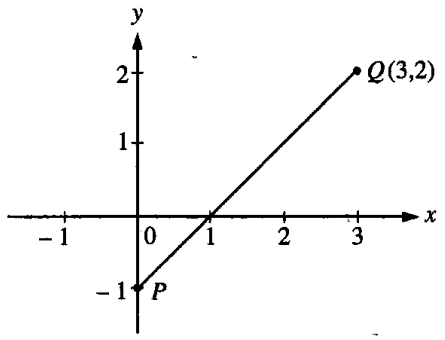
(A) $\frac{nx+y}{n+1}$

(B) $x+\frac{y}{n+1}$

(C) $x+\frac{y}{n}$

(D) $\frac{n(x+y)}{n+1}$

(E) $\frac{x+ny}{n+1}$



183 In the figure above, the point on segment PQ that is twice as far from P as from Q is

(A) (3, 1)
(B) (2, 1)
(C) (2, −1)
(D) (1 5, 0 5)
(E) (1, 0)

184 $\frac{3}{100}+\frac{5}{1{,}000}+\frac{7}{100{,}000}=$

(A) 0 357
(B) 0 3507
(C) 0 35007
(D) 0 0357
(E) 0 03507

185 If the number n of calculators sold per week varies with the price p in dollars according to the equation $n = 300 - 20p$, what would be the total weekly revenue from the sale of $10 calculators?

(A) $100 (B) $300 (C) $1,000
(D) $2,800 (E) $3,000

186 Of the 65 cars on a car lot, 45 have air-conditioning, 30 have power windows, and 12 have both air-conditioning and power windows How many of the cars on the lot have neither air-conditioning nor power windows?

(A) 2
(B) 8
(C) 10
(D) 15
(E) 18

187 Of the following numbers, which one is third greatest?

(A) $2\sqrt{2}-1$ (B) $\sqrt{2}+1$ (C) $1-\sqrt{2}$
(D) $\sqrt{2}-1$ (E) $\sqrt{2}$

188 During the second quarter of 1984, a total of 2,976,000 domestic cars were sold If this was 24 percent greater than the number sold during the first quarter of 1984, how many were sold during the first quarter?

(A) 714,240
(B) 2,261,760
(C) 2,400,000
(D) 3,690,240
(E) 3,915,790

189 If a positive integer n is divisible by both 5 and 7, the n must also be divisible by which of the following?

I 12
II 35
III 70

(A) None (B) I only (C) II only
(D) I and II (E) II and III

190 An author received \$0 80 in royalties for each of the first 100,000 copies of her book sold, and \$0 60 in royalties for each additional copy sold If she received a total of \$260,000 in royalties, how many copies of her book were sold?

(A) 130,000
(B) 300,000
(C) 380,000
(D) 400,000
(E) 420,000

191 Starting from Town S, Fred rode his bicycle 8 miles due east, 3 miles due south, 2 miles due west, and 11 miles due north, finally stopping at Town T If the entire region is flat, what is the straight-line distance, in miles, between Towns S and T?

(A) 10

(B) $8\sqrt{2}$

(C) $\sqrt{157}$

(D) 14

(E) 24

192 Which of the following describes all values of x for which $1 - x^2 \geq 0$?

(A) $x \geq 1$
(B) $x \leq -1$
(C) $0 \leq x \leq 1$
(D) $x \leq -1$ or $x \geq 1$
(E) $-1 \leq x \leq 1$

193 Four hours from now, the population of a colony of bacteria will reach $1\ 28 \times 10^6$ If the population of the colony doubles every 4 hours, what was the population 12 hours ago?

(A) $6\ 4 \times 10^2$
(B) $8\ 0 \times 10^4$
(C) $1\ 6 \times 10^5$
(D) $3\ 2 \times 10^5$
(E) $8\ 0 \times 10^6$

194 At a certain pizzeria, $\frac{1}{8}$ of the pizzas sold in one week were mushroom and $\frac{1}{3}$ of the remaining pizzas sold were pepperoni If n of the pizzas sold were pepperoni, how many were mushroom?

(A) $\frac{3}{8}n$

(B) $\frac{3}{7}n$

(C) $\frac{7}{16}n$

(D) $\frac{7}{8}n$

(E) $3n$

195 If 4 is one solution of the equation $x^2 + 3x + k = 10$, where k is a constant, what is the other solution?

(A) -7 (B) -4 (C) -3 (D) 1 (E) 6

196 The probability is $\frac{1}{2}$ that a certain coin will turn up heads on any given toss If the coin is to be tossed three times, what is the probability that on at least one of the tosses the coin will turn up tails?

(A) $\frac{1}{8}$ (B) $\frac{1}{2}$ (C) $\frac{3}{4}$ (D) $\frac{7}{8}$ (E) $\frac{15}{16}$

197 A caterer ordered 125 ice-cream bars and 125 sundaes. If the total price was $200 00 and the price of each ice-cream bar was $0.60, what was the price of each sundae?

(A) $0 60
(B) $0 80
(C) $1 00
(D) $1 20
(E) $1 60

198 Lloyd normally works 7 5 hours per day and earns $4 50 per hour For each hour he works in excess of 7 5 hours on a given day, he is paid 1 5 times his regular rate If Lloyd works 10 5 hours on a given day, how much does he earn for that day?

(A) $33 75
(B) $47 25
(C) $51 75
(D) $54 00
(E) $70 00

199 If $x = -3$, what is the value of $-3x^2$?

(A) –27 (B) –18 (C) 18 (D) 27 (E) 81

200 Of the final grades received by the students in a certain math course, $\frac{1}{5}$ are A's, $\frac{1}{4}$ are B's, $\frac{1}{2}$ are C's, and the remaining 10 grades are D's What is the number of students in the course?

(A) 80
(B) 110
(C) 160
(D) 200
(E) 400

201 $\frac{29^2 + 29}{29} =$

(A) 870 (B) 841 (C) 58 (D) 31 (E) 30

202. Mr Hernandez, who was a resident of State X for only 8 months last year, had a taxable income of $22,500 for the year If the state tax rate were 4 percent of the year's taxable income prorated for the proportion of the year during which the taxpayer was a resident, what would be the amount of Mr Hernandez's State X tax for last year?

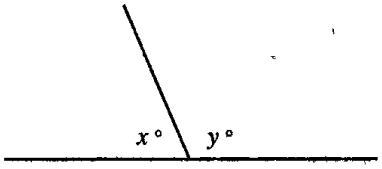
(A) $900 (B) $720 (C) $600
(D) $300 (E) $60

203 If $x = 1 - 3t$ and $y = 2t - 1$, then for what value of t does $x = y$?

(A) $\frac{5}{2}$ (B) $\frac{3}{2}$ (C) $\frac{2}{3}$ (D) $\frac{2}{5}$ (E) 0

204 Which of the following fractions is equal to the decimal 0 0625 ?

(A) $\frac{5}{8}$ (B) $\frac{3}{8}$ (C) $\frac{1}{16}$ (D) $\frac{1}{18}$ (E) $\frac{3}{80}$



205 In the figure above, if $\frac{x}{x+y} = \frac{3}{8}$, then $x =$

(A) 60
(B) 67 5
(C) 72
(D) 108
(E) 112 5

206 The number of coronary-bypass operations performed in the United States increased from 13,000 in 1970 to 191,000 in 1983 What was the approximate percent increase in the number of coronary-bypass operations from 1970 to 1983 ?

(A) 90%
(B) 140%
(C) 150%
(D) 1,400%
(E) 1,600%

207 If positive integers x and y are not both odd, which of the following must be even?

(A) xy
(B) $x + y$
(C) $x - y$
(D) $x + y - 1$
(E) $2(x + y) - 1$

208 Two trains, X and Y, started simultaneously from opposite ends of a 100-mile route and traveled toward each other on parallel tracks Train X, traveling at a constant rate, completed the 100-mile trip in 5 hours, train Y, traveling at a constant rate, completed the 100-mile trip in 3 hours How many miles had train X traveled when it met train Y?

(A) 37 5 (B) 40 0 (C) 60 0
(D) 62 5 (E) 77 5

209 As x increases from 165 to 166, which of the following must increase?

I $2x - 5$

II $1 - \frac{1}{x}$

III $\frac{1}{x^2 - x}$

(A) I only
(B) III only
(C) I and II
(D) I and III
(E) II and III

210 If it is true that $x > -2$ and $x < 7$, which of the following must be true?

(A) $x > 2$
(B) $x > -7$
(C) $x < 2$
(D) $-7 < x < 2$
(E) None of the above

211 A club sold an average (arithmetic mean) of 92 raffle tickets per member Among the female members, the average number sold was 84, and among the male members, the average number sold was 96 What was the ratio of the number of male members to the number of female members in the club?

(A) 1 1
(B) 1 2
(C) 1 3
(D) 2 1
(E) 3 1

212 How many bits of computer memory will be required to store the integer x, where $x = -\sqrt{810{,}000}$, if each digit requires 4 bits of memory and the sign of x requires 1 bit?

(A) 25 (B) 24 (C) 17 (D) 13 (E) 12

213 One week a certain truck rental lot had a total of 20 trucks, all of which were on the lot Monday morning If 50 percent of the trucks that were rented out during the week were returned to the lot on or before Saturday morning of that week, and if there were at least 12 trucks on the lot that Saturday morning, what is the greatest number of different trucks that could have been rented out during the week?

(A) 18
(B) 16
(C) 12
(D) 8
(E) 4

214 Ms Adams sold two properties, X and Y, for $30,000 each She sold property X for 20 percent more than she paid for it and sold property Y for 20 percent less than she paid for it If expenses are disregarded, what was her total net gain or loss, if any, on the two properties?

(A) Loss of $1,250
(B) Loss of $2,500
(C) Gain of $1,250
(D) Gain of $2,500
(E) There was neither a net gain nor a net loss

215 A rectangular box is 10 inches wide, 10 inches long, and 5 inches high What is the greatest possible (straight-line) distance, in inches, between any two points on the box?

(A) 15
(B) 20
(C) 25
(D) $10\sqrt{2}$
(E) $10\sqrt{3}$

216 How many positive integers less than 20 are either a multiple of 2, an odd multiple of 9, or the sum of a positive multiple of 2 and a positive multiple of 9?

(A) 19
(B) 18
(C) 17
(D) 16
(E) 15

217 On 3 sales John has received commissions of $240, $80, and $110, and he has 1 additional sale pending If John is to receive an average (arithmetic mean) commission of exactly $150 on the 4 sales, then the 4th commission must be

(A) $164
(B) $170
(C) $175
(D) $182
(E) $185

218 $\sqrt{463}$ is between

(A) 21 and 22
(B) 22 and 23
(C) 23 and 24
(D) 24 and 25
(E) 25 and 26

219. The annual budget of a certain college is to be shown on a circle graph If the size of each sector of the graph is to be proportional to the amount of the budget it represents, how many degrees of the circle should be used to represent an item that is 15 percent of the budget?

(A) 15°
(B) 36°
(C) 54°
(D) 90°
(E) 150°

220 A company accountant estimates that airfares next year for business trips of a thousand miles or less will increase by 20 percent and airfares for all other business trips will increase by 10 percent This year total airfares for business trips of a thousand miles or less were $9,900 and airfares for all other business trips were $13,000 According to the accountant's estimate, if the same business trips will be made next year as this year, how much will be spent for airfares next year?

(A) $22,930
(B) $26,180
(C) $26,330
(D) $26,490
(E) $29,770

221 What is the value of $2x^2 - 2\,4x - 1\,7$ for $x = 0\,7$?

(A) – 0 72
(B) – 1 42
(C) – 1.98
(D) – 2 40
(E) – 2 89

222 If $x * y = xy - 2(x + y)$ for all integers x and y, then $2 * (-3) =$

(A) –16
(B) –11
(C) –4
(D) 4
(E) 16

223 During a two-week period, the price of an ounce of silver increased by 25 percent by the end of the first week and then decreased by 20 percent of this new price by the end of the second week If the price of silver was x dollars per ounce at the beginning of the two-week period, what was the price, in dollars per ounce, by the end of the period?

(A) $0\,8x$
(B) $0\,95x$
(C) x
(D) $1\,05x$
(E) $1\,25x$

224 If a cube has a volume of 64, what is its total surface area?

(A) 16
(B) 24
(C) 48
(D) 64
(E) 96

Club	Number of Students
Chess	40
Drama	30
Math	25

225 The table above shows the number of students in three clubs at McAuliffe School Although no student is in all three clubs, 10 students are in both chess and drama, 5 students are in both chess and math, and 6 students are in both drama and math How many different students are in the three clubs?

(A) 68
(B) 69
(C) 74
(D) 79
(E) 84

226 If s, u, and v are positive integers and $2^s = 2^u + 2^v$, which of the following must be true?

I $s = u$
II $u \neq v$
III $s > v$

(A) None
(B) I only
(C) II only
(D) III only
(E) II and III

227 In a nationwide poll, N people were interviewed If $\frac{1}{4}$ of them answered "yes" to question 1, and of those, $\frac{1}{3}$ answered "yes" to question 2, which of the following expressions represents the number of people interviewed who did not answer "yes" to both questions?

(A) $\frac{N}{7}$
(B) $\frac{6N}{7}$
(C) $\frac{5N}{12}$
(D) $\frac{7N}{12}$
(E) $\frac{11N}{12}$

228 In a certain pond, 50 fish were caught, tagged, and returned to the pond A few days later, 50 fish were caught again, of which 2 were found to have been tagged If the percent of tagged fish in the second catch approximates the percent of tagged fish in the pond, what is the approximate number of fish in the pond?

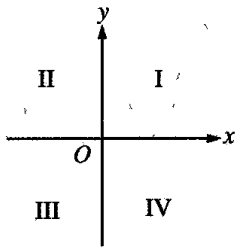
(A) 400
(B) 625
(C) 1,250
(D) 2,500
(E) 10,000

229 The ratio of two quantities is 3 to 4 If each of the quantities is increased by 5, what is the ratio of these two new quantities?

(A) $\frac{3}{4}$
(B) $\frac{8}{9}$
(C) $\frac{18}{19}$
(D) $\frac{23}{24}$
(E) It cannot be determined from the information given

230 In 1986 the book value of a certain car was $\frac{2}{3}$ of the original purchase price, and in 1988 its book value was $\frac{1}{2}$ of the original purchase price By what percent did the book value of this car decrease from 1986 to 1988 ?

(A) $16\frac{2}{3}\%$
(B) 25%
(C) $33\frac{1}{3}\%$
(D) 50%
(E) 75%



231 In the rectangular coordinate system shown above, which quadrant, if any, contains no point (x, y) that satisfies the inequality $2x - 3y \leq -6$?

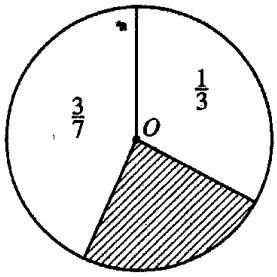
(A) None
(B) I
(C) II
(D) III
(E) IV

232 A hiker walked for two days On the second day the hiker walked 2 hours longer and at an average speed 1 mile per hour faster than he walked on the first day If during the two days he walked a total of 64 miles and spent a total of 18 hours walking, what was his average speed on the first day?

(A) 2 mph
(B) 3 mph
(C) 4 mph
(D) 5 mph
(E) 6 mph

233 If a printer can print 2 pages of text per second, then, at this rate, approximately how many minutes will it take to print 5,000 pages of text?

(A) 4
(B) 25
(C) 42
(D) 250
(E) 417



234 In the circular region with center O, shown above, the two unshaded sections comprise $\frac{3}{7}$ and $\frac{1}{3}$ of the area of the circular region The shaded section comprises what fractional part of the area of the circular region?

(A) $\frac{3}{5}$
(B) $\frac{6}{7}$
(C) $\frac{2}{21}$
(D) $\frac{5}{21}$
(E) $\frac{16}{21}$

235 Envelopes can be purchased for \$1 50 per pack of 100, \$1 00 per pack of 50, or \$0 03 each What is the greatest number of envelopes that can be purchased for \$7 30 ?

(A) 426
(B) 430
(C) 443
(D) 460
(E) 486

236 $\sqrt{16+16} =$

(A) $4\sqrt{2}$
(B) $8\sqrt{2}$
(C) $16\sqrt{2}$
(D) 8
(E) 16

237 An automobile's gasoline mileage varies, depending on the speed of the automobile, between 18 0 and 22 4 miles per gallon, inclusive What is the maximum distance, in miles, that the automobile could be driven on 15 gallons of gasoline?

(A) 336
(B) 320
(C) 303
(D) 284
(E) 270

238 $\frac{(0\,3)^5}{(0\,3)^3} =$

(A) 0 001
(B) 0 01
(C) 0 09
(D) 0 9
(E) 1 0

239 In a horticultural experiment, 200 seeds were planted in plot I and 300 were planted in plot II If 57 percent of the seeds in plot I germinated and 42 percent of the seeds in plot II germinated, what percent of the total number of planted seeds germinated?

(A) 45 5%
(B) 46 5%
(C) 48 0%
(D) 49 5%
(E) 51 0%

240 The organizers of a fair projected a 25 percent increase in attendance this year over that of last year, but attendance this year actually decreased by 20 percent What percent of the projected attendance was the actual attendance?

(A) 45%
(B) 56%
(C) 64%
(D) 75%
(E) 80%

241 An optometrist charges $150 per pair for soft contact lenses and $85 per pair for hard contact lenses Last week she sold 5 more pairs of soft lenses than hard lenses If her total sales for pairs of contact lenses last week were $1,690, what was the total number of pairs of contact lenses that she sold?

(A) 11
(B) 13
(C) 15
(D) 17
(E) 19

242 What is the ratio of $\frac{3}{4}$ to the product $4\left(\frac{3}{4}\right)$?

(A) $\frac{1}{4}$
(B) $\frac{1}{3}$
(C) $\frac{4}{9}$
(D) $\frac{9}{4}$
(E) 4

243 The cost to rent a small bus for a trip is x dollars, which is to be shared equally among the people taking the trip. If 10 people take the trip rather than 16, how many more dollars, in terms of x, will it cost per person?

(A) $\frac{x}{6}$
(B) $\frac{x}{10}$
(C) $\frac{x}{16}$
(D) $\frac{3x}{40}$
(E) $\frac{3x}{80}$

244 If x is an integer and $y = 3x + 2$, which of the following CANNOT be a divisor of y?

(A) 4
(B) 5
(C) 6
(D) 7
(E) 8

245 The size of a television screen is given as the length of the screen's diagonal If the screens were flat, then the area of a square 21-inch screen would be how many square inches greater than the area of a square 19-inch screen?

(A) 2
(B) 4
(C) 16
(D) 38
(E) 40

246 If the average (arithmetic mean) of x and y is 60 and the average (arithmetic mean) of y and z is 80, what is the value of $z - x$?

(A) 70
(B) 40
(C) 20
(D) 10
(E) It cannot be determined from the information given

247 If 3 and 8 are the lengths of two sides of a triangular region, which of the following can be the length of the third side?

I 5
II 8
III 11

(A) II only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

248 One night a certain motel rented $\frac{3}{4}$ of its rooms, including $\frac{2}{3}$ of its air-conditioned rooms If $\frac{3}{5}$ of its rooms were air-conditioned, what percent of the rooms that were not rented were air-conditioned?

(A) 20%
(B) $33\frac{1}{3}\%$
(C) 35%
(D) 40%
(E) 80%

249 If $3 - x = 2x - 3$, then $4x =$

(A) -24
(B) -8
(C) 0
(D) 8
(E) 24

250 A certain electronic component is sold in boxes of 54 for \$16 20 and in boxes of 27 for \$13.20 A customer who needed only 54 components for a project had to buy 2 boxes of 27 because boxes of 54 were unavailable Approximately how much more did the customer pay for each component due to the unavailability of the larger boxes?

(A) \$0 33
(B) \$0 19
(C) \$0 11
(D) \$0.06
(E) \$0 03

251 On a certain street, there is an odd number of houses in a row The houses in the row are painted alternately white and green, with the first house painted white If n is the total number of houses in the row, how many of the houses are painted white?

(A) $\frac{n+1}{2}$
(B) $\frac{n-1}{2}$
(C) $\frac{n}{2}+1$
(D) $\frac{n}{2}-1$
(E) $\frac{n}{2}$

$$\begin{array}{r} \square\triangle \\ \times\ \triangle\square \\ \hline \end{array}$$

252 The product of the two-digit numbers above is the three-digit number $\square\diamond\square$, where $\square$, $\triangle$, and $\diamond$ are three different nonzero digits. If $\square \times \triangle < 10$, what is the two-digit number $\square\triangle$?

(A) 11
(B) 12
(C) 13
(D) 21
(E) 31

253 As a salesperson, Phyllis can choose one of two methods of annual payment either an annual salary of $35,000 with no commission or an annual salary of $10,000 plus a 20 percent commission on her total annual sales What must her total annual sales be to give her the same annual pay with either method?

(A) $100,000
(B) $120,000
(C) $125,000
(D) $130,000
(E) $132,000

254 A restaurant buys fruit in cans containing $3\frac{1}{2}$ cups of fruit each If the restaurant uses $\frac{1}{2}$ cup of the fruit in each serving of its fruit compote, what is the least number of cans needed to prepare 60 servings of the compote?

(A) 7
(B) 8
(C) 9
(D) 10
(E) 12

255 If $x > 3{,}000$, then the value of $\frac{x}{2x+1}$ is closest to

(A) $\frac{1}{6}$
(B) $\frac{1}{3}$
(C) $\frac{10}{21}$
(D) $\frac{1}{2}$
(E) $\frac{3}{2}$

256 Machine A produces 100 parts twice as fast as machine B does Machine B produces 100 parts in 40 minutes If each machine produces parts at a constant rate, how many parts does machine A produce in 6 minutes?

(A) 30
(B) 25
(C) 20
(D) 15
(E) 7 5

257 If 18 is 15 percent of 30 percent of a certain number, what is the number?

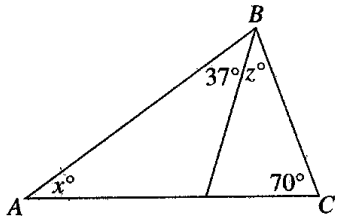
(A) 9
(B) 36
(C) 40
(D) 81
(E) 400

258 A necklace is made by stringing N individual beads together in the repeating pattern red bead, green bead, white bead, blue bead, and yellow bead If the necklace design begins with a red bead and ends with a white bead, then N could equal

(A) 16
(B) 32
(C) 41
(D) 54
(E) 68

259 If $x = (0\ 08)^2$, $y = \frac{1}{(0\ 08)^2}$, and $z = (1 - 0\ 08)^2 - 1$, which of the following is true?

(A) $x = y = z$
(B) $y < z < x$
(C) $z < x < y$
(D) $y < x$ and $x = z$.
(E) $x < y$ and $x = z$



260 In $\triangle ABC$ above, what is x in terms of z ?

(A) $z + 73$
(B) $z - 73$
(C) $70 - z$
(D) $z - 70$
(E) $73 - z$

261 In 1990 a total of x earthquakes occurred worldwide, some but not all of which occurred in Asia If m of these earthquakes occurred in Asia, which of the following represents the ratio of the number of earthquakes that occurred in Asia to the number that did not occur in Asia?

(A) $\frac{x}{m}$

(B) $\frac{m}{x}$

(C) $\frac{m}{x-m}$

(D) $\frac{x}{x-m}$

(E) $1-\frac{m}{x}$

262 If $\frac{x+y}{xy}=1$, then $y=$

(A) $\frac{x}{x-1}$

(B) $\frac{x}{x+1}$

(C) $\frac{x-1}{x}$

(D) $\frac{x+1}{x}$

(E) x

263 If $\frac{1}{2}$ of the air in a tank is removed with each stroke of a vacuum pump, what fraction of the original amount of air has been removed after 4 strokes?

(A) $\frac{15}{16}$

(B) $\frac{7}{8}$

(C) $\frac{1}{4}$

(D) $\frac{1}{8}$

(E) $\frac{1}{16}$

264 Last year Department Store X had a sales total for December that was 4 times the average (arithmetic mean) of the monthly sales totals for January through November The sales total for December was what fraction of the sales total for the year?

(A) $\frac{1}{4}$

(B) $\frac{4}{15}$

(C) $\frac{1}{3}$

(D) $\frac{4}{11}$

(E) $\frac{4}{5}$

265 How many integers n are there such that $1<5n+5<25$?

(A) Five
(B) Four
(C) Three
(D) Two
(E) One

266 If the two-digit integers M and N are positive and have the same digits, but in reverse order, which of the following CANNOT be the sum of M and N ?

(A) 181
(B) 165
(C) 121
(D) 99
(E) 44

267 Working alone, printers X, Y, and Z can do a certain printing job, consisting of a large number of pages, in 12, 15, and 18 hours, respectively What is the ratio of the time it takes printer X to do the job, working alone at its rate, to the time it takes printers Y and Z to do the job, working together at their individual rates?

(A) $\frac{4}{11}$

(B) $\frac{1}{2}$

(C) $\frac{15}{22}$

(D) $\frac{22}{15}$

(E) $\frac{11}{4}$

268 In 1985 a company sold a brand of shoes to retailers for a fixed price per pair In 1986 the number of pairs of the shoes that the company sold to retailers decreased by 20 percent, while the price per pair increased by 20 percent If the company's revenue from the sales of the shoes in 1986 was $3 0 million, what was the approximate revenue from the sale of the shoes in 1985 ?

(A) $2 4 million
(B) $2 9 million
(C) $3 0 million
(D) $3 1 million
(E) $3 6 million

269 $\frac{(3)(0\,072)}{0\,54} =$

(A) 0 04
(B) 0 3
(C) 0 4
(D) 0 8
(E) 4 0

270 A car dealer sold x used cars and y new cars during May If the number of used cars sold was 10 greater than the number of new cars sold, which of the following expresses this relationship?

(A) $x > 10y$
(B) $x > y + 10$
(C) $x > y - 10$
(D) $x = y + 10$
(E) $x = y - 10$

271 What is the maximum number of $1\frac{1}{4}$-foot pieces of wire that can be cut from a wire that is 24 feet long?

(A) 11
(B) 18
(C) 19
(D) 20
(E) 30

272 If each of the two lines ℓ_1 and ℓ_2 is parallel to line ℓ_3, which of the following must be true?

(A) Lines ℓ_1, ℓ_2, and ℓ_3 lie in the same plane
(B) Lines ℓ_1, ℓ_2, and ℓ_3 lie in different planes
(C) Line ℓ_1 is parallel to line ℓ_2
(D) Line ℓ_1 is the same line as line ℓ_2
(E) Line ℓ_1 is the same line as line ℓ_3

$$\frac{61.24 \times (0\,998)^2}{\sqrt{403}}$$

273 The expression above is approximately equal to

(A) 1
(B) 3
(C) 4
(D) 5
(E) 6

274 Car X and car Y traveled the same 80-mile route If car X took 2 hours and car Y traveled at an average speed that was 50 percent faster than the average speed of car X, how many hours did it take car Y to travel the route?

(A) $\frac{2}{3}$

(B) 1

(C) $1\frac{1}{3}$

(D) $1\frac{3}{5}$

(E) 3

275 If the numbers $\frac{17}{24}$, $\frac{1}{2}$, $\frac{3}{8}$, $\frac{3}{4}$, and $\frac{9}{16}$ were ordered from greatest to least, the middle number of the resulting sequence would be

(A) $\frac{17}{24}$

(B) $\frac{1}{2}$

(C) $\frac{3}{8}$

(D) $\frac{3}{4}$

(E) $\frac{9}{16}$

276 If a 10 percent deposit that has been paid toward the purchase of a certain product is $110, how much more remains to be paid?

(A) $880
(B) $990
(C) $1,000
(D) $1,100
(E) $1,210

277 Kim purchased n items from a catalog for \$8 each Postage and handling charges consisted of \$3 for the first item and \$1 for each additional item Which of the following gives the total dollar amount of Kim's purchase, including postage and handling, in terms of n?

(A) $8n + 2$
(B) $8n + 4$
(C) $9n + 2$
(D) $9n + 3$
(E) $9n + 4$

278 $\left(\sqrt{7}+\sqrt{7}\right)^2 =$

(A) 98
(B) 49
(C) 28
(D) 21
(E) 14

279 If the average (arithmetic mean) of the four numbers K, $2K + 3$, $3K - 5$, and $5K + 1$ is 63, what is the value of K?

(A) 11

(B) $15\frac{3}{4}$

(C) 22

(D) 23

(E) $25\frac{3}{10}$

280 A rabbit on a controlled diet is fed daily 300 grams of a mixture of two foods, food X and food Y Food X contains 10 percent protein and food Y contains 15 percent protein If the rabbit's diet provides exactly 38 grams of protein daily, how many grams of food X are in the mixture?

(A) 100
(B) 140
(C) 150
(D) 160
(E) 200

281 A company that ships boxes to a total of 12 distribution centers uses color coding to identify each center If either a single color or a pair of two different colors is chosen to represent each center and if each center is uniquely represented by that choice of one or two colors, what is the minimum number of colors needed for the coding? (Assume that the order of the colors in a pair does not matter)

(A) 4
(B) 5
(C) 6
(D) 12
(E) 24

282 If $x + y = a$ and $x - y = b$, then $2xy =$

(A) $\frac{a^2 - b^2}{2}$

(B) $\frac{b^2 - a^2}{2}$

(C) $\frac{a - b}{2}$

(D) $\frac{ab}{2}$

(E) $\frac{a^2 + b^2}{2}$

283 A rectangular circuit board is designed to have width w inches, perimeter p inches, and area k square inches Which of the following equations must be true?

(A) $w^2 + pw + k = 0$
(B) $w^2 - pw + 2k = 0$
(C) $2w^2 + pw + 2k = 0$
(D) $2w^2 - pw - 2k = 0$
(E) $2w^2 - pw + 2k = 0$

284 On a certain road, 10 percent of the motorists exceed the posted speed limit and receive speeding tickets, but 20 percent of the motorists who exceed the posted speed limit do not receive speeding tickets What percent of the motorists on that road exceed the posted speed limit?

(A) $10\frac{1}{2}\%$

(B) $12\frac{1}{2}\%$

(C) 15%

(D) 22%

(E) 30%

285. If p is an even integer and q is an odd integer, which of the following must be an odd integer?

(A) $\frac{p}{q}$

(B) pq

(C) $2p + q$

(D) $2(p + q)$

(E) $\frac{3p}{q}$

286 A certain college has a student-to-teacher ratio of 11 to 1 The average (arithmetic mean) annual salary for teachers is $26,000 If the college pays a total of $3,380,000 in annual salaries to its teachers, how many students does the college have?

(A) 130
(B) 169
(C) 1,300
(D) 1,430
(E) 1,560

287 Last year if 97 percent of the revenues of a company came from domestic sources and the remaining revenues, totaling $450,000, came from foreign sources, what was the total of the company's revenues?

(A) $1,350,000
(B) $1,500,000
(C) $4,500,000
(D) $15,000,000
(E) $150,000,000

288 Drum X is $\frac{1}{2}$ full of oil and drum Y, which has twice the capacity of drum X, is $\frac{2}{3}$ full of oil If all of the oil in drum X is poured into drum Y, then drum Y will be filled to what fraction of its capacity?

(A) $\frac{3}{4}$

(B) $\frac{5}{6}$

(C) $\frac{11}{12}$

(D) $\frac{7}{6}$

(E) $\frac{11}{6}$

289 In a certain population, there are 3 times as many people aged twenty-one or under as there are people over twenty-one. The ratio of those twenty-one or under to the total population is

(A) 1 to 2
(B) 1 to 3
(C) 1 to 4
(D) 2 to 3
(E) 3 to 4

290 $\frac{2+2\sqrt{6}}{2} =$

(A) $\sqrt{6}$

(B) $2\sqrt{6}$

(C) $1+\sqrt{6}$

(D) $1+2\sqrt{6}$

(E) $2+\sqrt{6}$

291 A certain telescope increases the visual range at a particular location from 90 kilometers to 150 kilometers By what percent is the visual range increased by using the telescope?

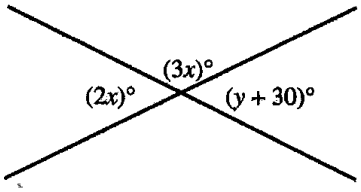
(A) 30%

(B) $33\frac{1}{2}\%$

(C) 40%

(D) 60%

(E) $66\frac{2}{3}\%$



Note. Figure not drawn to scale

292 In the figure above, the value of y is

(A) 6
(B) 12
(C) 24
(D) 36
(E) 42

293 A part-time employee whose hourly wage was increased by 25 percent decided to reduce the number of hours worked per week so that the employee's total weekly income would remain unchanged By what percent should the number of hours worked be reduced?

(A) 12 5%
(B) 20%
(C) 25%
(D) 50%
(E) 75%

294 If $x > 0$, $\frac{x}{50} + \frac{x}{25}$ is what percent of x ?

(A) 6%

(B) 25%

(C) $37\frac{1}{2}\%$

(D) 60%

(E) 75%

295 If the operation $\circledast$ is defined for all a and b by the equation $a \circledast b = \frac{a^2 b}{3}$, then $2 \circledast (3 \circledast -1) =$

(A) 4

(B) 2

(C) $-\frac{4}{3}$

(D) -2

(E) -4

296 A factory that employs 1,000 assembly-line workers pays each of these workers \$5 per hour for the first 40 hours worked during a week and $1\frac{1}{2}$ times that rate for hours worked in excess of 40 What was the total payroll for the assembly-line workers for a week in which 30 percent of them worked 20 hours, 50 percent worked 40 hours, and the rest worked 50 hours?

(A) \$180,000
(B) \$185,000
(C) \$190,000
(D) \$200,000
(E) \$205,000

297 If $x \neq 2$, then $\frac{3x^2(x-2) - x + 2}{x-2} =$

(A) $3x^2 - x + 2$

(B) $3x^2 + 1$

(C) $3x^2$

(D) $3x^2 - 1$

(E) $3x^2 - 2$

298 In a certain school, 40 more than $\frac{1}{3}$ of all the students are taking a science course and $\frac{1}{4}$ of those taking a science course are taking physics If $\frac{1}{8}$ of all the students in the school are taking physics, how many students are in the school?

(A) 240
(B) 300
(C) 480
(D) 720
(E) 960

299 If $d>0$ and $0<1-\frac{c}{d}<1$, which of the following must be true?

I $c>0$

II $\frac{c}{d}<1$

III $c^2+d^2>1$

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

300 The inside dimensions of a rectangular wooden box are 6 inches by 8 inches by 10 inches A cylindrical cannister is to be placed inside the box so that it stands upright when the closed box rests on one of its six faces Of all such cannisters that could be used, what is the radius, in inches, of the one that has maximum volume?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 8

301 $\frac{\frac{1}{2}}{\frac{1}{4}+\frac{1}{6}}=$

(A) $\frac{6}{5}$
(B) $\frac{5}{6}$
(C) $\frac{5}{24}$
(D) $\frac{1}{5}$
(E) $\frac{1}{12}$

302 Kelly and Chris packed several boxes with books. If Chris packed 60 percent of the total number of boxes, what was the ratio of the number of boxes Kelly packed to the number of boxes Chris packed?

(A) 1 to 6
(B) 1 to 4
(C) 2 to 5
(D) 3 to 5
(E) 2 to 3

303 A train travels from New York City to Chicago, a distance of approximately 840 miles, at an average rate of 60 miles per hour and arrives in Chicago at 6 00 in the evening, Chicago time At what hour in the morning, New York City time, did the train depart for Chicago? (Note Chicago time is one hour earlier than New York City time)

(A) 4 00
(B) 5 00
(C) 6 00
(D) 7 00
(E) 8 00

304 Of the following, which is the closest approximation of $\frac{50.2 \times 0.49}{199.8}$?

(A) $\frac{1}{10}$

(B) $\frac{1}{8}$

(C) $\frac{1}{4}$

(D) $\frac{5}{4}$

(E) $\frac{25}{2}$

305 Last year Manfred received 26 paychecks Each of his first 6 paychecks was \$750; each of his remaining paychecks was \$30 more than each of his first 6 paychecks To the nearest dollar, what was the average (arithmetic mean) amount of his paychecks for the year?

(A) \$752
(B) \$755
(C) \$765
(D) \$773
(E) \$775

306 A certain pair of used shoes can be repaired for \$12 50 and will last for 1 year A pair of the same kind of shoes can be purchased new for \$28 00 and will last for 2 years The average cost per year of the new shoes is what percent greater than the cost of repairing the used shoes?

(A) 3%
(B) 5%
(C) 12%
(D) 15%
(E) 24%

307 In a certain brick wall, each row of bricks above the bottom row contains one less brick than the row just below it If there are 5 rows in all and a total of 75 bricks in the wall, how many bricks does the bottom row contain?

(A) 14
(B) 15
(C) 16
(D) 17
(E) 18

308 If 25 percent of p is equal to 10 percent of q, and $pq \neq 0$, then p is what percent of q ?

(A) 2 5%
(B) 15%
(C) 20%
(D) 35%
(E) 40%

309 If the length of an edge of cube X is twice the length of an edge of cube Y, what is the ratio of the volume of cube Y to the volume of cube X ?

(A) $\frac{1}{2}$

(B) $\frac{1}{4}$

(C) $\frac{1}{6}$

(D) $\frac{1}{8}$

(E) $\frac{1}{27}$

310 $(\sqrt{2}+1)(\sqrt{2}-1)(\sqrt{3}+1)(\sqrt{3}-1) =$

(A) 2

(B) 3

(C) $2\sqrt{6}$

(D) 5

(E) 6

311 In a certain calculus class, the ratio of the number of mathematics majors to the number of students who are not mathematics majors is 2 to 5 If 2 more mathematics majors were to enter the class, the ratio would be 1 to 2 How many students are in the class?

(A) 10
(B) 12
(C) 21
(D) 28
(E) 35

312 Machines A and B always operate independently and at their respective constant rates When working alone, machine A can fill a production lot in 5 hours, and machine B can fill the same lot in x hours When the two machines operate simultaneously to fill the production lot, it takes them 2 hours to complete the job What is the value of x ?

(A) $3\frac{1}{3}$

(B) 3

(C) $2\frac{1}{2}$

(D) $2\frac{1}{3}$

(E) $1\frac{1}{2}$

313 In the xy-coordinate system, if (a, b) and $(a+3, b+k)$ are two points on the line defined by the equation $x = 3y - 7$, then $k =$

(A) 9

(B) 3

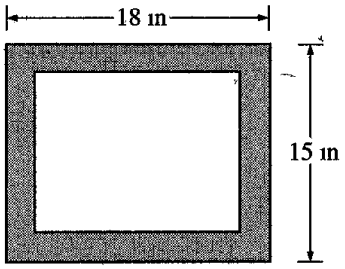
(C) $\frac{7}{3}$

(D) 1

(E) $\frac{1}{3}$

314 What is the units digit of $(13)^4 (17)^2 (29)^3$?

(A) 9
(B) 7
(C) 5
(D) 3
(E) 1



Note Figure not drawn to scale

315 The shaded region in the figure above represents a rectangular frame with length 18 inches and width 15 inches The frame encloses a rectangular picture that has the same area as the frame itself If the length and width of the picture have the same ratio as the length and width of the frame, what is the length of the picture, in inches?

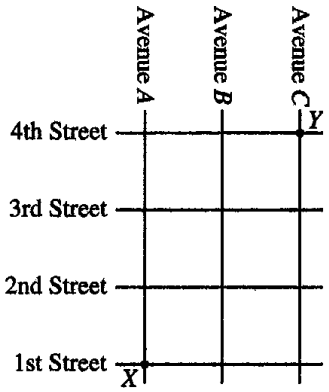
(A) $9\sqrt{2}$

(B) $\frac{3}{2}$

(C) $\frac{9}{\sqrt{2}}$

(D) $15\left(1-\frac{1}{\sqrt{2}}\right)$

(E) $\frac{9}{2}$

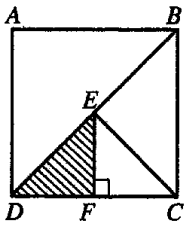


316 Pat will walk from intersection X to intersection Y along a route that is confined to the square grid of four streets and three avenues shown in the map above How many routes from X to Y can Pat take that have the minimum possible length?

(A) Six
(B) Eight
(C) Ten
(D) Fourteen
(E) Sixteen

317 A certain fishing boat is chartered by 6 people who are to contribute equally to the total charter cost of $480 If each person contributes equally to a $150 down payment, how much of the charter cost will each person still owe?

(A) $80 (B) $66 (C) $55 (D) $50 (E) $45



318 In square $ABCD$ above, if $DE = EB$ and $DF = FC$, then the area of the shaded region is what fraction of the area of square region $ABCD$?

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{6}$ (D) $\frac{1}{4}$ (E) $\frac{1}{3}$

319 Craig sells major appliances For each appliance he sells, Craig receives a commission of $50 plus 10 percent of the selling price. During one particular week Craig sold 6 appliances for selling prices totaling $3,620 What was the total of Craig's commissions for that week?

(A) $412 (B) $526 (C) $585
(D) $605 (E) $662

320 The average (arithmetic mean) of 10, 30, and 50 is 5 more than the average of 20, 40, and

(A) 15 (B) 25 (C) 35 (D) 45 (E) 55

321 What number when multiplied by $\frac{4}{7}$ yields $\frac{6}{7}$ as the result?

(A) $\frac{2}{7}$ (B) $\frac{2}{3}$ (C) $\frac{3}{2}$ (D) $\frac{24}{7}$ (E) $\frac{7}{2}$

322 If $y = 4 + (x - 3)^2$, then y is least when $x =$

(A) -4 (B) -3 (C) 0 (D) 3 (E) 4

323 If 3 pounds of dried apricots that cost x dollars per pound are mixed with 2 pounds of prunes that cost y dollars per pound, what is the cost, in dollars, per pound of the mixture?

(A) $\frac{3x+2y}{5}$

(B) $\frac{3x+2y}{x+y}$

(C) $\frac{3x+2y}{xy}$

(D) $5(3x + 2y)$

(E) $3x + 2y$

324 A cashier mentally reversed the digits of one customer's correct amount of change and thus gave the customer an incorrect amount of change If the cash register contained 45 cents more than it should have as a result of this error, which of the following could have been the correct amount of change in cents?

(A) 14 (B) 45 (C) 54 (D) 65 (E) 83

325 Which of the following is NOT equal to the square of an integer?

(A) $\sqrt{\sqrt{1}}$ (B) $\sqrt{4}$ (C) $\frac{18}{2}$

(D) $41-25$ (E) 36

326 An artist wishes to paint a circular region on a square poster that is 2 feet on a side If the area of the circular region is to be $\frac{1}{2}$ the area of the poster, what must be the radius of the circular region in feet?

(A) $\frac{1}{\pi}$ (B) $\sqrt{\frac{2}{\pi}}$ (C) 1 (D) $\frac{2}{\sqrt{\pi}}$ (E) $\frac{\pi}{2}$

327 Which of the following must be equal to zero for all real numbers x ?

I $-\frac{1}{x}$

II $x + (-x)$

III x^0

(A) I only
(B) II only
(C) I and III only
(D) II and III only
(E) I, II, and III

328. At the rate of m meters per s seconds, how many meters does a cyclist travel in x minutes?

(A) $\frac{m}{sx}$ (B) $\frac{mx}{s}$ (C) $\frac{60m}{sx}$

(D) $\frac{60ms}{x}$ (E) $\frac{60mx}{s}$

	City A	City B	City C	City D	City E	City F
City A						
City B						
City C						
City D						
City E						
City F						

329 In the table above, what is the least number of table entries that are needed to show the mileage between each city and each of the other five cities?

(A) 15 (B) 21 (C) 25 (D) 30 (E) 36

330 A certain tax rate is \$0 82 per \$100 00 What is this rate, expressed as a percent?

(A) 82% (B) 8 2% (C) 0 82%
(D) 0 082% (E) 0 0082%

331 Fermat primes are prime numbers that can be written in the form $2^k + 1$, where k is an integer and a power of 2 Which of the following is NOT a Fermat prime?

(A) 3 (B) 5 (C) 17 (D) 31 (E) 257

332 A shipment of 1,500 heads of cabbage, each of which was approximately the same size, was purchased for \$600 The day the shipment arrived, $\frac{2}{3}$ of the heads were sold, each at 25 percent above the cost per head The following day the rest were sold at a price per head equal to 10 percent less than the price each head sold for on the day before What was the gross profit on this shipment?

(A) \$100 (B) \$115 (C) \$125
(D) \$130 (E) \$135

333 If $(t - 8)$ is a factor of $t^2 - kt - 48$, then $k =$

(A) -6 (B) -2 (C) 2 (D) 6 (E) 14

334 If a is a positive integer, and if the units' digit of a^2 is 9 and the units' digit of $(a + 1)^2$ is 4, what is the units' digit of $(a + 2)^2$?

(A) 1 (B) 3 (C) 5 (D) 7 (E) 9

335 The ratio, by volume, of soap to alcohol to water in a certain solution is 2 50 100. The solution will be altered so that the ratio of soap to alcohol is doubled while the ratio of soap to water is halved If the altered solution will contain 100 cubic centimeters of alcohol, how many cubic centimeters of water will it contain?

(A) 50 (B) 200 (C) 400 (D) 625 (E) 800

336 If 75 percent of a class answered the first question on a certain test correctly, 55 percent answered the second question on the test correctly, and 20 percent answered neither of the questions correctly, what percent answered both correctly?

(A) 10% (B) 20% (C) 30%
(D) 50% (E) 65%

337 $\frac{31}{125} =$

(A) 0 248
(B) 0 252
(C) 0 284
(D) 0 312
(E) 0 320

338 Members of a social club met to address 280 newsletters If they addressed $\frac{1}{4}$ of the newsletters during the first hour and $\frac{2}{5}$ of the remaining newsletters during the second hour, how many newsletters did they address during the second hour?

(A) 28 (B) 42 (C) 63 (D) 84 (E) 112

339 If $x^2 = 2y^3$ and $2y = 4$, what is the value of $x^2 + y$?

(A) -14
(B) -2
(C) 3
(D) 6
(E) 18

340 If the cost of 12 eggs varies between \$0 90 and \$1 20, then the cost per egg varies between

(A) \$0 06 and \$0 08
(B) \$0 065 and \$0 085
(C) \$0 07 and \$0 09
(D) \$0 075 and \$0 10
(E) \$0 08 and \$0 105

341 $(\sqrt{3}+2)(\sqrt{3}-2) =$

(A) $\sqrt{3}-4$ (B) $\sqrt{6}-4$ (C) -1
(D) 1 (E) 2

342 A glucose solution contains 15 grams of glucose per 100 cubic centimeters of solution If 45 cubic centimeters of the solution were poured into an empty container, how many grams of glucose would be in the container?

(A) 3 00
(B) 5 00
(C) 5.50
(D) 6 50
(E) 6 75

343 If Sam were twice as old as he is, he would be 40 years older than Jim. If Jim is 10 years younger than Sam, how old is Sam?

(A) 20
(B) 30
(C) 40
(D) 50
(E) 60

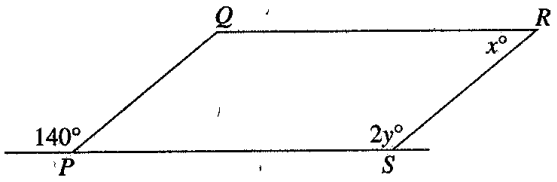
344. If $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}=\frac{13}{x}$, which of the following must be an integer?

I $\frac{x}{8}$

II $\frac{x}{12}$

III $\frac{x}{24}$

(A) I only (B) II only (C) I and III only
(D) II and III only (E) I, II, and III

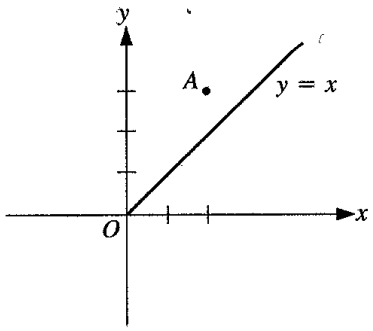


345 In the figure above, if $PQRS$ is a parallelogram, then $y - x =$

(A) 30 (B) 35 (C) 40 (D) 70 (E) 100

346 The temperature in degrees Celsius (C) can be converted to temperature in degrees Fahrenheit (F) by the formula $F = \frac{9}{5}C + 32$ What is the temperature at which $F = C$?

(A) 20° (B) $\left(\frac{32}{5}\right)°$ (C) 0°
(D) −20° (E) −40°



347 In the rectangular coordinate system above, the line $y = x$ is the perpendicular bisector of segment AB (not shown), and the x-axis is the perpendicular bisector of segment BC (not shown) If the coordinates of point A are (2, 3), what are the coordinates of point C?

(A) (−3,−2)
(B) (−3, 2)
(C) (2,−3)
(D) (3,−2)
(E) (2, 3)

348 If 1 kilometer is approximately 0 6 mile, which of the following best approximates the number of kilometers in 2 miles?

(A) $\frac{10}{3}$ (B) 3 (C) $\frac{6}{5}$ (D) $\frac{1}{3}$ (E) $\frac{3}{10}$

349 A \$500 investment and a \$1,500 investment have a combined yearly return of 8 5 percent of the total of the two investments If the \$500 investment has a yearly return of 7 percent, what percent yearly return does the \$1,500 investment have?

(A) 9%
(B) 10%
(C) $10\frac{5}{8}\%$
(D) 11%
(E) 12%

350 A store currently charges the same price for each towel that it sells If the current price of each towel were to be increased by $1, 10 fewer of the towels could be bought for $120, excluding sales tax What is the current price of each towel?

(A) $1
(B) $2
(C) $3
(D) $4
(E) $12

351 If the sum of n consecutive integers is 0, which of the following must be true?

I n is an even number
II n is an odd number
III The average (arithmetic mean) of the n integers is 0

(A) I only (B) II only (C) III only
(D) I and III (E) II and III

352 In the formula $V = \frac{1}{(2r)^3}$, if r is halved, then V is multiplied by

(A) 64

(B) 8

(C) 1

(D) $\frac{1}{8}$

(E) $\frac{1}{64}$

353 For any integer n greater than 1, $\underline{\lfloor n}$ denotes the product of all the integers from 1 to n, inclusive How many prime numbers are there between $\underline{\lfloor 6} + 2$ and $\underline{\lfloor 6} + 6$, inclusive?

(A) None (B) One (C) Two
(D) Three (E) Four

354 In how many arrangements can a teacher seat 3 girls and 3 boys in a row of 6 seats if the boys are to have the first, third, and fifth seats?

(A) 6 (B) 9 (C) 12 (D) 36 (E) 720

355 A circular rim 28 inches in diameter rotates the same number of inches per second as a circular rim 35 inches in diameter If the smaller rim makes x revolutions per second, how many revolutions per minute does the larger rim make in terms of x ?

(A) $\frac{48\pi}{x}$

(B) $75x$

(C) $48x$

(D) $24x$

(E) $\frac{x}{75}$

356 The cost C of manufacturing a certain product can be estimated by the formula $C = 0.03rst^2$, where r and s are the amounts, in pounds, of the two major ingredients and t is the production time, in hours If r is increased by 50 percent, s is increased by 20 percent, and t is decreased by 30 percent, by approximately what percent will the estimated cost of manufacturing the product change?

(A) 40% increase
(B) 12% increase
(C) 4% increase
(D) 12% decrease
(E) 24% decrease

357 Reggie purchased a car costing $8,700 As a down payment he used a $2,300 insurance settlement, and an amount from his savings equal to 15 percent of the difference between the cost of the car and the insurance settlement If he borrowed the rest of the money needed to purchase the car, how much did he borrow?

(A) $6,400
(B) $6,055
(C) $5,440
(D) $5,095
(E) $3,260

MEMBERSHIP OF ORGANIZATION *X*, 1988

Honorary Members	78
Fellows	9,209
Members	35,509
Associate Members	27,909
Affiliates	2,372

358 According to the table above, the number of fellows was approximately what percent of the total membership of Organization *X*?

(A) 9%
(B) 12%
(C) 18%
(D) 25%
(E) 35%

359 The arithmetic mean and standard deviation of a certain normal distribution are 13 5 and 1 5, respectively What value is exactly 2 standard deviations less than the mean?

(A) 10 5
(B) 11 0
(C) 11.5
(D) 12 0
(E) 12 5

360 Mark bought a set of 6 flower pots of different sizes at a total cost of $8 25 Each pot cost $0 25 more than the next one below it in size. What was the cost, in dollars, of the largest pot?

(A) $1 75
(B) $1 85
(C) $2 00
(D) $2 15
(E) $2 30

361 When N is divided by T, the quotient is S and the remainder is V Which of the following expressions is equal to N?

(A) ST
(B) $S + V$
(C) $ST + V$
(D) $T(S + V)$
(E) $T(S - V)$

38, 69, 22, 73, 31, 47, 13, 82

362 Which of the following numbers is greater than three-fourths of the numbers but less than one-fourth of the numbers in the list above?

(A) 56
(B) 68
(C) 69
(D) 71
(E) 73

363 Lucy invested $10,000 in a new mutual fund account exactly three years ago The value of the account increased by 10 percent during the first year, increased by 5 percent during the second year, and decreased by 10 percent during the third year What is the value of the account today?

(A) $10,350
(B) $10,395
(C) $10,500
(D) $11,500
(E) $12,705

364 A certain bakery has 6 employees It pays annual salaries of $14,000 to each of 2 employees, $16,000 to 1 employee, and $17,000 to each of the remaining 3 employees The average (arithmetic mean) annual salary of these employees is closest to which of the following?

(A) $15,200
(B) $15,500
(C) $15,800
(D) $16,000
(E) $16,400

365 If x is equal to the sum of the even integers from 40 to 60, inclusive, and y is the number of even integers from 40 to 60, inclusive, what is the value of $x+y$?

(A) 550
(B) 551
(C) 560
(D) 561
(E) 572

366 If $\left(7^{\frac{3}{4}}\right)^n = 7$, what is the value of n?

(A) $\frac{1}{3}$
(B) $\frac{2}{3}$
(C) $\frac{4}{3}$
(D) $\frac{5}{3}$
(E) $\frac{6}{3}$

367 Which of the following is equal to the average (arithmetic mean) of $(x+2)^2$ and $(x-2)^2$?

(A) x^2
(B) x^2+2
(C) x^2+4
(D) x^2+2x
(E) x^2+4x

368 If $x^4+y^4=100$ then the greatest possible value of x is between

(A) 0 and 3
(B) 3 and 6
(C) 6 and 9
(D) 9 and 12
(E) 12 and 15

369 During a car trip, Maria stopped to rest after she traveled $\frac{1}{2}$ of the total distance to her destination She stopped again after she traveled $\frac{1}{4}$ of the distance remaining between her first stop and her destination, and then she drove the remaining 120 miles to her destination What was the total distance, in miles, from Maria's starting point to her destination?

(A) 280
(B) 320
(C) 360
(D) 420
(E) 480

NUMBER OF SOLID-COLORED MARBLES IN THREE JARS

Jar	Number of Red Marbles	Number of Green Marbles	Total Number of Red and Green Marbles
P	x	y	80
Q	y	z	120
R	x	z	160

370 In the table above, what is the number of green marbles in jar R?

(A) 70
(B) 80
(C) 90
(D) 100
(E) 110

371 The cost of picture frame M is \$10 00 less than 3 times the cost of picture frame N If the cost of frame M is \$50 00, what is the cost of frame N?

(A) \$13 33
(B) \$16 66
(C) \$20 00
(D) \$26 66
(E) \$40 00

372 If x is to be chosen at random from the set $\{1, 2, 3, 4\}$ and y is to be chosen at random from the set $\{5, 6, 7\}$, what is the probability that xy will be even?

(A) $\frac{1}{6}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) $\frac{2}{3}$
(E) $\frac{5}{6}$

373 If $S = \{0, 4, 5, 2, 11, 8\}$, how much greater than the median of the numbers in S is the mean of the numbers in S?

(A) 0 5
(B) 1 0
(C) 1 5
(D) 2 0
(E) 2 5

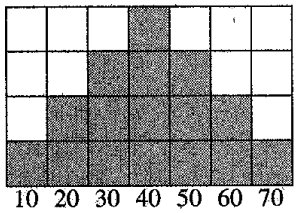
374 The value of $\sqrt[3]{-89}$ is

(A) between –9 and –10
(B) between –8 and –9
(C) between –4 and –5
(D) between –3 and –4
(E) undefined

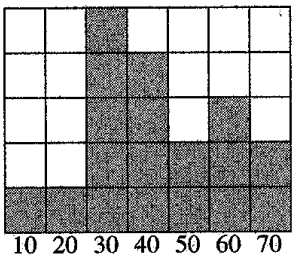
Shipment	Number of Defective Chips in the Shipment	Total Number of Chips in the Shipment
$S1$	2	5,000
$S2$	5	12,000
$S3$	6	18,000
$S4$	4	16,000

375 A computer chip manufacturer expects the ratio of the number of defective chips to the total number of chips in all future shipments to equal the corresponding ratio for shipments $S1$, $S2$, $S3$, and $S4$ combined, as shown in the table above. What is the expected number of defective chips in a shipment of 60,000 chips?

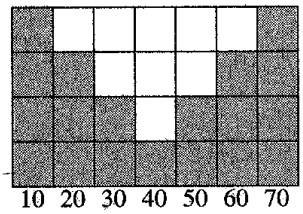
(A) 14
(B) 20
(C) 22
(D) 24
(E) 25



X



Y



Z

376 If the variables, X, Y, and Z take on only the values 10, 20, 30, 40, 50, 60, or 70 with frequencies indicated by the shaded regions above, for which of the frequency distributions is the mean equal to the median?

(A) X only
(B) Y only
(C) Z only
(D) X and Y
(E) X and Z

377 In a certain furniture store, each week Nancy earns a salary of $240 plus 5 percent of the amount of her total sales that exceeds $800 for the week If Nancy earned a total of $450 one week, what were her total sales that week?

(A) $2,200
(B) $3,450
(C) $4,200
(D) $4,250
(E) $5,000

$A = \{2, 3, 4, 5\}$
$B = \{4, 5, 6, 7, 8\}$

378 Two integers will be randomly selected from the sets above, one integer from set A and one integer from set B What is the probability that the sum of the two integers will equal 9?

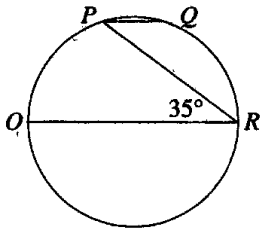
(A) 0 15
(B) 0 20
(C) 0 25
(D) 0 30
(E) 0 33

p, r, s, t, u

379 An arithmetic sequence is a sequence in which each term after the first is equal to the sum of the preceding term and a constant If the list of numbers shown above is an arithmetic sequence, which of the following must also be an arithmetic sequence?

I $2p, 2r, 2s, 2t, 2u$
II $p-3, r-3, s-3, t-3, u-3$
III p^2, r^2, s^2, t^2, u^2

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III



380 In the circle above, PQ is parallel to diameter OR, and OR has length 18 What is the length of minor arc PQ ?

(A) 2π
(B) $\frac{9\pi}{4}$
(C) $\frac{7\pi}{2}$
(D) $\frac{9\pi}{2}$
(E) 3π

381 Dick and Jane each saved $3,000 in 1989 In 1990 Dick saved 8 percent more than in 1989, and together he and Jane saved a total of $5,000 Approximately what percent less did Jane save in 1990 than in 1989 ?

(A) 8%
(B) 25%
(C) 41%
(D) 59%
(E) 70%

382 Of the following, which is least?

(A) $\frac{1}{0\,2}$
(B) $(0\,2)^2$
(C) 0 02
(D) $\frac{0\,2}{2}$
(E) 0 2

383 S represents the sum of the weights of n fish in pounds Which of the following represents the average (arithmetic mean) of the n weights in ounces? (1 pound = 16 ounces)

(A) $16nS$
(B) $\frac{16S}{n}$
(C) $\frac{16n}{S}$
(D) $\frac{nS}{16}$
(E) $\frac{S}{16n}$

NET INCOME BY SECTOR, SECOND QUARTER, 1996

Sector	Net Income (in billions)	Percent Change from First Quarter, 1996
Basic Materials	$4.83	–26%
Energy	7 46	+40
Industrial	5 00	–1
Utilities	8 57	+303
Conglomerates	2 07	+10

384 The table above represents the combined net income of all United States companies in each of five sectors for the second quarter of 1996 Which sector had the greatest net income during the first quarter of 1996 ?

(A) Basic Materials
(B) Energy
(C) Industrial
(D) Utilities
(E) Conglomerates

385 For how many integers n is $2^n = n^2$?

(A) None
(B) One
(C) Two
(D) Three
(E) More than three

386 The manager of a theater noted that for every 10 admission tickets sold, the theater sells 3 bags of popcorn at $2 25 each, 4 sodas at $1 50 each, and 2 candy bars at $1 00 each To the nearest cent, what is the average (arithmetic mean) amount of these snack sales per ticket sold?

(A) $1 48
(B) $1 58
(C) $1 60
(D) $1 64
(E) $1 70

387 If $n = 4p$, where p is a prime number greater than 2, how many different positive even divisors does n have, including n ?

(A) Two
(B) Three
(C) Four
(D) Six
(E) Eight

388 S is a set containing 9 different numbers. T is a set containing 8 different numbers, all of which are members of S Which of the following statements CANNOT be true?

(A) The mean of S is equal to the mean of T
(B) The median of S is equal to the median of T
(C) The range of S is equal to the range of T
(D) The mean of S is greater than the mean of T
(E) The range of S is less than the range of T

389 In a recent election, James received 0 5 percent of the 2,000 votes cast To win the election, a candidate needed to receive more than 50 percent of the vote How many additional votes would James have needed to win the election?

(A) 901
(B) 989
(C) 990
(D) 991
(E) 1,001

390 The regular price per can of a certain brand of soda is $0 40 If the regular price per can is discounted 15 percent when the soda is purchased in 24-can cases, what is the price of 72 cans of this brand of soda purchased in 24-can cases?

(A) $16 32
(B) $18 00
(C) $21 60
(D) $24 48
(E) $28 80

391 If r and s are integers and $rs + r$ is odd, which of the following must be even?

(A) r
(B) s
(C) $r + s$
(D) $rs - r$
(E) $rs + s$

List I 3, 6, 8, 19
List II x, 3, 6, 8, 19

392 If the median of the numbers in list I above is equal to the median of the numbers in list II above, what is the value of x ?

(A) 6
(B) 7
(C) 8
(D) 9
(E) 10

393 If $d = 2\ 0453$ and d^* is the decimal obtained by rounding d to the nearest hundredth, what is the value of $d^* - d$?

(A) −0 0053
(B) −0 0003
(C) 0 0007
(D) 0 0047
(E) 0 0153

394 Right triangle PQR is to be constructed in the xy-plane so that the right angle is at P and PR is parallel to the x-axis The x- and y-coordinates of P, Q, and R are to be integers that satisfy the inequalities $-4 \leq x \leq 5$ and $6 \leq y \leq 16$ How many different triangles with these properties could be constructed?

(A) 110
(B) 1,100
(C) 9,900
(D) 10,000
(E) 12,100

395 A box contains 100 balls, numbered from 1 to 100 If three balls are selected at random and with replacement from the box, what is the probability that the sum of the three numbers on the balls selected from the box will be odd?

(A) $\frac{1}{4}$
(B) $\frac{3}{8}$
(C) $\frac{1}{2}$
(D) $\frac{5}{8}$
(E) $\frac{3}{4}$

396 How many different positive integers are factors of 441 ?

(A) 4
(B) 6
(C) 7
(D) 9
(E) 11

397 Company K's earnings were \$12 million last year. If this year's earnings are projected to be 150 percent greater than last year's earnings, what are Company K's projected earnings this year?

(A) \$13 5 million
(B) \$15 million
(C) \$18 million
(D) \$27 million
(E) \$30 million

2, 4, 6, 8, n, 3, 5, 7, 9

398 In the list above, if n is an integer between 1 and 10, inclusive, then the median must be

(A) either 4 or 5
(B) either 5 or 6
(C) either 6 or 7
(D) n
(E) 5 5

399 If $0 < x < 1$, which of the following inequalities must be true?

I $x^5 < x^3$
II $x^4 + x^5 < x^3 + x^2$
III $x^4 - x^5 < x^2 - x^3$

(A) None
(B) I only
(C) II only
(D) I and II only
(E) I, II, and III

400 If $(2^x)(2^y) = 8$ and $(9^x)(3^y) = 81$, then $(x, y) =$

(A) (1, 2)
(B) (2, 1)
(C) (1, 1)
(D) (2, 2)
(E) (1, 3)

401 If $a = 1$ and $\frac{a-b}{c}=1$, which of the following is NOT a possible value of b ?

(A) –2
(B) –1
(C) 0
(D) 1
(E) 2

402 Which of the following is equal to x^{18} for all positive values of x ?

(A) $x^9 + x^9$
(B) $(x^2)^9$
(C) $(x^9)^9$
(D) $(x^3)^{15}$
(E) $\frac{x^4}{x^{22}}$

403 A television manufacturer produces 600 units of a certain model each month at a cost to the manufacturer of \$90 per unit and all of the produced units are sold each month What is the minimum selling price per unit that will ensure that the monthly profit (revenue from sales minus the manufacturer's cost to produce) on the sales of these units will be at least \$42,000 ?

(A) \$110
(B) \$120
(C) \$140
(D) \$160
(E) \$180

404 A square countertop has a square tile inlay in the center, leaving an untiled strip of uniform width around the tile If the ratio of the tiled area to the untiled area is 25 to 39, which of the following could be the width, in inches, of the strip?

I $1\frac{1}{2}$
II 3
III $4\frac{1}{2}$

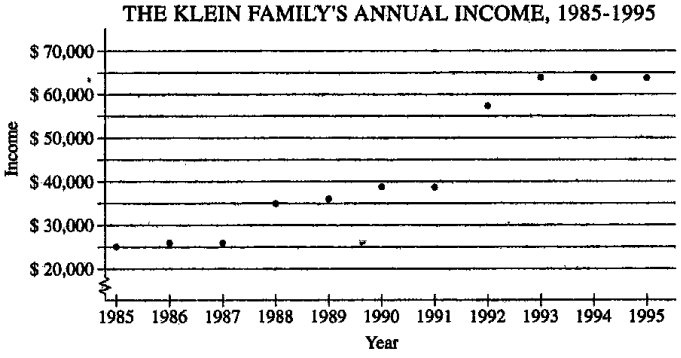
(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

$$\begin{array}{r} 4\square 7 \\ \triangle 2\ 3 \\ +\ 1\ 6\ 2 \\ \hline 1,\ 2\ 2\ 2 \end{array}$$

405 If $\square$ and $\triangle$ represent single digits in the correctly worked computation above, what is the value of $\square + \triangle$?

(A) 7
(B) 9
(C) 10
(D) 11
(E) 13

THE KLEIN FAMILY'S ANNUAL INCOME, 1985-1995



406 Which of the following statements can be inferred from the data above?

I The Klein family's annual income more than doubled from 1985 to 1995.

II The Klein family's annual income increased by a greater amount from1985 to 1990 than from 1990 to 1995

III The Klein family's average (arithmetic mean) annual income for the period shown was greater than $40,000

(A) I only
(B) II only
(C) I and III only
(D) II and III only
(E) I, II, and III

407 Anne bought a computer for $2,000 and then paid a 5 percent sales tax, and Henry bought a computer for $1,800 and then paid a 12 percent sales tax The total amount that Henry paid, including sales tax, was what percent less than the total amount that Anne paid, including sales tax?

(A) 3%
(B) 4%
(C) 7%
(D) 10%
(E) 12%

408 If $\frac{x}{y}=\frac{2}{3}$, then $\frac{x-y}{x}=$

(A) $-\frac{1}{2}$
(B) $-\frac{1}{3}$
(C) $\frac{1}{3}$
(D) $\frac{1}{2}$
(E) $\frac{5}{2}$

409 If $4x + 3y = -2$ and $3x + 6 = 0$, what is the value of y ?

(A) $-3\frac{1}{3}$
(B) -2
(C) $-\frac{2}{3}$
(D) $\frac{2}{3}$
(E) 2

I 72, 73, 74, 75, 76
II 74, 74, 74, 74, 74
III 62, 74, 74, 74, 89

410 The data sets I, II, and III above are ordered from greatest standard deviation to least standard deviation in which of the following?

(A) I, II, III
(B) I, III, II
(C) II, III, I
(D) III, I, II
(E) III, II, I

411 The contents of a certain box consist of 14 apples and 23 oranges How many oranges must be removed from the box so that 70 percent of the pieces of fruit in the box will be apples?

(A) 3
(B) 6
(C) 14
(D) 17
(E) 20

412 If n is a positive integer and n^2 is divisible by 72, then the largest positive integer that must divide n is

(A) 6
(B) 12
(C) 24
(D) 36
(E) 48

413 If –3 is 6 more than x, what is the value of $\frac{x}{3}$?

(A) –9
(B) –6
(C) –3
(D) –1
(E) 1

$$r = 400\left(\frac{D+S-P}{P}\right)$$

414 If stock is sold three months after it is purchased, the formula above relates P, D, S, and r, where P is the purchase price of the stock, D is the amount of any dividend received, S is the selling price of the stock, and r is the yield of the investment as a percent If Rose purchased $400 worth of stock, received a dividend of $5, and sold the stock for $420 three months after purchasing it, what was the yield of her investment according to the formula? (Assume that she paid no commissions)

(A) 1 25%
(B) 5%
(C) 6 25%
(D) 20%
(E) 25%

415 An athlete runs R miles in H hours, then rides a bicycle Q miles in the same number of hours Which of the following represents the athlete's average speed, in miles per hour, for these two activities combined?

(A) $\frac{R-Q}{H}$
(B) $\frac{R-Q}{2H}$
(C) $\frac{2(R+Q)}{H}$
(D) $\frac{2(R+Q)}{2H}$
(E) $\frac{R+Q}{2H}$

416 If a certain sample of data has a mean of 20 0 and a standard deviation of 3 0, which of the following values is more than 2 5 standard deviations from the mean?

(A) 12 0
(B) 13 5
(C) 17 0
(D) 23 5
(E) 26 5

417 Which of the following is the least positive integer that is divisible by 2, 3, 4, 5, 6, 7, 8, and 9 ?

(A) 15,120
(B) 3,024
(C) 2,520
(D) 1,890
(E) 1,680

418 Of the 50 researchers in a workgroup, 40 percent will be assigned to team A and the remaining 60 percent to team B However, 70 percent of the researchers prefer team A and 30 percent prefer team B What is the least possible number of researchers who will NOT be assigned to the team they prefer?

(A) 15
(B) 17
(C) 20
(D) 25
(E) 30

419 Last year, a certain public transportation system sold an average (arithmetic mean) of 41,000 tickets per day on weekdays (Monday through Friday) and an average of 18,000 tickets per day on Saturday and Sunday Which of the following is closest to the total number of tickets sold last year?

(A) 1 million
(B) 1.25 million
(C) 10 million
(D) 12 5 million
(E) 125 million

County	Amount Recycled	Amount Disposed of
A	16,700	142,800
B	8,800	48,000
C	13,000	51,400
D	3,900	20,300
E	3,300	16,200

420 The table above shows the amount of waste material, in tons, recycled by each of five counties in a single year and the amount of waste material, also in tons, that was disposed of in landfills by the five counties in that year Which county had the lowest ratio of waste material disposed of to waste material recycled in the year reported in the table?

(A) *A*
(B) *B*
(C) *C*
(D) *D*
(E) *E*

421 If a number between 0 and $\frac{1}{2}$ is selected at random, which of the following will the number most likely be between?

(A) 0 and $\frac{3}{20}$
(B) $\frac{3}{20}$ and $\frac{1}{5}$
(C) $\frac{1}{5}$ and $\frac{1}{4}$
(D) $\frac{1}{4}$ and $\frac{3}{10}$
(E) $\frac{3}{10}$ and $\frac{1}{2}$

District	Number of Votes	Percent of Votes for Candidate *P*	Percent of Votes for Candidate *Q*
1	800	60	40
2	1,000	50	50
3	1,500	50	50
4	1,800	40	60
5	1,200	30	70

422 The table above shows the results of a recent school board election in which the candidate with the higher total number of votes from the five districts was declared the winner Which district had the greatest number of votes for the winner?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

423 If m is the average (arithmetic mean) of the first 10 positive multiples of 5 and if M is the median of the first 10 positive multiples of 5, what is the value of $M - m$?

(A) –5
(B) 0
(C) 5
(D) 25
(E) 27 5

424 If n is a positive integer less than 200 and $\frac{14n}{60}$ is an integer, then n has how many different positive prime factors?

(A) Two
(B) Three
(C) Five
(D) Six
(E) Eight

Day	Change in Dollars
Monday	$+1\frac{1}{2}$
Tuesday	$-\frac{3}{4}$
Wednesday	0
Thursday	$-\frac{1}{8}$
Friday	$+2\frac{1}{4}$

425 The table above shows the daily change in the price of a certain stock last week What was the net change in dollars in the price of the stock for the week?

(A) $-4\frac{5}{8}$

(B) $-2\frac{7}{8}$

(C) $+2\frac{7}{8}$

(D) $+3\frac{3}{4}$

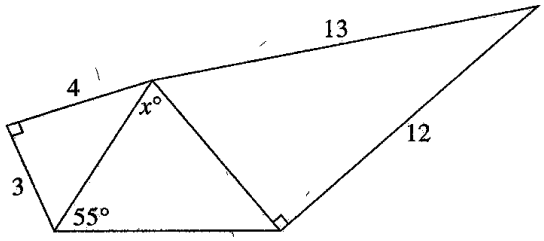
(E) $+4\frac{5}{8}$

426. A group of store managers must assemble 280 displays for an upcoming sale. If they assemble 25 percent of the displays during the first hour and 40 percent of the remaining displays during the second hour, how many of the displays will not have been assembled by the end of the second hour?

(A) 70
(B) 98
(C) 126
(D) 168
(E) 182

427 The temperatures in degrees Celsius recorded at 6 in the morning in various parts of a certain country were 10°, 5°, –2°, –1°, –5°, and 15° What is the median of these temperatures?

(A) –2°C
(B) –1°C
(C) 2°C
(D) 3°C
(E) 5°C



428 In the figure above, what is the value of x ?

(A) 55
(B) 60
(C) 65
(D) 70
(E) 75

1	2	3	4	5	6	7
–2	–4	–6	–8	–10	–12	–14
3	6	9	12	15	18	21
–4	–8	–12	–16	–20	–24	–28
5	10	15	20	25	30	35
–6	–12	–18	–24	–30	–36	–42
7	14	21	28	35	42	49

429 What is the sum of the integers in the table above?

(A) 28
(B) 112
(C) 336
(D) 448
(E) 784

430. If $m > 0$ and x is m percent of y, then, in terms of m, y is what percent of x ?

(A) $100m$

(B) $\frac{1}{100m}$

(C) $\frac{1}{m}$

(D) $\frac{10}{m}$

(E) $\frac{10,000}{m}$

3, k, 2, 8, m, 3

431 The arithmetic mean of the list of numbers above is 4 If k and m are integers and $k \neq m$, what is the median of the list?

(A) 2
(B) 2 5
(C) 3
(D) 3 5
(E) 4

432 A certain junior class has 1,000 students and a certain senior class has 800 students Among these students, there are 60 sibling pairs, each consisting of 1 junior and 1 senior If 1 student is to be selected at random from each class, what is the probability that the 2 students selected will be a sibling pair?

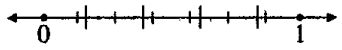
(A) $\frac{3}{40,000}$

(B) $\frac{1}{3,600}$

(C) $\frac{9}{2,000}$

(D) $\frac{1}{60}$

(E) $\frac{1}{15}$



433 On the number line above, the segment from 0 to 1 has been divided into fifths, as indicated by the large tick marks, and also into sevenths, as indicated by the small tick marks. What is the least possible distance between any two of the tick marks?

(A) $\frac{1}{70}$

(B) $\frac{1}{35}$

(C) $\frac{2}{35}$

(D) $\frac{1}{12}$

(E) $\frac{1}{7}$

434 A certain musical scale has 13 notes, each having a different frequency, measured in cycles per second In the scale, the notes are ordered by increasing frequency, and the highest frequency is twice the lowest For each of the 12 lower frequencies, the ratio of a frequency to the next higher frequency is a fixed constant If the lowest frequency is 440 cycles per second, then the frequency of the 7th note in the scale is how many cycles per second?

(A) $440\sqrt{2}$

(B) $440\sqrt{2^7}$

(C) $440\sqrt{2^{12}}$

(D) $440\sqrt[12]{2^7}$

(E) $440\sqrt[7]{2^{12}}$

435 If $a = 7$ and $b = -7$, what is the value of $2a - 2b + b^2$?

(A) –49
(B) 21
(C) 49
(D) 63
(E) 77

436 Equal amounts of water were poured into two empty jars of different capacities, which made one jar $\frac{1}{4}$ full and the other jar $\frac{1}{3}$ full. If the water in the jar with the lesser capacity is then poured into the jar with the greater capacity, what fraction of the larger jar will be filled with water?

(A) $\frac{1}{7}$
(B) $\frac{2}{7}$
(C) $\frac{1}{2}$
(D) $\frac{7}{12}$
(E) $\frac{2}{3}$

437 If Mel saved more than \$10 by purchasing a sweater at a 15 percent discount, what is the smallest amount the original price of the sweater could be, to the nearest dollar?

(A) 45
(B) 67
(C) 75
(D) 83
(E) 150

438 Which of the following CANNOT be the median of the three positive integers x, y, and z ?

(A) x
(B) z
(C) $x+z$
(D) $\frac{x+z}{2}$
(E) $\frac{x+z}{3}$

439 $\frac{(8^2)(3^3)(2^4)}{96^2} =$

(A) 3
(B) 6
(C) 9
(D) 12
(E) 18

440 What is the 25th digit to the right of the decimal point in the decimal form of $\frac{6}{11}$?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

441. Which of the following lists the number of points at which a circle can intersect a triangle?

(A) 2 and 6 only
(B) 2, 4, and 6 only
(C) 1, 2, 3, and 6 only
(D) 1, 2, 3, 4, and 6 only
(E) 1, 2, 3, 4, 5, and 6

Explanatory Material: Problem Solving

The following discussion is intended to familiarize you with the most efficient and effective approaches to the kinds of problems common to problem solving questions The questions in this chapter are generally representative of the kinds of problems you will encounter in the GMAT Remember that it is the problem-solving strategy that is important, not the specific details of a particular problem

1. **If Mario was 32 years old 8 years ago, how old was he x years ago?**

   (A) $x - 40$
   (B) $x - 24$
   (C) $40 - x$
   (D) $24 - x$
   (E) $24 + x$

Since Mario was 32 years old 8 years ago, his age now is $32 + 8 = 40$ x years ago, Mario was x years younger, so his age then was $40 - x$ Thus, the best answer is C

2. **Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?**

   (A) 648
   (B) 1,800
   (C) 2,700
   (D) 10,800
   (E) 64,800

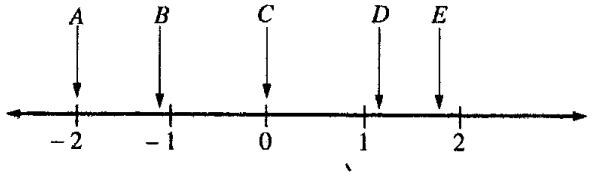
The production rate of each machine is $\frac{270}{6} = 45$ bottles per minute The production rate for 10 machines is $45(10) = 450$ bottles per minute Therefore, the 10 machines can produce $450(4) = 1{,}800$ bottles in 4 minutes The best answer is B

3. **Three business partners, Q, R, and S, agree to divide their total profit for a certain year in the ratios 2 : 5 : 8, respectively. If Q's share was \$4,000, what was the total profit of the business partners for the year?**

   (A) \$26,000
   (B) \$30,000
   (C) \$52,000
   (D) \$60,000
   (E) \$300,000

Based on the ratios $2 \cdot 5$ 8, the total profit T was divided as follows $\frac{2}{15}T$ was given to Q, $\frac{5}{15}T$ was given to R, and $\frac{8}{15}T$ was given to S Since $\frac{2}{15}T = \$4{,}000$, $T = \frac{15}{2}(4{,}000) = \$30{,}000$

Therefore, the best answer is B



4. **Of the five coordinates associated with points A, B, C, D, and E on the number line above, which has the greatest absolute value?**

   (A) A
   (B) B
   (C) C
   (D) D
   (E) E

The absolute value of a number x may be thought of as the distance between x and 0 on the number line By inspection of the five points, the coordinate of point A is farthest from 0 and thus has the greatest absolute value Therefore, the best answer is A

5. **A restaurant meal cost \$35.50 and there was no tax. If the tip was more than 10 percent but less than 15 percent of the cost of the meal, then the total amount paid must have been between**

   (A) \$40 and \$42
   (B) \$39 and \$41
   (C) \$38 and \$40
   (D) \$37 and \$39
   (E) \$36 and \$37

If P is the total amount paid, then P must be greater than \$35 50(1 1) but less than \$35 50(1 15) That is, P is between \$39 05 and \$40 825 It follows that P must be between \$39 and \$41, which is choice B. Each of the other choices excludes a possible value of P Thus, the best answer is B