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Quant Live Session

Statistics + Number Properties

Standard directions for all Data Sufficiency Questions:

Mark:

A. Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
B. Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
C. BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
D. EACH statement ALONE is sufficient.
E. Statements (1) and (2) TOGETHER are not sufficient.

Statistics

1. Set S consists of 5 values, not necessarily in ascending order: {4, 8, 12, 16, *x*}. For how many non-negative integer values of *x* does the mean of set S equal the median of set S?

A. Zero
B. One
C. Two
D. Three
E. Every Integer

2. A certain portfolio consisted of 5 stocks, priced at $20, $35, $40, $45, and $70, respectively. On a given day, the price of one stock increased by 16%, while the price of another stock decreased by 35% and the prices of the remaining three remained constant. If the average price of a stock in the portfolio rose by 2%, which of the following could be the prices of the shares that remained constant?

A. $35, $40, and $45
B. $20, $35, and $70
C. $20, $45, and $70
D. $20, $35, and $40
E. $35, $40, and $70

3. T is a set of y integers, where $0 < y < 7$. If the average of Set T is the positive integer x, which of the following could NOT be the median of Set T?

A. 0
B. x
C. $-x$
D. $y/3$
E. $2y/7$

4. a, b, and c are integers and $a < b < c$. S is the set of all integers from a to b, inclusive. Q is the set of all integers from b to c, inclusive. The median of set S is $3b/4$. The median of set Q is $7c/8$. If R is the set of all integers from a to c, inclusive, what is the median of set R?

A. 3c/8
B. c/2
C. 11c/16
D. 5c/7
E. 3c/4

5. What is the median value of the set R, if for every term in the set, $R_n = R_{n-1} + 3$?

(1)The first term of set R is 15.

(2)The mean of set R is 36.

6. Five pieces of wood have an average (arithmetic mean) length of 124 centimeters and a median length of 140 centimeters. What is the maximum possible length in centimeters of the shortest piece of wood?

A. 90
B. 100
C. 110
D. 130
E. 140

7. Amy's grade was 90th percentile of the 80 grades for her class. Of the 100 grades from another class, 19 were higher than Amy's, and the rest were lower. If no other grade was the same as Amy's grade, then Amy's grade was what percentile of the grades of the two classes combined?
   A. 72nd
   B. 80th
   C. 81st
   D. 85th
   E. 92nd

8. The mean and the standard deviation of the 8 numbers (9.4, 9.9, 9.9, 9.9, 10.0, 10.2, 10.2, and 10.5) are 10 and 0.3, respectively. What percentage of the 8 numbers are within one standard deviation of the mean?

A. 90%
B. 85%
C. 80%
D. 75%
E. 70%

9. The lifetime of all the batteries produced by a certain company in a year have a distribution that is perfectly symmetrical about the mean m. If the distribution has a standard deviation of d, what percent of the distribution is greater than m + d?

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

(2) 16% of the distribution is less than m – d

10. Does data set A = {1, 2, x} have a greater standard deviation than data set B = {1, 2, 3}?

(1) x is greater than 3.

(2) x is less than 1.

11. Last month 15 homes were sold in Town X. The average (arithmetic mean) sale price of the homes was $ 150,000 and the median sale price was $130,000. Which of the following statement must be true?

I. at least one of the homes was sold for more than $165,000
II. at least one of the homes was sold for more than $130,000 and less than $150,000
III. at least one of the homes was sold for less than $130,000

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

12. A set of 5 numbers has an average of 50. The largest element in the set is 5 greater than 3 times the smallest element in the set. If the median of the set equals the mean, what is the largest possible value in the set?

A. 80
B. 83
C. 86
D. 89
E. 92

13. The average (arithmetic mean) of six numbers is 18 and the median of the six numbers is 16. What is the minimum possible value for the greatest number in the list?

A. 19
B. 20
C. 21
D. 22
E. 23

14. A group of students took an exam that was scored from 0 to 100 points. 70 percent of the students in the group passed the exam, and these students received an average score of 86. The average score on the exam for the entire group was 74. Then the median score on the exam for the entire group of students must be:

A. a unique value
B. <92
C. >92
D. Nothing can be conclusively said

15. A set of 15 different integers has a range of 25 and a median of 25. What is greatest possible integer that could be in this set?

A. 32
B. 37
C. 40
D. 43
E. 50

16. Set S contains 100 consecutive integers. If the range of the negative elements of Set S equals 80, what is the average (arithmetic mean) of the positive numbers in the set?

A. 8
B. 8.5
C. 9
D. 9.5
E. 10

17. Set S contains exactly four distinct positive integers. When the range of S is added to the sum of all the terms in S, the resulting sum is equal to the smallest term in S plus three times the largest term in S. Then:

A. Mean = Median
B. Mean < Median
C. Mean > Median
D. No relationship between Mean and Median can be derived

18. Set A consists of all even integers between 2 and 100, inclusive. Set X is derived by reducing each term in set A by 50, set Y is derived by multiplying each term in set A by 1.5, and set Z is derived by dividing each term in set A by –4. Which of the following represents the ranking of the three sets in descending order of standard deviation?

A. X, Y, Z
B. X, Z, Y
C. Y, Z, X
D. Y, X, Z
E. Z, Y, X

19. If M is a negative integer and K is a positive integer, which of the following could be the standard deviation of a set $\{-7, -5, -3, M, 0, 1, 3, K, 7\}$?

I. -1.5
II. -2
III. 0

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

20. If $y = ax + b$, and if the standard deviation of x series is 'S', what is the standard deviation of y series?

A. $a \times S$

B. S/a

C. $b \times S$

D. S/b

E. $|a| \times S$

21. Let Set $T = \{2, 4, 5, 7\}$. Which of the following values, if added to Set T, would most increase the standard deviation of Set T?

A. 1
B. 3
C. 6
D. 8
E. 14

22. What is the standard deviation of Q, a set of consecutive integers?

(1) Q has 21 members.

(2) The median value of set Q is 20.

23. A certain list of 100 data has an average of 6 and a standard deviation of d, where d is positive. Which of the following pairs of data, when added to the list, must result in a list of 102 data with standard deviation less than d?

A. −6 and 0
B. 0 and 0
C. 0 and 6
D. 0 and 12
E. 6 and 6

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

(1) For each tank 30% of the volume of the water that was in the tank before the beginning of the experiment was removed during the experiment

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

25. A convenience store currently stocks 48 bottles of mineral water. The bottles have two sizes of either 20 or 40 ounces each. The average volume per bottle the store currently has in stock is 35 ounces. How many 40–ounce bottles are in stock?

A. 12
B. 18
C. 24
D. 30
E. 36

Number Properties

1. y^4 is a two-digit positive odd integer. A positive integer n is divisible by y^2. What could be the sum of digits of n?

I. 1
II. 9
III. 17

Choose one answer from below:

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

2. If a and b are both positive integers and a is odd then $b^{a+1} - ba^b$ must be:

A. Odd

B. Even

C. Prime

D. Composite

E. Can not be conclusively determined

3. Is x an even number?

(1) $7x$ is an even number.

(2) $5x$ is an even number.

4. For all positive integers m, [m] = 3m when m is odd and [m] = ½ m when m is even. Which of the following is equivalent to [9] × [6]?

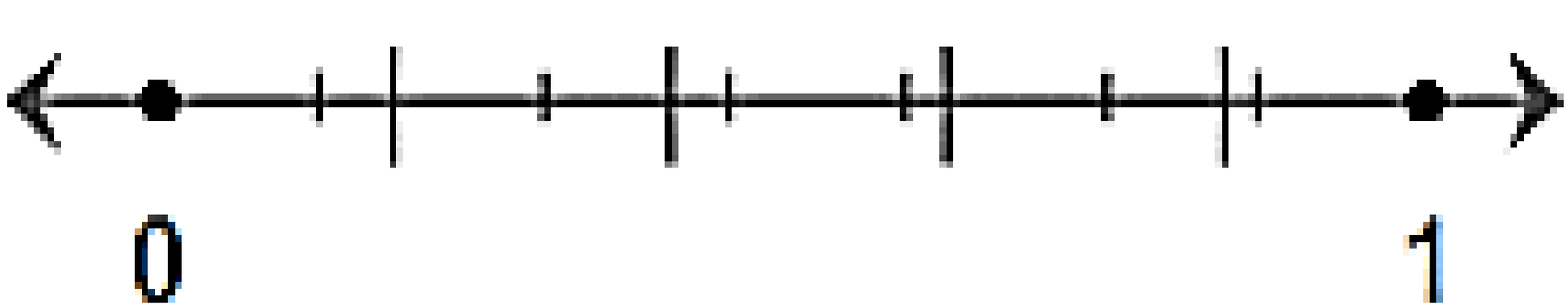
A. [81]
B. [54]
C. [36]
D. [27]
E. [18]

5. If n denotes a number to the left of 0 on the number line such that the square of n is less than 1/100, then the reciprocal of n must be:

A. less than –10
B. between –1 and –1/10
C. between –1/10 and 0
D. between 0 and –1/10
E. greater than 10

6. On the number line, 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. 1/7
B. 1/35
C. 2/35
D. 2/7
E. 3/7



7. If the square root of p^2 is an integer greater than 1, which of the following must be true?

I. p^2 has an odd number of factors
II. p^2 can always be expressed as the product of an odd number of prime factors
III. p has an even number of factors

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

8. If x and y are positive integers, which of the following CANNOT be the greatest common divisor of $35x$ and $20y$?

A. 5
B. $5(x - y)$
C. $20x$
D. $20y$
E. $35x$

9. For any integer $k > 1$, the term "length of an integer" refers to the number of positive prime factors, not necessarily distinct, whose product is equal to k. For example, if $k = 24$, the length of k is equal to 4, since $24 = 2 \times 2 \times 2 \times 3$. If x and y are positive integers such that $x > 1$, $y > 1$, and $x + 3y < 1000$, what is the maximum possible sum of the length of x and the length of y?

A. 5
B. 6
C. 15
D. 16
E. 18

10. If n is a positive integer and the product of all the integers from 1 to n, inclusive, is divisible by 990, what is the least possible value of n ?

A. 8

B. 9

C. 10

D. 11

E. 12

11. When positive integer x is divided by positive integer y, the remainder is 9. If $\frac{x}{y} = 96.12$, what is the value of y ?

A. 96

B. 75

C. 48

D. 25

E. 12

12. For the positive integers a, b, and k, $a^k \| b$ means that a^k is a divisor of b, but a^{k+1} is not a divisor of b. If k is a positive integer and $2^k \| 72$, then k is equal to

A. 2

B. 3

C. 4

D. 8

E. 18

13. If p is the product of the integers from 1 to 30, inclusive, what is the greatest integer k for which 3^k is a factor of p ?

A. 10

B. 12

C. 14

D. 16

E. 18

14. If $n = 3^8 - 2^8$, which of the following is NOT a factor of n ?

A. 97

B. 65

C. 35

D. 13

E. 5

15. If $3 < x < 100$, for how many values of x is $\frac{x}{3}$ the square of a prime number?

A. Two

B. Three

C. Four

D. Five

E. Nine

16. If y is the smallest positive integer such that 3,150 multiplied by y is the square of an integer, then y must be

A. 2

B. 5

C. 6

D. 7

E. 14

17. How many prime numbers between 1 and 100 are factors of 7,150 ?

A. One

B. Two

C. Three

D. Four

E. Five

18. From the consecutive integers −10 to 10, inclusive, 20 integers are randomly chosen with repetitions allowed. What is the least possible value of the product of the 20 integers?

A. $(-10)^{20}$

B. $(-10)^{10}$

C. 0

D. $-(10)^{19}$

E. $-(10)^{20}$

19. If a two-digit positive integer has its digits reversed, the resulting integer differs from the original by 27. By how much do the two digits differ?

A. 3

B. 4

C. 5

D. 6

E. 7

20. If $\frac{1}{x}-\frac{1}{x+1}=\frac{1}{x+4}$, then x could be

A. 0

B. -1

C. -2

D. -3

E. -4

21. Two numbers differ by 2 and sum to S. Which of the following is the greater of the numbers in terms of S ?

A. $\frac{S}{2} - 1$

B. $\frac{S}{2}$

C. $\frac{S}{2} + \frac{1}{2}$

D. $\frac{S}{2} + 1$

E. $\frac{S}{2} + 2$

22. If m is an integer and $m = 10^{32} - 32$, what is the sum of the digits of m ?

A. 257

B. 264

C. 275

D. 284

E. 292

23. If x and k are integers and $(12^x)(4^{2x+1}) = (2^k)(3^2)$, what is the value of k ?

A. 5

B. 7

C. 10

D. 12

E. 14

24. The number $\sqrt{63-36\sqrt{3}}$ can be expressed as $x+y\sqrt{3}$ for some integers x and y. What is the value of xy ?

A. -18

B. -6

C. 6

D. 18

E. 27

25. If $n = 9! - 6^4$, which of the following is the greatest integer k such that 3^k is a factor of n ?

A. 1

B. 3

C. 4

D. 6

E. 8

Stats

1. D
2. A
3. E
4. C
5. B
6. B
7. D
8. D
9. D
10. A
11. A
12. E
13. D
14. D
15. D
16. D
17. A
18. D
19. E
20. E
21. E
22. A
23. E
24. A
25. E

Numbers

1. E
2. B
3. C
4. D
5. A
6. B
7. A
8. C
9. D
10. D
11. B
12. B
13. C
14. C
15. B
16. E
17. D
18. E
19. A
20. C
21. D
22. D
23. E
24. A
25. D