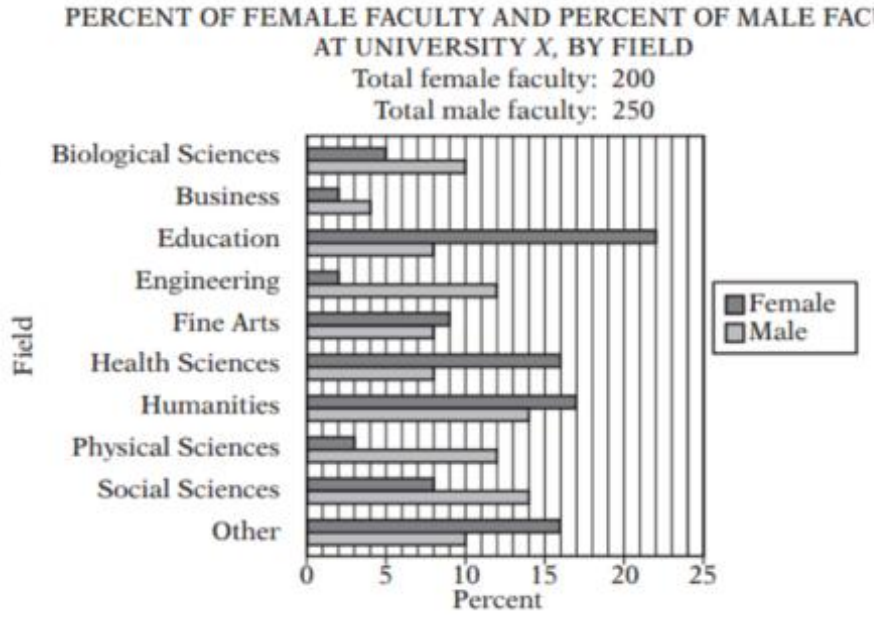
1.The total amount that Mary paid for a book was equal to the price of the book plus a sales tax that was 4 percent of the price of the book. Mary paid for the book with a $10 bill and received the correct change, which was less than $3.00. Which of the following statements must be true? Indicate all such statements.
A. The price of the book was less than $9.50.
B. The price of the book was greater than $6.90.
C. The sales tax was less than $0.45.

2.For the biological sciences and health sciences faculty combined, 1/3 of the female and 2/9 of the male faculty members are tenured professors. What fraction of all the faculty members in those two fields combined are tenured professors?
Give your answer as a fraction.

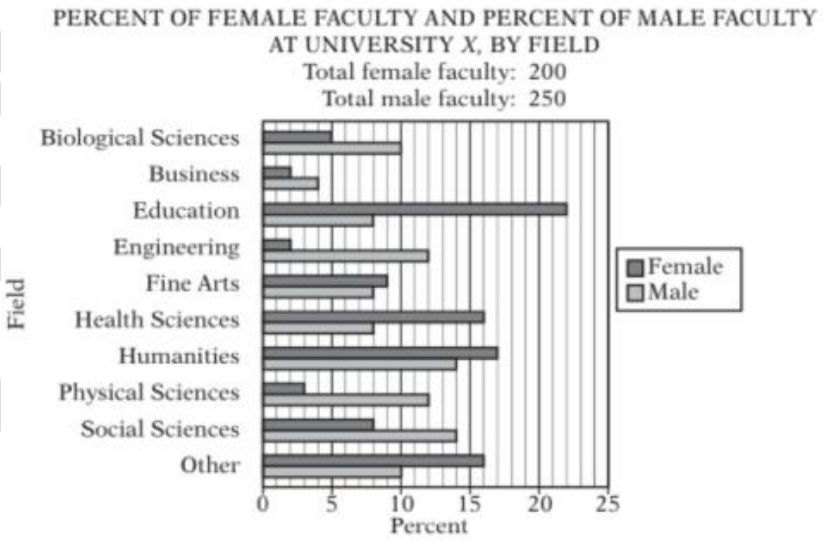



3.In the xy-plane, line k is a line that does not pass through the origin. Which of the following statements individually provide(s) sufficient additional information to determine whether the slope of line k is negative? Indicate all such statements.
A. The x-intercept of line k is twice the y-intercept of line k.
B. The product of the x-intercept and the y-intercept of line k is positive.
C. Line k passes through the points (a, b) and (r, s), where $(a-r)(b-s) < 0$.

4. What is the least positive integer that is not a factor of 25! and is not a prime number?
A. 26
B. 28
C. 36
D. 56
E. 58

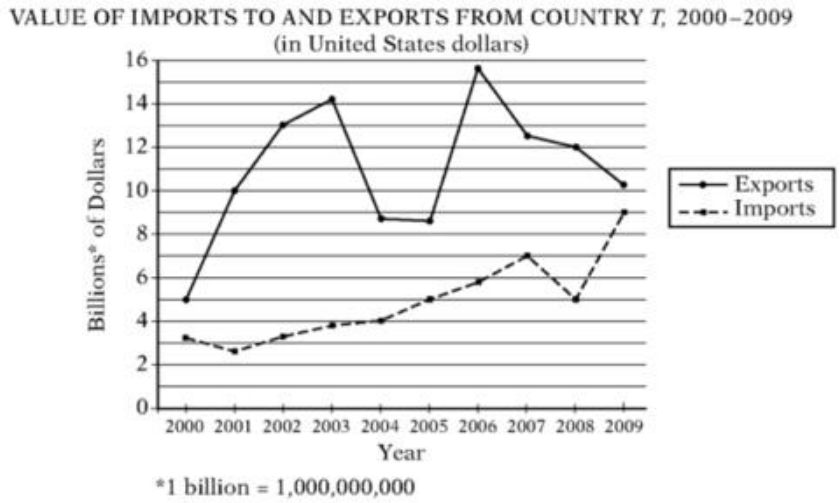
5. A student made a conjecture that for any integer n, the integer 4n + 3 is a prime number. Which of the following values of n could be used to disprove the student's conjecture? Indicate all such values.
A. 1
B. 3
C. 4
D. 6
E. 7

6. Approximately what percent of the faculty in humanities are male?
A. 35%
B. 38%
C. 41%
D. 45%
E. 51%



7.Which of the following is closest to the average (arithmetic mean) of the 9 changes in the value of imports between consecutive years from 2000 to 2009?

A. $260 million
B. $320 million
C. $400 million
D. $480 million
E. $640 million




8.A random variable Y is normally distributed with a mean of 200 and a standard deviation of 10.

Quantity A The probability of the event that the value of Y is greater than 220
Quantity B 1/6

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

9.In a quality-control test, 50 boxes-each containing 30 machine parts-were examined for defective parts. The number of defective parts was recorded for each box, and the average (arithmetic mean) of the 50 recorded numbers of defective parts per box was 1.12. Only one error was made in recording the 50 numbers: "1" defective part in a certain box was incorrectly recorded as “10".

Quantity A The actual average number of defective parts per box
Quantity B 0.94

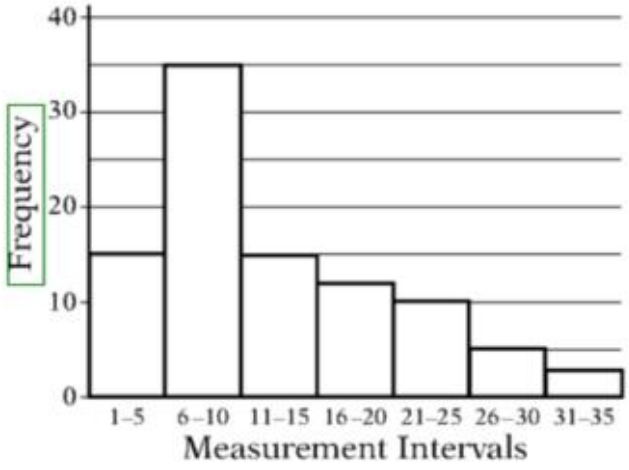
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

10.x is an integer greater than 1.

Quantity A $3^{x+1}$
Quantity B $4^{x}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

11.In the course of an experiment, 95 measurements were recorded, and all of the measurements were integers. The 95 measurements were then grouped into 7 measurement intervals. The graph above shows the frequency distribution of the 95 measurements by measurement interval.




Quantity A The average (arithmetic mean) of the 95 measurements
Quantity B The median of the 95 measurements

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

12. $x^y > 0, xy^2 < 0$

Quantity A x
Quantity B y

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

13. r, s, and t are three consecutive odd integers such that r < s < t.

Quantity A r + s + 1
Quantity B s + t - 1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

14.n is a positive integer, x = 7n + 2, and y = 6n + 3

Quantity A the ones digit of x+y
Quantity B 5

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

15.
Quantity A $x^2$+1
Quantity B 2x-1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given

16.List K consists of the numbers -10, -5, 0, 5, and 10. Which of the following lists of numbers have the same range as the numbers in list K?
Indicate all such lists.
A. -15, -1, 0, 1, 15
B. -7, -4, -2, 1, 13
C. 0, 1, 2, 5, 8, 10
D. 2, 3, 5, 15, 19, 22
E. 4, 5, 6, 24

17.If a < b < 0, which of the following numbers must be positive?
Indicate all such numbers.
A. a-b
B. $a^2$-$b^2$
C. ab
D. $a^2b$
E. $a^2$+a$b^2$

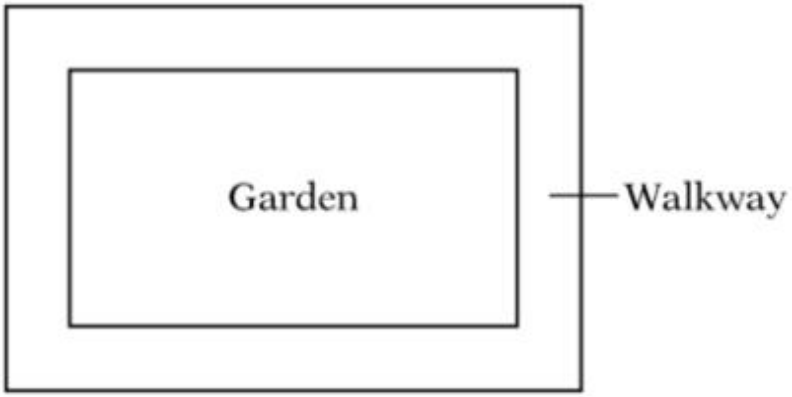
18.Eight points are equally spaced on a circle. If 4 of the 8 points are to be chosen at random, what is the probability that a quadrilateral having the 4 points chosen as vertices will be a square?
A. 1/70
B. 1/35
C. 1/7
D. 1/4
E. 1/2

19.The range of the heights of the female students in a certain class is 13.2 inches, and the range of the heights of the male students in the class is 15.4 inches. Which of the following statements individually provide(s) sufficient additional information to determine the range of the heights of all the students in the class? Indicate all such statements.

A. The tallest male student in the class is 5.8 inches taller than the tallest female student in the class.
B. The median height of the male students in the class is 1.1 inches greater than the median height of the female students in the class.
C. The average (arithmetic mean) height of the male students in the class is 4.6 inches greater than the average height of the female students in the class.

20.Of the 20 light bulbs in a box, 2 are defective. An inspector will select 2 light bulbs simultaneously and at random from the box. What is the probability that neither of the light bulbs selected will be defective?
Give your answer as a fraction.

21.The figure above represents a rectangular garden with a walkway around it. The garden is 18 feet long and 12 feet wide. The walkway is uniformly 3 feet wide, and its edges meet at right angles. What is the area of the walkway?



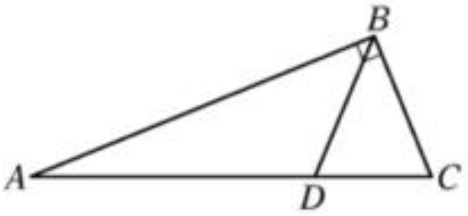

22.Line k lies in the xy-plane. The x-intercept of line k is -4, and line k passes through the midpoint of the line segment whose endpoints are (2, 9) and (2, 0). What is the slope of line k ?
Give your answer as a fraction.

23.The table below shows the frequency distribution of the values of a variable Y. What is the mean of the distribution?
Give your answer to the nearest 0.01.

| $y$ | Frequency |
|---|---|
| $\frac{1}{2}$ | 2 |
| $\frac{3}{4}$ | 7 |
| $\frac{5}{4}$ | 8 |
| $\frac{3}{2}$ | 8 |
| $\frac{7}{4}$ | 9 |

24. If $1/[(2^{11})\cdot(5^{17})]$ is expressed as a terminating decimal, how many nonzero digits will the decimal have?
A. One
B. Two
C. Four
D. Six
E. Eleven

25.Which of the following statements individually provide(s) sufficient additional information to determine the area of triangle ABC above? Indicate all such statements.




The length of $AB$ is $10\sqrt{3}$.

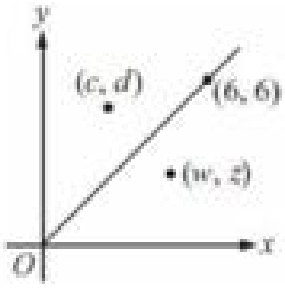
A. DBC is an equilateral triangle.
B. ABD is an isosceles triangle.
C. The length of BC is equal to the length of AD.
D. The length of BC is 10.
E. The length of AD is 10.

26.During an experiment, the pressure of a fixed mass of gas increased from 40 pounds per square inch (psi) to 50 psi. Throughout the experiment, the pressure, P psi, and the volume, V cubic inches, of the gas varied in such a way that the value of the product PV was constant.

| | |
|---|---|
| Quantity A | the volume of the gas when the pressure was 40 psi |
| Quantity B | 1.2 times the volume of the gas when the pressure was 50 psi |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

27.




Quantity A w+d

Quantity B c+z

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

28.In the xy-plane, one of the vertices of square S is the point (2, 2). The diagonals of S intersect at the point (6, 6).

Quantity A the area of S

Quantity B 64

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

29.

Quantity A the number of two-digit positive integers for which the units digit is not equal to the tens digit

Quantity B 80

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

30.S = {1, 4, 7, 10} T = {2, 3, 5, 8, 13} x is a number in set S, and y is a number in set T.

Quantity A The number of different possible values of the product xy

Quantity B 20

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

31. m=$10^{32}$+2, when m is divided by 11, the remainder is r.

Quantity A r
Quantity B 3

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

32. List X: 2, 5, s, t List Y: 2, 5, t.
The average (arithmetic mean) of the numbers in list X is equal to the average of the numbers in list Y.

Quantity A s
Quantity B 0

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

RESULTS OF A USED-CAR AUCTION

| | Small Cars | Large Cars |
|---|---|---|
| Number of cars offered | 32 | 23 |
| Number of cars sold | 16 | 20 |
| Projected sales total for cars offered (in thousands) | $70 | $150 |
| Actual sales total (in thousands) | $41 | $120 |

33.For the large cars sold at an auction that is summarized in the table above, what was the average sale price per car?

34.N=$824^x$ where x is a positive integer

Quantity A the number of possible values of the units digit of N
Quantity B 4

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

35.r and t are consecutive integers and p=$r^2$+t

Quantity A $(-1)^p$
Quantity B -1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

36. {1, –3, 4, 1, –3, 4, 1, –3, 4,..}
In the sequence above, the first 3 terms repeat without end. What is the sum of the terms of the sequence from the 150th term to the 154th term?

37.A manufacturing company has plants in three locations: Indonesia, Mexico, and Pakistan. The company has 6,000 employees, and each of the employees works at only one of the plants. If 3/8 of the employees work at the plant in Indonesia and if twice as many employees work at the plant in Mexico as work at the plant in Pakistan, how many employees work at the plant in Mexico?

38.In a single line of people waiting to purchase tickets for a movie, there are currently 10 people behind Shandra. If 3 of the people who are currently in line ahead of Shandra purchase tickets and leave the line, and no one else leaves the line, there will be 8 people ahead of Shandra in line. How many people are in the line currently?

39.When the decimal point of a certain positive decimal number is moved six places to the right, the resulting number is 9 times the reciprocal of the original number. What is the original number?

40.From 2011 to 2012, Jack's annual salary increased by 10 percent and Arnie's annual salary decreased by 5 percent. If their annual salaries were equal in 2012, then Arnie's annual salary in 2011 was what percent greater than Jack's annual salary in 2011?
Give your answer to the nearest 0.1 percent.

41.If $|z| \leq 1$, which of the following statements must be true? Indicate all such statements.
A. $z^2 \leq 1$
B. $z^2 \leq z$
C. $z^3 \leq z$

42.Each of the following linear equations defines y as a function of x for all integers x from 1 to 100. For which of the following equations is the standard deviation of the y-values corresponding to all the x-values the greatest?
A. y=x/3
B. y=x/2+40
C. y=x
D. y=2x+50
E. y=3x-20

43.For a certain distribution, the measurement 12.1 is 1.5 standard deviations below the mean, and the measurement 17.5 is 3.0 standard deviations above the mean. What is the mean of the distribution?
A. 13.8
B. 13.9
C. 14
D. 14.1
E. 14.2

44.The greatest of the 21 positive integers in a certain list is 16. The median of the 21 integers is 10. What is the least possible average (arithmetic mean) of the 21 integers?
A. 4
B. 5
C. 6
D. 7
E. 8

45.If j and k are even integers and j < k, which of the following equals the number of even integers that are greater than j and less than k?
A. (k-j-2)/2
B. (k-j-1)/2
C. (k-j)/2
D. k-j
E. k-j-1

46. Based on the information given, which of the following statements must be true? Indicate all such statements.

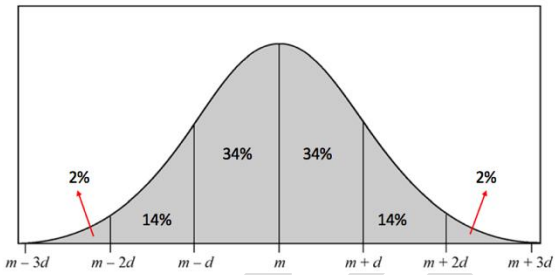
ANNUAL PERCENT CHANGE IN DOLLAR AMOUNT OF SALES AT FIVE RETAIL STORES FROM 2006 TO 2008

| Store | Percent Change from 2006 to 2007 | Percent Change from 2007 to 2008 |
|---|---|---|
| *P* | 10 | −10 |
| *Q* | −20 | 9 |
| *R* | 5 | 12 |
| *S* | −7 | −15 |
| *T* | 17 | −8 |

A. For 2008 the dollar amount of sales at Store R was greater than that at each of the other four stores.
B. The dollar amount of sales at Store S for 2008 was 22 percent less than that for 2006.
C. The dollar amount of sales at Store R for 2008 was more than 17 percent greater than that for 2006

47. The figure above shows the standard normal distribution, with mean 0 and standard deviation 1, including approximate percents of the distribution corresponding to the six regions shown. The random variable Y is normally distributed with a mean of 470, and the value Y = 340 is at the 15th percentile of the distribution. Of the following, which is the best estimate of the standard deviation of the distribution?

A. 125
B. 135
C. 145
D. 155
E. 165




48. In a certain medical group, Dr. Schwartz schedules appointments to begin 30 minutes apart, Dr. Ramirez schedules appointments to begin 25 minutes apart, and Dr. Wu schedules appointments to begin 50 minutes apart. All three doctors schedule their first appointments to begin at 8:00 in the morning, which are followed by their successive appointments throughout the day without breaks. Other than at 8:00 in the morning, at what times before 1:30 in the afternoon do all three doctors schedule their appointments to begin at the same time? Indicate all such times

A. 9:30 in the morning
B. 10:30 in the morning
C. 11:30 in the morning
D. 12:00 noon
E. 1:00 in the afternoon

49. In the xy-plane, triangular region R is bounded by the lines x = 0, y = 0, and 4x + 3y = 60. Which of the following points lie inside region R?
Indicate all such points

A. (2, 18)
B. (5, 12)
C. (10, 7)
D. (12, 3)
E. (15, 2)

50. Set A has 50 members and set B has 53 members. At least 2 of the members in set A are not in set B. Which of the following could be the number of members in set B that are not in set A? Indicate all such numbers.
A. 53
B. 5
C. 13
D. 25
E. 50

51.The distribution of the numbers of hours that students at a certain college studied for final exams have a mean of 12 hours and a standard deviation of 3 hours. Which of the following numbers of hours are within 2 standard deviations of the mean of the distribution? Indicate all such numbers
A. 2
B. 5
C. 10
D. 14
E. 16

52. In a certain sequence of numbers, each term after the first term is found by multiplying the preceding term by 2 and then subtracting 3 from the product. If the 4th term in the sequence is 19, which of the following numbers are in the sequence? Indicate all such numbers.
A. 5
B. 8
C. 11
D. 16
E. 35

53. For a certain probability experiment, the probability that event A will occur is 1/2 and the probability that event B will occur is 1/3. Which of the following values could be the probability

that the event A B (that is, the event A or B, or both) will occur?

Indicate all such values.
A. 1/3
B. 1/2
C. 3/4

54.In a factory, machine A operates on a cycle of 20 hours of work followed by 4 hours of rest, and machine B operates on a cycle of 40 hours of work followed by 8 hours of rest. Last week, the two machines began their respective cycles at 12 noon on Monday and continued until 12 noon on the following Saturday. On which days during that time period was there a time when both machines were at rest? Indicate all such days.

A. Monday
B. Tuesday
C. Wednesday
D. Thursday
E. Friday

55. n is an even integer.

| | |
|---|---|
| Quantity A | The number of prime factors of n |
| Quantity B | The number of prime factors of n/2 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

56. In the xy-plane, line k has slope 2 and passes through the point (3, r).

| Quantity A | Quantity B |
|---|---|
| r | 3 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

57.

| | |
|---|---|
| Quantity A | The number of 3-digit integers all of whose digits are even |
| Quantity B | The number of 3-digit integers all of whose digits are odd |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

58. a and b are primes. a+b=12

| | |
|---|---|
| Quantity A | b |
| Quantity B | 8 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

59. A and B are independent events, and the probability that both events occur is 1/2. Which of the following could be the probability that event A occurs? Indicate all such probabilities.
A. 0
B. 1/4
C. 1/2
D. 3/4
E. 1

60.If a, b, x, and y are positive integers, and$13^a \times 13^b = (13^x)^y$=$13^{13}$, what is the average (arithmetic mean) of a, b, x, and y?

61. A rectangle is drawn in a standard xy-coordinate plane. If the sides of the rectangle are not parallel to the axes, what is the product of the slope of the four sides?
A. -1
B. 0
C. 1
D. 2
E. It cannot be determined from the information given.

62. In a certain state, each license plate consists of either three digits (between 0 and 9, inclusive) followed by two letters or three letters followed by two digits. For example, 055-XY, 123-PP, and AAA-70 are all acceptable plates. How many different license plates can the state issue?

63.Line l passes through points in both quadrants II and III. Which of the following statements are true? Indicate all such statements.
A. Line l cannot pass through the origin.
B. Line l cannot pass through any point in quadrant I.
C. Line l cannot pass through any point in quadrant IV.
D. The slope of line l cannot be 0.
E. The slope of line l cannot be positive.
F. The slope of line l cannot be negative.

64.Consider the following list of numbers that represent the number of text messages that Geraldine received on 10 consecutive days: 10, 9, 1, 3, 7, 7, 8, 3, 4, 3. Which of the following statements concerning this set of data are true? Indicate all such lengths.
A. The median is less than the average (arithmetic mean).
B. The median is less than the mode.
C. The mode is less than the average.
D. The average of the median and the mode is between 4 and 4.5.

65.If c and d are odd positive integers, which of the following could be odd?
Indicate all such expressions.
A. $c^{\mathrm{d}}$
B. $c^{\mathrm{d+1}}$
C. $(c+1)^{\mathrm{d+1}}$
D. $(c+d)^{\mathrm{c+d}}$
E. $c^{\mathrm{d}}/d^{\mathrm{c}}$

66.Last year Leo bought two paintings. This year he sold them for $2,000 each. On one, he made a 25% profit, and on the other he had a 25% loss. What was his net loss or profit?
A. He broke even.
B. He lost less than $100.
C. He lost more than $100.
D. He earned less than $100.
E. He earned more than $100.

67.The system of equations has how many solutions?
3x-6y=9, 2y-x-3=0
A. None
B. Exactly 1
C. Exactly 2
D. Exactly 3
E. Infinitely many

68. If A is the initial amount put into an account, R is the annual percentage of interest written as a decimal, and the interest compounds annually, then which of the following would be an expression, in terms of A and R, for the interest accrued in three years?
A. $A(R)^3$
B. $A(R+R^3)$
C. $A(3R+3R^2+R^3)$
D. $3A(R)^3$
E. $3A(R+R^2+R^3)$

69.What is the sum of all possible solutions to the equation: $\sqrt{2x^2-x-9}$ = x+1
A. -2
B. 2
C. 3
D. 5
E. 6

70.If x+|x|+y=7 and x+|y|-y=6 , then x+y=
A. -1
B. 1
C. 3
D. 5
E. 13

71.If 6 ·|4-k/3|>12, which of the following could be the value of k ?
A. -15
B. -10
C. -5
D. 0
E. 5
F. 10
G. 15
H. 20

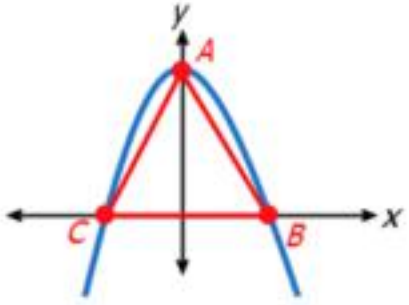
72.If x + y ≠ 0, which of the following is a solution to the inequality: $\frac{x^2-y^2-1}{x+y} > \frac{-1}{x+y}$

A. x=3 and y =7
B. x=-3 and y =7
C. x=-11 and y =-9
D. x=9 and y =-6
E. x=-20 and y =-24
F. x=12 and y =9
G. x=-2 and y =16

73.How many points (x, y) lie on the line segment between (22, 38/3) and (7, 53/3) such that x and y are both integers?

A. 4
B. 5
C. 7
D. 8
E. 9

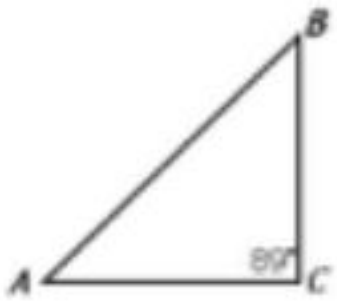
74.The figure shows the graph of the equation y=k-x2, where k is a constant. If the area of triangle ABC is 1/8, what is the value of k?
Give your answer to the nearest 0.01.



75.

Quantity A Length of AB

Quantity B Length of BC

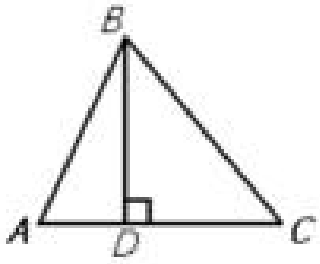



A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

76.

Quantity A BD/AB

Quantity B BC/DC

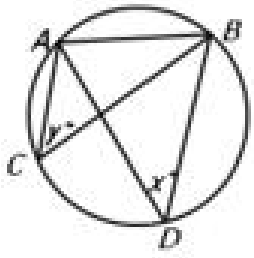



A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

77.

Quantity A x

Quantity B y




AB = 12, AC = 10, AD = 18

Note: the region above is circular

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

78.

Quantity A Area of a rectangle with perimeter 20

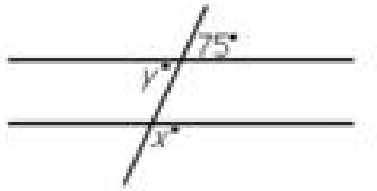
Quantity B Area of a triangle with base 5 and height 10.

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

79.

Quantity A x

Quantity B y




A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

80. If x>0, and two sides of a certain triangle have lengths 2x+1 and 3x+4 respectively, which of the following could be the length of the third side of the triangle?
Indicate all possible lengths.

A. 4x+5
B. x+2
C. 6x+1
D. 5x+6
E. 2x+17

81.If the length of each side of an equilateral triangle were increased by 50 percent, what would be the percent increase in the area?

A. 75%
B. 100%
C. 125%
D. 150%
E. 225%

82. Two sides of a triangle have length 6 and 8. Which of the following are possible areas of the triangle?
I. 2
II. 12
III. 24

A. I only
B. I and II only
C. II and III only
D. I and III only
E. I, II, and III

83. If $5,000,000 is the initial amount placed in an account that collects 7% annual interest, which of the following compounding rates would produce the largest total amount after two years?
A. compounding annually
B. compounding quarterly
C. compounding monthly
D. compounding daily
E. All four of these would produce the same total

84. Tuk weighs 60 percent more than Kim, Lee weighs 50 percent less than Tuk, and Pat weighs 25 percent more than Lee. If Pat weighs 126 pounds, what is Kim's weight?

85. If $x>0$, which of the following expressions are equal to 3.6 percent of $5x/12$?
Indicate all such expressions.
A. 3 percent of 20x
B. x percent of 3/2
C. 3x percent of 0.2
D. 0.05 percent of 3x
E. 3x/200

86.

| | |
|---|---|
| Quantity A | 0.05 percent of 4000 |
| Quantity B | 1/200 of 4000 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

87. Anne pays 150 percent more for a wholesale widget than Bart pays. Anne's retail price per widget is 15 percent greater than the wholesale price she paid. Bart's retail price per widget is 185 percent greater than the wholesale price he paid.

| | |
|---|---|
| Quantity A | Anne's retail price |
| Quantity B | Bart's retail price |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

88. Diana invested $61,293 in an account with a fixed annual percent of interest, compounding quarterly. At the end of five full years, she had $76,662.25 in principal plus interest. Approximately what was the annual percent rate of interest for this account?
A. 1.2%
B. 4.5%
C. 10%
D. 18%
E. 25.2%

89. Events A and B are independent. The probability that events A and B both occur is 0.6.

| | |
|---|---|
| Quantity A | The probability that event A occurs |
| Quantity B | 0.3 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

90. A box contains 10 balls numbered from 1 to 10 inclusive. If Ann removes a ball at random and replaces it, and then Jane removes a ball at random, what is the probability that both women removed the same ball?
A. 1/100
B. 1/90
C. 1/45
D. 1/10
E. 41/45

91. A: {71,73,79,83,87} B: {57,59,61,67}
If one number is selected at random from set A, and one number is selected at random from set B, what is the probability that both numbers are prime?
A. 9/20
B. 3/5
C. 3/4
D. 4/5
E. 1

92. In how many different ways can 3 boys and 3 girls be seated in a row of 6 chairs such that the girls are not separated, and the boys are not separated?
A. 24
B. 36
C. 72
D. 144
E. 288

93. N equals the number of positive 3-digit numbers that contain odd digits only.

Quantity A N
Quantity B 125

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

94. From a group of 8 people, it is possible to create exactly 56 different k-person committees. Which of the following could be the value of k? Indicate all such values.
A. 1
B. 2
C. 3
D. 4
E. 5
F. 6
G. 7

95. A knockoff website requires users to create a password using letters from the word MAGOSH. If each password must have at least 4 letters and no repeated letters are allowed, how many different passwords are possible?

96. There are 10 people in a room. If each person shakes hands with exactly 3 other people, what is the total number of handshakes?
A. 15
B. 30
C. 45
D. 60
E. 120

97. In a group of 200 workers, 10 percent of the males smoke, and 49 percent of the females smoke.

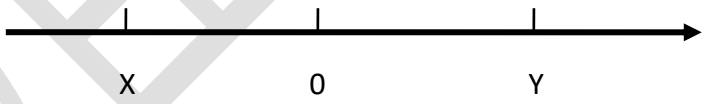
Quantity A Total number of workers who smoke
Quantity B 59

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

98. A-town and B-ville are connected by a straight, 420-mile road. At noon, Atu left A-town for Bville, and Brek left B-ville for A-town. If Atu travels at 56 miles per hour and Brek travels at 49 miles per hour, how many miles apart will Atu and Brek be 1 hour before they meet?

Note: Figure not drawn to scale
99. If x and y are numbers on the number line above, which of the following statements must be true?
I. $|x+y| < y$
II. $x + y < 0$
III. $xy < 0$

A. I only
B. III only
C. I and II
D. I and III
E. II and III




100.
Quantity A The number of prime numbers divisible by 13
Quantity B The number of prime numbers divisible by 2

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

101.

Quantity A Number of primes between 50 and 60

Quantity B Number of primes between 80 and 90

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

102. x and y are prime numbers and x+y=18

Quantity A xy

Quantity B 70

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

103.x is a positive integer. k is the remainder when $x^3$-x is divided by 3.

Quantity A k

Quantity B 1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

104. x and y are integers greater than 5. x is y percent of $x^2$.

Quantity A x

Quantity B 10

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

105. 16,000 has how many positive divisors?

106. If x and y are integers, and w=($x^2$)y+x+3y, which of the following statements must be true? Indicate all such statements.
A. If w is even, then x must be even.
B. If x is odd, then w must be odd.
C. If y is odd, then w must be odd.
D. If w is odd, then y must be odd.

107. If x and y are positive integers, and 1 is the greatest common divisor of x and y, what is the greatest common divisor of 2x and 3y?
A. Cannot be determined
B. 1
C. 2
D. 5
E. 6

108. If n= 2x3x5x7x11x13x17, then which of the following statements must be true?
I. $n^2$is divisible by 600
II. n+19 is divisible by 19
III. (n+4)/2 is even

A. I only
B. II only
C. III only
D. I and III
E. None of the above

109. If x is an odd negative integer and y is an even integer, which of the following statements must be true?
**I.** (3x - 2y) is odd **II.** x$y^2$ is an even negative integer **III.** ($y^2$-x) is an odd negative integer
A. I only
B. II only
C. I and II
D. I and III
E. II and III

110. How many positive integers less than 100 have a remainder of 2 when divided by 13?
A. 6
B. 7
C. 8
D. 9
E. 10

111.Which of the following are equal to $(\frac{1}{560})^{-4}$? Indicate all correct answers.
A. $(560^5-560^4)/559$
B. $560^{-8}/560^2$
C. $70^4 \cdot (1/8)^{-4}$
D. $(560^{16})^{0.5}$

112. S is a set of n consecutive integers.

Quantity A The mean of S
Quantity B The median of S

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

113. When the even integer n is divided by 7, the remainder is 3.

Quantity A The remainder when n is divided by 14.
Quantity B 10

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

114. The 20 people at a party are divided into n mutually exclusive groups in such a way that the number of people in any group does not exceed the number in any other group by more than 1.

Quantity A The value of n if at least one of the groups consists of 3 people
Quantity B 6

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

115. If n is a positive integer then n+ denotes a number such that n < n+< n +1.

Quantity A 20+/4+
Quantity B 5+

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

116. At a sale, the cost of each tie was reduced by 20 percent and the cost of each belt was reduced by 30 percent.

Quantity A The percent reduction on the total cost of 1 tie and 2 belts
Quantity B 25%

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

117. If n is any prime number greater than 2, which of the following CANNOT be a prime number?
A. n-4
B. n-3
C. n-1
D. n+2
E. n+5

118.The "reflection" of a positive integer is obtained by reversing its digits. For example, 321 is the reflection of 123 The difference between a five-digit integer and its reflection must be divisible by which of the following?
A. 2
B. 4
C. 5
D. 6
E. 9

119. If 55 percent of a group of people have brown hair and 80 percent of the same group do not have red hair, what fraction of those who do not have brown hair have red hair?
A. 1/4
B. 4/11
C. 4/9
D. 5/9
E. 4/5

120. A certain money market account that had a balance of $48,000 during all of last month earned $360 in interest for the month. At what simple annual interest rate did the account earn interest last month?
A. 7%
B. 7.50%
C. 8%
D. 8.50%
E. 9%

121. If N is an integer and $99 < N^2 < 200$, then N could have at most how many values?
A. Two
B. Four
C. Six
D. Eight
E. Ten

122. If one number is chosen at random from the first 1,000 positive integers, what is the probability that the number chosen is a multiple of both 2 and 8?
A. 1/125
B. 1/8
C. 1/2
D. 9/16
E. 5/8

123. A certain holiday is always on the fourth Tuesday of Month X. If Month X has 30 days, on how many different dates of Month X can the holiday fall
A. Four
B. Five
C. Six
D. Seven
E. Eight

124.How many positive integers can be expressed as a product of two or more of the prime numbers 5, 7, 11, and 13 if no one product is to include the same prime factor more than once

A. Eight
B. Nine
C. Ten
D. Eleven
E. Twelve

125. The decorating committee for a dance plans to fringe the 3-inch-wide end of a streamer by making small cuts every 1/16 inch. How many cuts must be made to fringe the end.
A. 45
B. 46
C. 47
D. 48
E. 49

126. What is the remainder when $3^{283}$ is divided by 5?
A. 0
B. 1
C. 2
D. 3
E. 4

127. If n is a positive odd integer and k=$n^3$+2n, what is the value of $(-1)^k$-$(-1)^{k+1}$?
A. -2
B. -1
C. 0
D. 1
E. 2

128. If n and m are positive integers and m is a factor of $2^6$, what is the greatest possible number of integers that can be equal to both 3n and $2^6$/m?
A. Zero
B. One
C. Three
D. Four
E. Six

129. In a data set of 10,000 numbers varying from 20 to 80, the number 62 is the 60th percentile and the number 74 is the nth percentile.

| Quantity A | Quantity B |
|---|---|
| n | 70 |

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

130. If 2, 4, 6, 9 are the digits of two 2-digit integers, what is the least possible positive difference between the integers?
A. 28
B. 27
C. 17
D. 13
E. 9

131. A box at a yard sale contains 3 different china dinner set, each consisting of 5 plates. A customer will randomly select 2 plates to check for defects. What is the probability that the 2 plates selected will be from the same dinner set?
A. 2/7
B. 2/5
C. 2/3
D. 5/6
E. 3/2

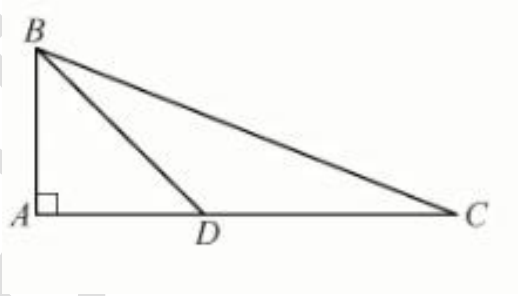
132. Mike, Scott, Jim, Kate and Pete each have a different number of assignments this month. Pete has fewer assignments than Kate, Kate has more assignments than Mike, Mike has more assignments than Jim, and Jim has more assignments than Scott. Which of the following could be the person who has the median number of assignments this month for the five people listed? Indicate all such answers.
A. Mike
B. Scott
C. Jim
D. Kate
E. Pete

133. A certain brand of dishwashing liquid was sold in two different bottle sizes. The small bottle was sold with 2/5 as many ounces of liquid as the large bottle and was sold at a price that was 1/2 the price of the large bottle.

Quantity A: The price per ounce of the liquid in the small bottle
Quantity B: The price per ounce of the liquid in the large bottle

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

134.
Quantity A: The measure of angle BDC
Quantity B: 120




A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

135.
Set T consists of the integers from 11 through 100, inclusive.

Quantity A: 4 times the number of integers in set T that are multiples of 4
Quantity B: 5times the number of integers in set T that are multiples of 5

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

136. $x^2$+6x=7

Quantity A: $(x + 3)^2$
Quantity B: 16

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

137.
Quantity A: The number of different prime factors of 500
Quantity B: The number of different prime factors of 360.

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

138.
Quantity A: The area of a triangular region with perimeter 8
Quantity B: 8

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

139.
List L consists of 7 numbers. The range of the numbers in list L is 0.
Quantity A: The average (arithmetic mean) of the numbers in list L.
Quantity B: 0

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

140. s=|t-2|

Quantity A: s+2
Quantity B: |t|

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

141. A jar contains exactly 10 dimes and x quarters and no other coins. If a coin is randomly selected from the jar, the probability that a quarter is selected is 0.6. What is the value of x.
A. 5
B. 6
C. 8
D.12
E. 15

142. In the rectangular coordinate system, the point (3,1) is on the circle with center (0, -3). What is the area of the circle?
A. 5π
B. 7π
C. 10π
D. 25π
E. $\pi\sqrt{7}$

143. $(2x+1)^2$-$(2x$-$1)^2$
A. 2
B. 8x
C. 4x-1
D. 4x+1
E. 8x+2

144. Which of the following is an equation of a line that doe NOT contain any points in the xy-plane for which both coordinates are integers?

A. $y=4$

B. $y=\frac{1}{2}x$

C. $y=x+3$

D. $y=x+\frac{1}{2}$

E. $y=\frac{1}{2}x+3$

145. A veterinarian has 70 clients who own cats, dogs, or both. Of these clients, 36 own cats, including 20 clients who own both cats and dogs. Which of the following statements must be true? Indicate all such statements.

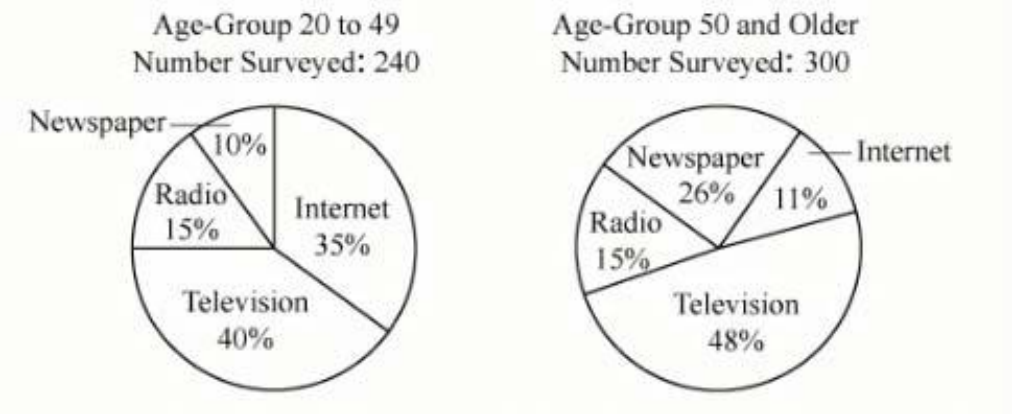
A. There are 54 clients who own dogs.

B. There are 34 clients who own dogs but not cats.

C. There are 16 clients who own cats but not dogs.

146-148 are based on the following data.

**Survey* of preferred method to obtain news, by age-group**




*Each person surveyed indicated one of the four methods as his or her preferred method to obtain news.

146. What fraction of the people in the age-group 20 to 49 indicated newspaper or the Internet as their preferred method to obtain news?

147. Which of the following is closest to the percent of all the people survey who indicated the Internet as their preferred method to obtain news?
A. 18.8%
B. 21.7%
C.23.0%
D.33.3%
E.46.0%

148. For the age-group 50 and older, the number of people who indicated the Internet as their preferred method to obtain news is approximately what percent less than the number of people who indicated radio?
A. 12%
B. 27%
C. 36%
D. 45%
E. 50%

149. When the positive integer x is divided by 42, the remainder is 19. What is the remainder when x is divided by 7?
A. 0
B. 2
C. 3
D. 4
E. 5

150.If x is 4 more than half of y and if y is 10 more than half of x, what is the value of x?

151. A pianist agreed to perform one concert at a fee 12.5 percent less than her usual fee and a second concert at a fee 20 percent greater than the first fee. The fee for the second concert was what percent greater than her usual fee?
A. 5%
B. 7.5%
C. 15%
D. 16.25%
E. 32.5%

152.

| Textbook | Number of Pages |
|---|---|
| A | 510 |
| B | 480 |
| C | 490 |
| D | 520 |
| E | $x$ |

The table shows the number of pages in each of 5 textbooks. What is the greatest possible value of x for which the average (arithmetic mean) number of pages of the 5 textbooks is equal to the median number of pages of the 5 textbooks?

153. For the 500 measurements obtained in experiment X, the average (arithmetic mean) value is 280 and the value k is at the 75th percentile. For the 500 measurements obtained in experiment Y, the average value is 280 and the value n is at the 75th percentile.

Quantity A: k
Quantity B: n

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

154.

Quantity A: The greatest possible value of $\frac{2}{x-y}$, where $9 \leq x \leq 12$ and $-2 \leq y \leq 8$

Quantity B: 2

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

155. x - y =5

Quantity A: $x^2$-$y^2$
Quantity B: 5

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

156. F(x)=$4x^2 + 28x + 49, for\ x$

Quantity A: The number b such that f(b) is the minimum value of f
Quantity B: -3

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

157.
Quantity A: $27^{-8}$
Quantity B: $81^{-6}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

158. m and n are integers.

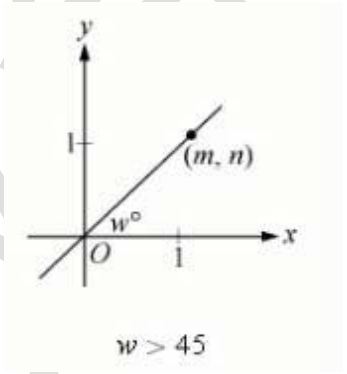
Quantity A: $\sqrt{10^{2m}}\sqrt{10^{2n}}$
Quantity B: $10^{mn}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

159.

Quantity A: m + n
Quantity B: 2m

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.



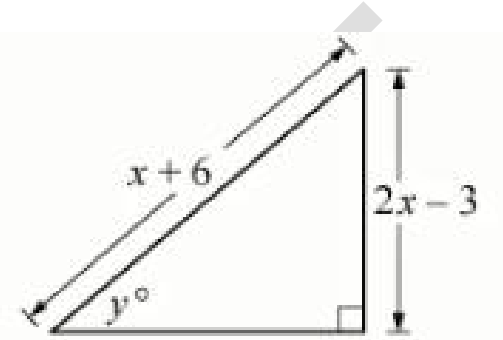

160. Company A has twice as many employees as Company B, and the two companies have no employees in common. If 64 percent of the employees of Company A are women and 52 percent of the employees of Company B are women, what percent of all the employees of the two companies are women?

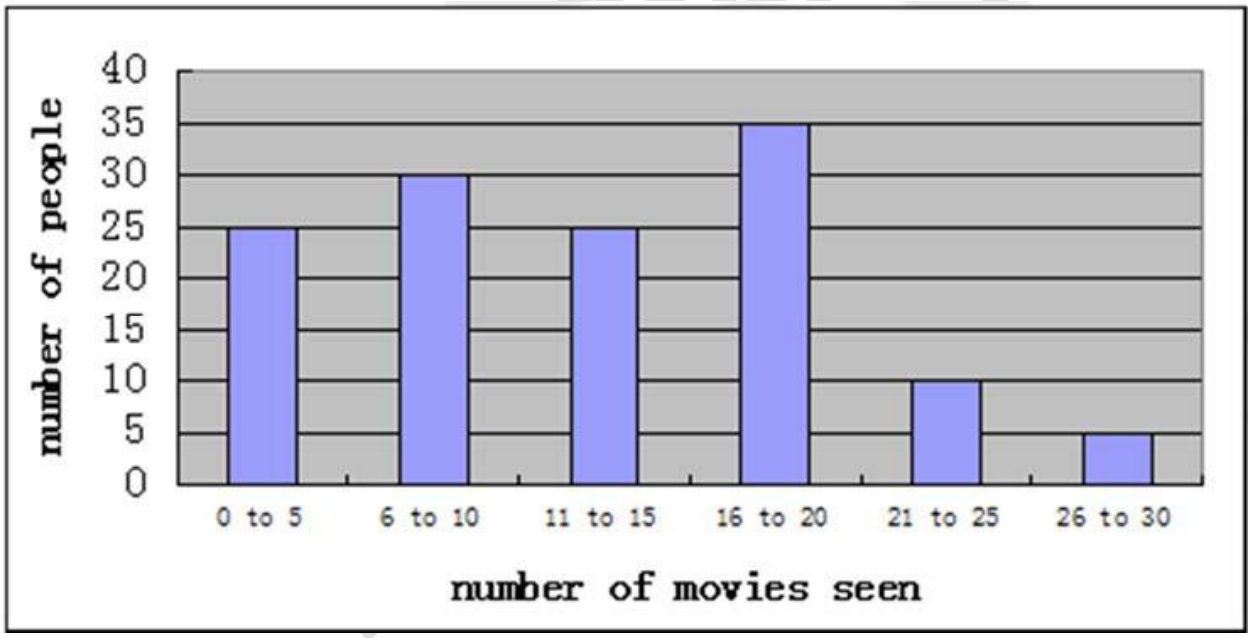
161. A bookcase has s shelves with n books on each shelf, where n is a multiple of both s and s-1. If all of the books on the highest shelf were removed and redistributed equally among the other shelves, which of the following represents the number of books that would be on each of the other shelves?

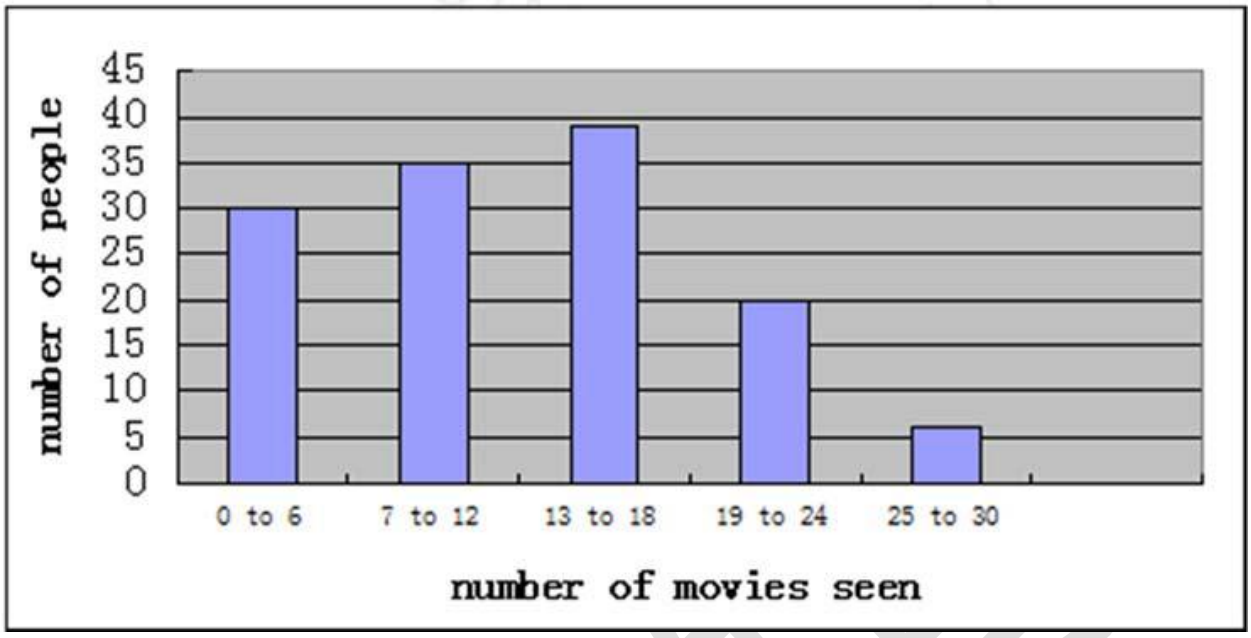
A. $\frac{ns}{n\text{-}1}$
B. $\frac{n(s+1)}{s}$
C. $\frac{(n+1)s}{s\text{-}1}$
D. $\frac{(n\text{-}1)s}{s\text{-}1}$
E. $\frac{(n+1)(s\text{-}1)}{s}$

162. Which of the following pairs of integers have reciprocals whose sum is either less than 1/3 or greater than 1/2?
Indicate all such pairs.
A. 1 and 14
B. 3 and 12
C. 5 and 10
D. 7 and 8

163. In the triangle, is y =30, then x =
A. 3
B. 4
C. 5
D. 8
E. 9





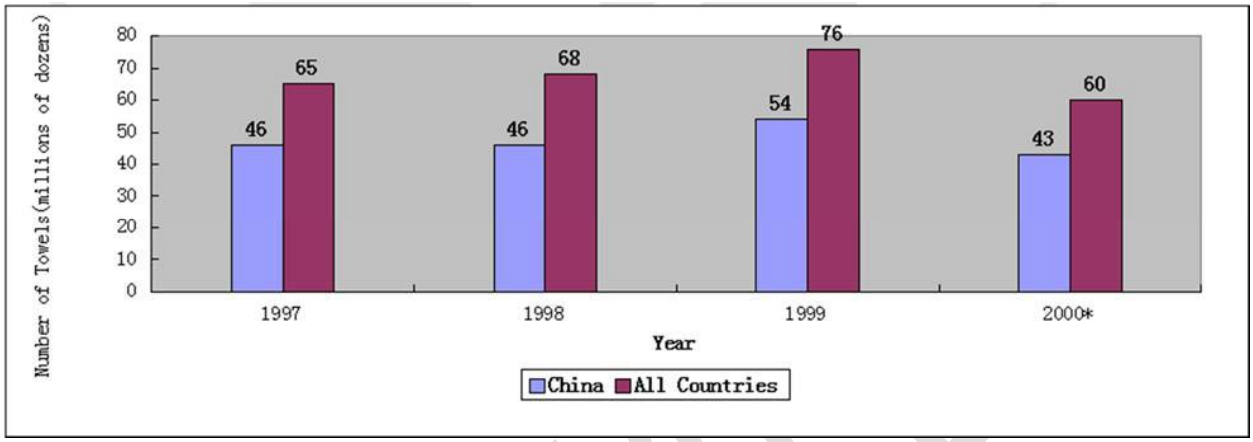

164. In a survey, 130 people were asked how many movies they had seen in the preceding year. Their responses varied from 0 to 30 movies. The graphs above show two different summaries of the same survey results. How many people responded that they had seen 11 or 12 movies?

A. 10
B. 12
C. 15
D. 20
E. 23

165. The width and the length of a rectangular piece of plywood are 4 feet and 8 feet, respectively. Along one edge of the plywood, a strip x inches wide and 8 feet long is removed. Then, along an edge perpendicular to the 8-foot edge, a strip x inches wide is removed. For what value of x will the remaining rectangular piece have width and length in the ratio of 2 to 5? (1 foot = 12 inches)

Questions 166-168 are based on the following data.
For each of the years 1997 through 2000*, the graph shows the number of towels imported to Japan from China, and the total number of towels imported to Japan from all countries, including China.

Number of Towels Imported to Japan, 1997-2000*
(in millions of dozens**)




*For the first nine months of 2000
**1 dozen = 12

166. In 1998, how many of the imported towels were not imported from China?
A. 260 million
B. 264 million
C. 268 million
D. 272 million
E. 276 million

167. If the average (arithmetic mean) number of towels imported from China per month was the same for the last 3 months of 2000 as it was for the first 9 months of 2000, approximately how many million dozen towels were imported from China during the 12 months of 2000?
A. 57
B. 63
C. 76
D. 80
E. 86

168. In 1999, the ratio of the number of towels imported from China to the total number of towels imported from countries other than China was closets to which of the following?
A. 7 to 2
B. 3 to 1
C. 5 to 2
D. 2 to 1
E. 3 to 2

169. If x is a positive integer such that the units digit of x3 is 3, what is the units digit of $x^{15}$?
A. 1
B. 3
C. 5
D. 7
E. 9

170.If a square region with side x and a circular region with radius r have the same area, then x must be how many times as great as r?
A.$\frac{1}{\pi}$
B.$\frac{1}{\sqrt{\pi}}$
C.$\sqrt{\pi}$
D. π
E.$\pi^2$

171. The sum of n numbers is greater than 48. If the average (arithmetic mean) of n numbers is 1.2, what is the least possible value of n?

172. n is an integer.

Quantity A: $(-1)^n(-1)^{n+2}$
Quantity B: 1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

173. The population of Country X for 1980 was p. The population of Country X increased by 3.8 percent in each of the next two years.

Quantity A: The population of Country X for 1982.
Quantity B: 1.076p

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

174. $x \neq 0$
Quantity A: $x^2$
Quantity B: x(x+5)

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

175. x=2, y=3, z=5

Quantity A: $x^{-1}yz^{-2}$
Quantity B: $(\frac{xz}{y})^{-2}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

176. $x < y-2$

Quantity A: The average (arithmetic mean) of x and y
Quantity B: y-1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

177. x is an integer greater than 3.

Quantity A: The number of even factors of 2x
Quantity B: The number of odd factors of 3x

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

178. For a sample of 210 households, one-third of the households do not have any pets, one-third of the households each have 1 pet, and the rest of the households each have 2 pets. Which of the following statistics for the sample are equal to 1?
Indicate all such statistics.
A. The average (arithmetic mean) number of pets per household.
B. The median number of pets per household.
C. The range of the numbers of pets per household.

179. If (a, b) is a point in the xy-plane, then the distance between (a, b) and the x-axis is |b| and the distance between (a, b) and the y-axis is |a|.

Quantity A: The total number of points P in the xy-plane such that the distance between P and one of the axes is 10 and the distance between P and the other axis is 8
Quantity B: The total number of points Q in the xy-plane such that the distance between Q and one of the axes is 5 and the distance between Q and the other axis is 4.

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

180. According to a tax rate formula for a certain year, the amount of tax owed by an individual whose annual income was between $31,850 and $77,100 was equal to a base tax of $4,386 plus 24 percent of the annual income that exceeded $31,850. According to this formula, what was the amount of tax owed by an individual whose annual income that year was $42,000?

181. Each week a salesperson receives a commission that is equal to 12 percent of the first $500 of sales plus 20 percent of additional sales. If the salesperson received a commission of $380 last week, what was the total amount of the sales that the salesperson made last week?
A. $1,600
B. $1,660
C. $1,860
D. $2,000
E. $2,100

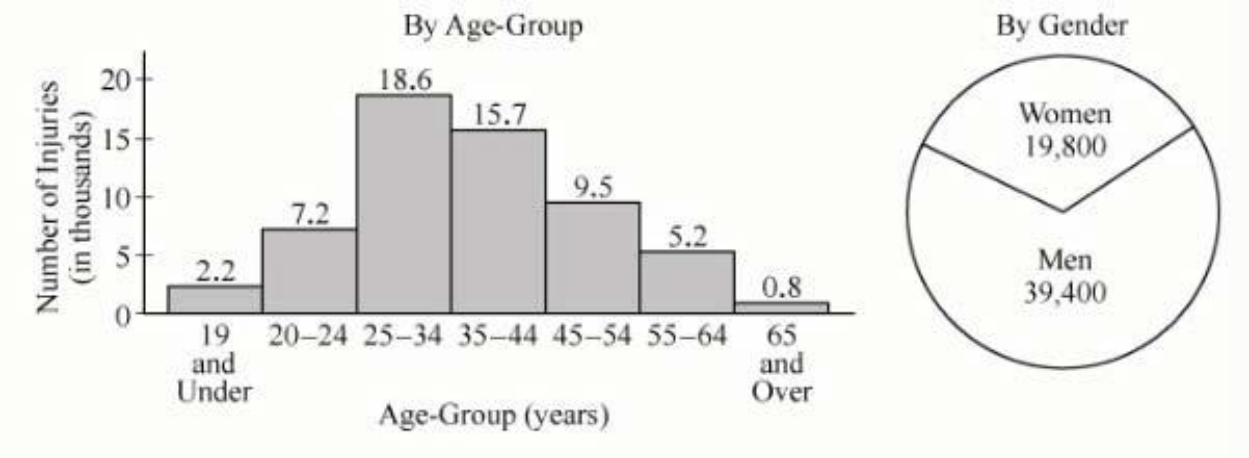
182. Last Monday a certain store sold 17 wrenches at x dollars each. Last Tuesday the store reduced its prices and sold an additional 8 wrenches at 0.5x dollars each. Which of the following is equal to the average (arithmetic mean) price, in dollars, of the 25 wrenches that the store sold last Monday and Tuesday?
A. 0.68x
B. 0.73x
C.0.76x
D.0.81x
E.0.84x

183. In a distribution of 8,500 different measurements of the variable x, 26.5 is the 56th percentile and 37.1 is the 78th percentile. Which of the following is closest to the number of measurements of x that are in the distribution such that $26.5 \leq x \leq 37.1$?

A. 1,850
B. 2,200
C. 3,500
D. 4,750
E. 6,650

Questions 184 -186 are based on the following data.

NUMBER OF OCCUPATIONAL INJURIES IN STATE X, 1998




184. How many of the age-groups each accounted for more than 15 percent of the total number of occupational injuries in State X in 1998?

A. One
B. Two
C. Three
D. Four
E. Five

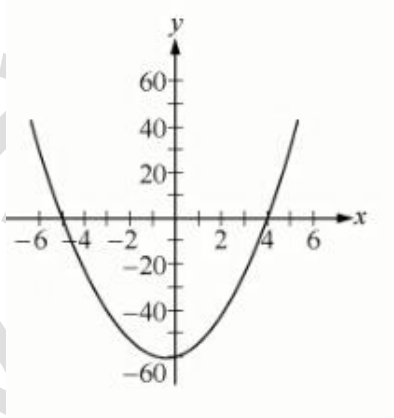
185. In 1998, if one-half of the occupational injuries in the combine 34-and-under age-groups were incurred by men, what was the number of occupational injuries incurred by men in the combined 35-and-over age-groups?

A. 33,500
B. 31,900
C. 30,500
D. 25,400
E. 21,700

186. For the 55-64 age-group in 1998, the average (arithmetic mean) number of work-hours lost per occupational injury was 48.5. If a workweek is 40 work-hours, which of the following is closets to the total number of workweeks lost due to occupational injuries in the 55-64 age-group in 1998?

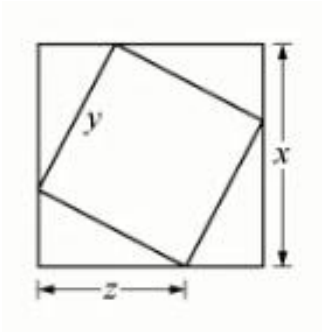
A. 4,500
B. 5,200
C. 5,500
D. 5,900
E. 6,300

187. Which of the following could be the equation of the graph in the xy-plane shown above?




A. y=$x^2 + x$-60
B. y=$x^2 + x$-20
C. y=$x^2 + 3x$-60
D. y=$3x^2 + x$-60
E. y=$3x^2 + 3x$-60

188. The figure shows a smaller square with sides of length y inscribed in a larger square with sides of length x. Which of the following relationships between x, y, and z must be true?




A. $x^2 = y^2 + z^2$
B. $x^2 = y^2$-$z^2$
C. $(x$-$z)^2 = y^2$
D. $(x$-$z)^2 = z^2$
E. $(x$-$z)^2 + z^2 = y^2$

189. The table shows the frequency distribution of the random variable X. What is the median of the distribution of the values of X ?

A. 1.0
B. 1.8
C. 2.0
D. 2.5
E 3.0

| $X$ | Frequency |
|---|---|
| 0 | 6 |
| 1 | 11 |
| 2 | 18 |
| 3 | 23 |
| 4 | 15 |

190. The functions f and g are defined by f (x) = |2x +1| and g(x)=3 for all numbers x. What is the least value of c for which f (c) = g (c)?

191. Of the students in a certain group, 22 percent are juniors and 26 percent are seniors.

Quantity A: The ratio of the number of juniors in the group to the number of seniors in the group.
Quantity B: 4/5

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

192. The area of a circular region is 5π

Quantity A: The diameter of the circular region
Quantity B:$\sqrt{20}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

193. The reciprocal of x - 2 is x +2

Quantity A: x
Quantity B: 3

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

194. x > 0

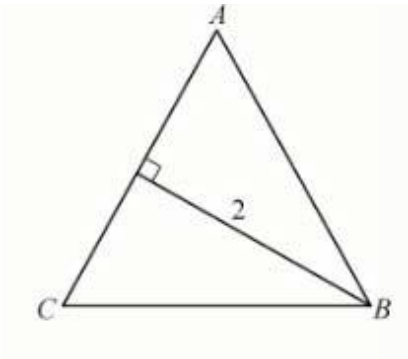
Quantity A: The area of a square region with diagonal of length $\sqrt{2}x$
Quantity B: The area of a circular region with diameter of length x

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

195. ABC is an equilateral triangle.

Quantity A: The length of AB
Quantity B: $2\sqrt{3}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.



196. $1/2 < r < 1$

Quantity A: $2r$
Quantity B: $1/r$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

197. In a data set of 10,000 numbers varying from 20 to 80, the number 62 is the 60th percentile and the number 74 is the nth percentile.

Quantity A: n
Quantity B: 70

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

198. A historian asserts that at the beginning of 1852, the population of a certain mining town was 16,000. The historian also asserts that for each of the years from 1849 through 1853, the town's population at the beginning of the year was twice that of the preceding year. According to the historian, what was the range of the town's populations at the beginning of each year from 1848 through 1853?
A. 14,000
B. 15,000
C. 28,000
D. 30,000
E. 31,000

199. Line l in the xy-plane contains points A and B with coordinates (-4,5) and (6, -1), respectively. Line k is perpendicular to l and contains the midpoint of line segment AB. Which of the following statements are true? Indicate all such statements.
A. The slope of line l is -3/5.
B. Line k has a negative slope.
C. Line k contains the point (1,2).

200. A box at a yard sale contains 3 different china dinner sets, each consisting of 5 plates. A customer will randomly select 2 plates to check for defects. What is the probability that the 2 plates selected will be from the same dinner set?
A. 2/7
B. 2/5
C. 2/3
D. 5/6
E. 3/2

201. What is the remainder when $3^{283}$ is divided by 5?
A. 0
B. 1
C. 2
D. 3
E. 4

202. If x < y, which of the following must be true?
A. 2x < y
B. 2x > y
C. $x^2 < y^2$
D. 2x-y < y
E. 2x-y < 2xy

203. A rectangular solid P has height 2c and a base of width a and length b. Two other rectangular solids, Q and R, each have height c and bases of width a and length b. Which of the following represents the amount by which the sum of the surface areas of Q and R exceeds the surface areas of P?
A. 2ab
B. 4ab
C. 2ab + 2bc
D. 2ab + 4ac
E. 2ab +4ac +4bc

Questions 204 -206 are based on the following data.
A survey of 550 male managers and 650 female managers was conducted. All 1,200 managers identified whether, for each of six characteristics, the characteristic is important to consider when hiring a new employee. For each of the six characteristics, the percent of managers surveyed who identified that characteristic as important to consider is given in the following table.

SURVEY RESULTS

| Characteristic | Percent |
|---|---|
| Work experience | 72% |
| Proficiency in English | 68% |
| Ability to follow directions | 65% |
| Specific occupational skill | 60% |
| Computer expertise | 58% |
| Appropriate attire and behavior | 55% |

204. Which of the following statements about the managers surveyed must be true? (多选)
A. Less than 55 percent were male managers.
B. Of the male managers, more identified work experience as an important characteristic to consider than identified proficiency in English.
C. Less than 60 percent of the male managers identified specific occupational skill as important to consider.

205. The number of managers surveyed who identified work experience as an important characteristic to consider was approximately what percent greater than the number who identified appropriate attire and behavior as an important characteristic to consider?
A. 15%
B. 20%
C. 25%
D. 30%
E. 35%

206. If 48 percent of the managers surveyed identified both ability to follow directions and computer expertise as important characteristics to consider, what percent of the managers surveyed identified neither of these characteristics as important to consider?
A. 15%
B. 18%
C. 23%
D. 25%
E. 28%

207. If the product of 7 consecutive integers is equal to the median of the integers, what is the least of the 7 integers?

208. On his trip to the airport, Grant drove a total of 9 miles. His average speed on the trip was x miles per hour, where $30 \leq x \leq 35$. Which of the following could be the total number of minutes that Grant took to make the trip?
Indicate all such numbers of minutes.
A. 15
B. 16
C. 17
D. 18
E. 19

209. If n is an integer, what is the least possible value of $3^n$+(3)( $3^{-n}$)
A. 1
B. 2
C. 3
D.$3\frac{1}{3}$
E. 4

210.At a certain elementary school, 10 percent of the fifth-grade students are members of the school band. If 12 percent of the fifth-grade boys and 8 percent of the fifth-grade girls are members of the band, what percent of the fifth-grade students at the school are boys?
A. 10%
B. 12%
C. 20%
D. 30%
E. 50%

211. n is an odd integer between 2 and 10, and n is not a prime number.
Quantity A: n
Quantity B: 9
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

212. s, t, and u are integers, and 10≤ s < t < u ≤ 20
Quantity A: s+$\frac{t}{u}$
Quantity B: 11
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

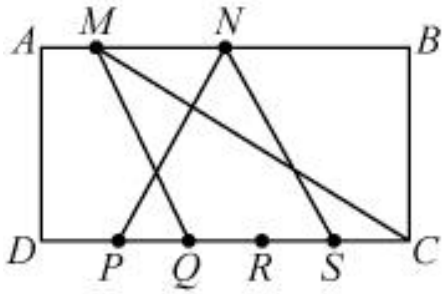
213. In the rectangular coordinate system, (x,y) is a point on a circle that has center (3,2) and is tangent to the x-axis at (3,0).

Quantity A: The least possible value of x
Quantity B: 0

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

214. Magdalena took 1 hour to complete a task that had 60 steps. She took 20 minutes to complete the first 30 steps of the task.
Quantity A: The average number of seconds per step that Magdalena took to complete the remaining 30 steps.
Quantity B: 80
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

215. In rectangle ABCD, side DC is divided into five equal segments by points P, Q, R and S.




Quantity A: The area of ΔMCQ
Quantity B: The area of ΔNSP

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

216. List L consists of the 7 numbers u,-2u,-3u,-4u,-5u,-6u, and -7u, where u≠0.

Quantity A: The median of the 7 numbers in list L.
Quantity B: u

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

217. 7. a> 0

Quantity A: $(a + a^{-1})^2$
Quantity B: $a^2 + a^{-2}$

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

218. If x postage stamps were divided evenly among 4 boys, each boy would receive y postage stamps. If the x postage stamps were divided evenly among 6 boys, each boy would receive z postage stamps. If y - z =25, what is the value of x?

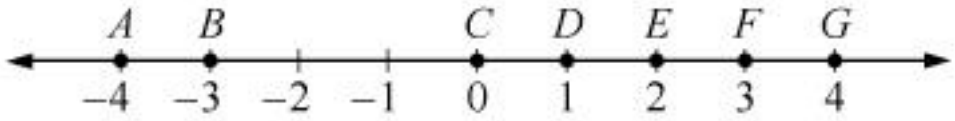
219. |2y -5|<1

Quantity A: y
Quantity B: 1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

220. If 1 kilometer is approximately 0.62 mile, what is the approximate speed, in kilometers per hour, of a car that is traveling at a speed of 50 miles per hour?
A. 31
B. 41
C. 61
D. 71
E. 81

221. The average (arithmetic mean) of the coordinates of the 7 labeled points on the number line is how much greater or less than the median of the coordinates of the 7 labeled points?
A. 4/7 greater
B. 3/7 greater
C. 1/2 greater
D. 3/7 less
E. 4/7 less




222. In a neighborhood consisting of 2,000 homes, 80 percent of the homes are valued at $325,000 or less. Which of the following statements about the values of the homes in the neighborhood must be true? Indicate all such statements.
A. The average (arithmetic mean) value is at most $325,000.
B. The median value is at most $325,000.
C. At most 400 homes have values greater than $325,000.

Questions 223 to 225 are based on the following data.

TEMPORARY EMPLOYMENT IN GERMANY, 1993–1999



223. Which of the following is closest to the percent increase in the number of temporary employees from 1993 to 1999?

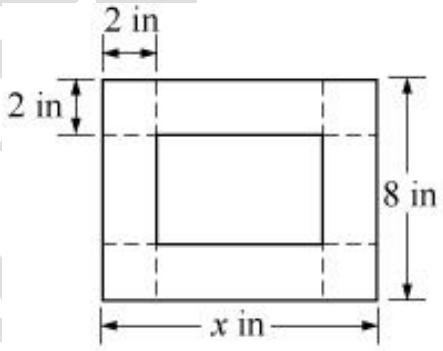
A. 36%
B. 58%
C. 136%
D. 158%
E. 236%

224. In 1999 approximately how many of the temporary employees had an employment contract with a length of at most 3 months?

A. 185,000
B. 150,000
C. 101,000
D. 35,000
E. 19,000

225. In 1998 the ratio of the number of female temporary employees to the number of male temporary employees was 1 to x, where x >0. In terms of x, what was the number, in thousands, of female temporary employees in 1998?
A. 253(x -1)
B. 253(x+1)
C. 253/x
D. 253/(x -1)
E. 253/(x +1)

226. The thin rectangular sheet of metal shown in the figure is 8 inches wide and x inches long. An open box is to be made by cutting a 2-inch square from each corner of the sheet of metal and then folding up the sides. If the volume of the box is to be 48 cubic inches, what is the value of x?




A. 6
B. 8
C. 10
D. 12
E. 14

227. What is the sum of the integers between -90 and 95, inclusive?
A. 5
B. 185
C. 465
D. 4,275
E. 4,560

228. From a set of 100 numbers, half were selected to form group I, and 60 percent of the remaining numbers were selected to form group II. The average (arithmetic mean) of the numbers in group I is 24.4, and the average of the numbers in group II is 31.5. Which of the following is closest to the average of the numbers in groups I and II combined?
A. 27.1
B. 27.6
C. 27.8
D. 28.0
E. 28.3

229. In the xy-plane, the point (t, t-1) lies on the line with equation $y=-\frac{1}{2}x+\frac{1}{3}$. What is the value of t?
Give your answer as a fraction.

230. n is an integer, and k is not an integer.$0 < k < n < k+2$

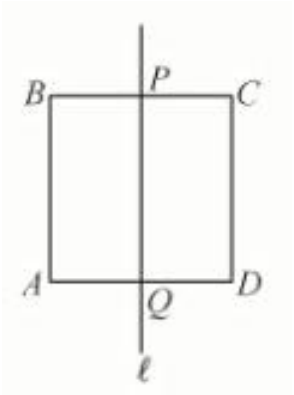
Quantity A: n
Quantity B: k +1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

231. In square ABCD, point P is the midpoint of side BC and point Q is the midpoint of side AD. Point E (not shown) is located on line l and triangle BCE is equilateral.

Quantity A: The length of PQ
Quantity B: The length of PE

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.




232. On a certain map, 1 centimeter represents 5 kilometers. On the map, region X has an area of 6.4 square centimeters.

Quantity A: The actual area of region X
Quantity B: 150 square kilometers

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

233. x >0
Quantity A: The area of a circle whose circumference is 8πx
Quantity B: The area of a circle with radius 4x

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

234. The average (arithmetic mean) of m and n is 1 more than k.

Quantity A: m+n
Quantity B: 2k+1

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

235. $z*10^k = 6*10^m$, m = k +2

Quantity A: z
Quantity B: 60

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

236. In the xy-plane, the point (c, c) lies on the graph of the equation 0.3x + 0.3y =12

Quantity A: The value of c
Quantity B: 20

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.

237. A certain bag contains red balls, green balls, and blue balls and no other balls. The ratio of the number of red balls to the number of blue balls is 2:3, and the ratio of the number of blue balls to the number of green balls is 4:3. The number of blue balls in the bag is what fraction of the total number of balls in the bag?
A. 3/8
B. 12/29
C. 7/13
D. 15/23
E. 12/17

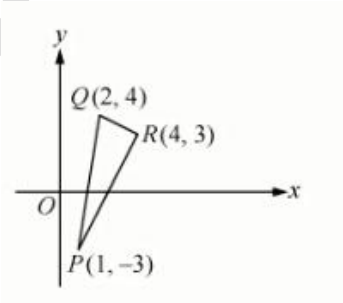
238.For each of the last 5 years, the population of a colony of beetles increased by 8 percent of the preceding year's population. If P represents the current population of the colony, which of the following best represents the population 5 years ago, in terms of P?
A. $(5)(1.08P^{-1})$
B. $(1.08^{-5})\ P^{-1}$
C.$(\ 1.08P)^{-5}$
D. $(1.08)^{-5}P$
E. $(1.08)^{-5}(P)^{5}$

239. Ben has 30 pencils in a box. Each of the pencils is one of 5 different colors, and there are 6 pencils of each color. If Ben selects pencils one at a time from the box without being able to see the pencils, what is the minimum number of pencils that he must select in order to ensure that he selects at least 2 pencils of each color?
A. 24
B. 25
C. 26
D. 27
E. 28

240. If p and n are prime numbers, p-n=4, and $\frac{3}{2} < \frac{P}{n} < 2$, what is the value of p?

241. At a certain company, employees who earn $20.00 per hour will be given an increase of $1.00 per hour. For each of the other employees, either the employee will be given an increase of $1.00 per hour or the employee will be given a percent increase equal to the percent increase that will be given to the employees who earn $20.00 per hour, whichever results in a larger increase for that employee. Which of the following statements are true? Indicate all such statements.
A. An employee who earns less than $20.00 per hour will be given a percent increase that is greater than the percent increase that will be given to the employees who earn $20.00 per hour.
B. An employee who earns $22.00 per hour will be given an increase of $1.10 per hour.
C. An employee who earns $24.00 per hour will earn $25.20 per hour after the increase.

242. Which of the following statements about triangle PQR shown in the xy-plane are true?
A. PQR is a right triangle.
B. The area of PQR is 15/2.
C. PQR is an isosceles triangle.

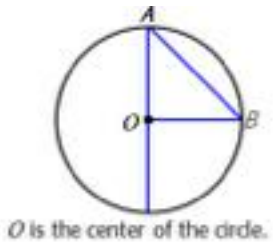



243. In a plane, points P and Q are 20 inches apart. If point R is randomly chosen from all the points in the plane that are 20 inches from P, what is the probability that R is closer to P than it is to Q ?
A. 0
B. 1/4
C. 1/3
D. 1/2
E. 2/3

244.

Quantity A Length of AO

Quantity B Length of AB



O is the center of the circle.

A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

245. In how many different ways can 3 identical green shirts and 3 identical red shirts be distributed among 6 children such that each child receives a shirt?
A. 20
B. 40
C. 216
D. 720
E. 729

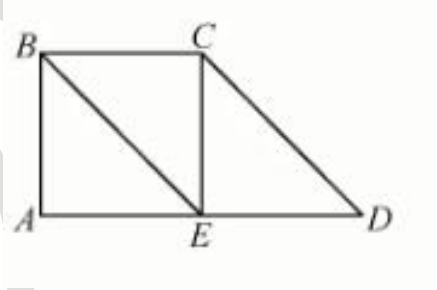
246. In the xy-plane, a circle is centered at the point (-4,3) and passes through the origin. What is the area of the circle?
A. 9π
B. 12π
C. 16π
D. 20π
E. 25π

247. Which of the following is equivalent to $0 < x < 2$?
A. $x = 1$
B. $|x| < 1$
C. $|x| < 2$
D. $|x+1| < 1$
E. $|x-1| \leq 1$

248. The area of a circle with radius a is less than the area of a square with sides of length ka. Which of the following could be the value of k? Indicate all such values.
A. 4/3
B. 5/3
C. 6/3
D. 7/3

249. If the product of 7 consecutive integers is equal to the median of the integers, what is the least of the 7 integers?

250. ABCE is a square, and BCDE is a parallelogram.
Quantity A: The area of square ABCE
Quantity B: The area of parallelogram BCDE
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal
D. The relationship cannot be determined from the information given.



1-5 C 24/87 ABC E BD
6-10 E E B C D
11-15 A D B D A
16-20 BDE BC B A 153/190
21-25 216 3/4 1.29 B AD
26-30 A A C A B
31-35 C D 6000 B C
36-40 7 2500 22 0.003 15.8%
41-45 A E B C A
46-50 C A BE BD ABCDE
51-55 CDE ACE BC CE D
56-60 D B B CDE 6.75
61-65 C 2433600 AD CD ABE
66-70 C A C D C
71-75 ABCDEH DEF B 0.25 D
76-80 B D D D ACE
81-85 C E D 126 BE
86-90 B A B A D
91-95 B C C CE 1800
96-100 A C 105 B C
101-105 C D B C 32
106-110 ABC A E A C
111-115 AC C C D D
116-120 D E E C E
121-125 E B D D C
126-130 C A A D D
131-135 A ACE A A A
136-140 C B B D D
141-145 E D B D ABC
146-150 45 B B E 12
151-155 A 55 D C D
156-160 B C D A 60%
161-165 A ACD B A 16
166-170 B A C B C
171-175 41 C A D B
176-180 B D AB C 6822
181-185 E E A C D

186-190 E E E E -2
191-195 A C B A B
196-200 D D E AC A
201-205 C D A A D
206-210 D -3 BCD E E
211-215 C D A C C
216-220 D A 300 A E
221-225 E BC C A E
226-230 C C A 8/9 D
231-235 A A C A A
236-240 C B D C 11
241-245 ABC AB E D A
246-250 E E CD -3 C