

1. Which of the following series of numbers, if added to the set {1, 6, 11, 16, 21}, will not change the set's mean?

I. 1.5, 7.11 and 16.89 II. 5.36, 10.7 and 13.24 III. -21.52, 23.3, 31.22

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

2. Sets A, B and C are shown below. If number 100 is included in each of these sets, which of the following represents the correct ordering of the sets in terms of the absolute increase in their standard deviation, from largest to smallest?

A {30, 50, 70, 90, 110}, B {-20, -10, 0, 10, 20}, C {30, 35, 40, 45, 50}

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

3. Is $x > y$?

(1) $x^2 > y$

(2) $\sqrt{x} < y$

4. A certain tank is filled to one quarter of its capacity with a mixture consisting of water and sodium chloride. The proportion of sodium chloride in the tank is 40% by volume and the capacity of the tank is 24 gallons. If the water evaporates from the tank at the rate of 0.5 gallons per hour, and the amount of sodium chloride stays the same, what will be the concentration of water in the mixture in 2 hours?

43% 50% 52% 54% 56%

5. Is positive integer $n - 1$ a multiple of 3?

(1) $n^3 - n$ is a multiple of 3

(2) $n^3 + 2n^2 + n$ is a multiple of 3

6. If numbers N and K are added to set X {2, 8, 10, 12}, its mean will increase by 25%. What is the value of $N^2 + 2NK + K^2$?

(A) 28 (B) 32 (C) 64 (D) 784 (E) 3600

7. If $3|3 - x| = 7$, what is the product of all the possible values of x?

$\frac{1}{9}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{16}{9}$ $\frac{32}{9}$

8. Machine A can fill an order of widgets in a hours. Machine B can fill the same order of widgets in b hours. Machines A and B begin to fill an order of widgets at noon, working together at their respective rates. If a and b are even integers, is Machine A's rate the same as that of Machine B?

(1) Machines A and B finish the order at exactly 4:48 p.m.

(2) $(a+b)^2 = 400$

9. If p is a positive integer, what is the value of p ?

- 1). $p/4$ is a prime number
- 2). p is divisible by 3

10. One smurf and one elf can build a treehouse together in two hours, but the smurf would need the help of two fairies in order to complete the same job in the same amount of time. If one elf and one fairy worked together, it would take them four hours to build the treehouse. Assuming that work rates for smurfs, elves, and fairies remain constant, how many hours would it take one smurf, one elf, and one fairy, working together, to build the treehouse?
5/7 1 10/7 12/7 22/7

11. Of the 645 speckled trout in a certain fishery that contains only speckled and rainbow trout, the number of males is 45 more than twice the number of females. If the ratio of female speckled trout to male rainbow trout is 4:3 and the ratio of male rainbow trout to all trout is 3:20, how many female rainbow trout are there?

192 195 200 205 208

12. When a certain tree was first planted, it was 4 feet tall, and the height of the tree increased by a constant amount each year for the next 6 years. At the end of the 6th year, the tree was $\frac{1}{5}$ taller than it was at the end of 4th year. By how many feet did the height of the tree increase each year?
3/10 2/5 1/2 2/3 6/5

13. A box contains one dozen donuts. Four of the donuts are chocolate, four are glazed, and four are jelly. If two donuts are randomly selected from the box, one after the other, what is the probability that both will be jelly donuts?

1/11 1/9 1/3 2/3 8/9

14. John and Jacob set out together on bicycle traveling at 15 and 12 miles per hour, respectively. After 40 minutes, John stops to fix a flat tire. If it takes John one hour to fix the flat tire and Jacob continues to ride during this time, how many hours will it take John to catch up to Jacob assuming he resumes his ride at 15 miles per hour? (consider John's deceleration/acceleration before/after the flat to be negligible)
3 3.33 $3\frac{1}{2}$ 4 $4\frac{1}{2}$

15. The three-digit positive integer x has the hundreds, tens, and units digits of a , b , and c , respectively. The three-digit positive integer y has the hundreds, tens, and units digits of k , l , and m , respectively. If $(2^a)(3^b)(5^c) = 12(2^k)(3^l)(5^m)$, what is the value of $x - y$?
21 200 210 300 310

16. What is the perimeter of isosceles triangle ABC?

- (1) The length of side AB is 9
- (2) The length of side BC is 4

17. In the game Cako, a player is awarded one tick for every third Alb captured, and one click for every fourth Berk captured. The total score is equal to the product of clicks and ticks. If a player has a score of 77, how many Albs did he capture?

- (1) The difference between Albs captured and Berks captured is 7.
- (2) The number of Albs captured is divisible by 4.

18. If $m > 0$, $y > 0$, and x is m percent of $2y$, then, in terms of y , m is what percent of x ?

$y/200$ $2y$ $50y$ $50/y$ $5000/y$

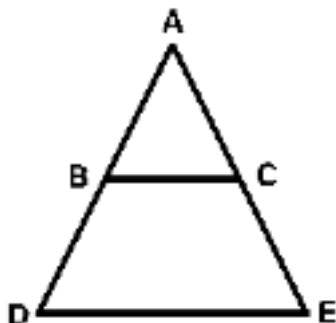
19. Is $x > 10^{10}$?

(1) $x > 2^{34}$

(2) $x = 2^{35}$

20. According to a recent student poll, 15 out of 21 members of the finance club are interested in a career in investment banking. If two students are chosen at random, what is the probability that at least one of them is interested in investment banking?

21. In the figure, $AC = 3$, $CE = x$, and BC is parallel to DE . If the area of triangle ABC is $1/12$ of the area of triangle ADE , then $x = ?$



22. 30% of major airline companies equip their planes with wireless internet access. 70% of major airlines offer passengers free on-board snacks. What is the greatest possible percentage of major airline companies that offer both wireless internet and free on-board snacks?

21% 30% 40% 50% 70%

23. A basketball team composed of 12 players scored 100 points in a particular contest. If none of the individual players scored fewer than 7 points, what is the greatest number of points that an individual player might have scored?

7 13 16 21 23

24. The number 75 can be written as the sum of the squares of 3 different positive integers. What is the sum of these 3 integers?

17 16 15 14 13

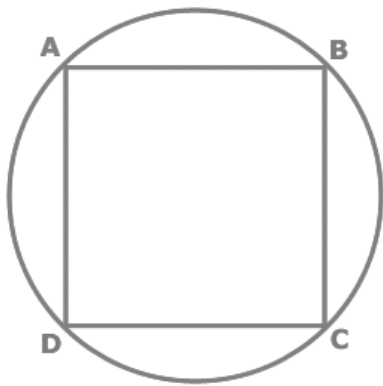
25. What is the units digit of $177^{28} - 133^{23}$?

(A) 1 (B) 3 (C) 4 (D) 6 (E) 9

26. A certain investment grows at an annual interest rate of 8%, compounded quarterly. Which of the following equations can be solved to find the number of years, x , that it would take for the investment to increase by a factor of 16?

$16 = (1.02)^{x/4}$ $2 = (1.02)^x$ $16 = (1.08)^{4x}$ $2 = (1.02)^{x/4}$ $1/16 = (1.02)^{4x}$

27. ABCD is a square inscribed in a circle and arc ADC has a length of $\pi\sqrt{x}$. If a dart is thrown and lands somewhere in the circle, what is the probability that it will not fall within the inscribed square? (Assume that the point in the circle where the dart lands is completely random.)



28. Donald plans to invest x dollars in a savings account that pays interest at an annual rate of 8% compounded quarterly. Approximately what amount is the minimum that Donald will need to invest to earn over \$100 in interest within 6 months?
\$1500 \$1750 \$2000 \$2500 \$3000

29. If x and y are integers and $(15^x + 15^{x+1}) / 4^y = 15^y$, what is the value of x ?
2 3 4 5 Cannot be determined

30. What is 35 percent of a^b ?

- (1) b is 200 percent of a .
- (2) 50 percent of b is a .

31. A store purchases 20 coats that each cost an equal amount and then sold each of the 20 coats at an equal price, what was the store's gross profit on the 20 coats?

(1) If the selling price per coat had been twice as much, the store's gross profit on the 20 coats would have been 2400

(2) If the store selling price per coat had been \$2 more, the store's gross profit on the 20 coats would have been 440

32. A certain company has budgeted \$1,440 for entertainment expenses for the year, divided into 12 equal monthly allocations. If by the end of the third month, the total amount spent on entertainment was \$300, how much was the company under budget or over budget?

\$60 under budget \$30 under budget \$30 over budget \$60 over budget \$180 over budget

33. Harold and Millicent are getting married and need to combine their already-full libraries. If Harold, who has $\frac{1}{2}$ as many books as Millicent, brings $\frac{1}{3}$ of his books to their new home, then Millicent will have enough room to bring $\frac{1}{2}$ of her books to their new home. What fraction of Millicent's old library capacity is the new home's library capacity?

$\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{4}{5}$ $\frac{5}{6}$

34. If $27^{4x+2} \times 162^{-2x} \times 36^x \times 9^{6-2x} = 1$, then what is the value of x ?

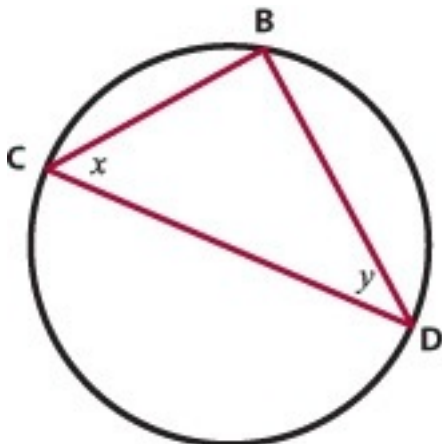
-9 -6 3 6 9

35. Bob and Wendy left home to walk together to a restaurant for dinner. They started out walking at a constant pace of 3 mph. At precisely the halfway point, Bob realized he had forgotten to lock the front door of their home. Wendy continued on to the restaurant at the same constant pace. Meanwhile, Bob, traveling at a new constant speed on the same route, returned home to lock the door and then went to the restaurant to join Wendy. How long did Wendy have to wait for Bob at the restaurant?

(1) Bob's average speed for the entire journey was 4 mph.

(2) On his journey, Bob spent 32 more minutes alone than he did walking with Wendy.

36. If CD is the diameter of the circle, does x equal 30?



(1) The length of CD is twice the length of BD.

(2) $y = 60$

37. In 2003 Acme Computer priced its computers five times higher than its printers. What is the ratio of its gross revenue for computers and printers respectively in the year 2003?

(1) In the first half of 2003 it sold computers and printers in the ratio of 3:2, respectively, and in the second half in the ratio of 2:1.

(2) It sold each computer for \$1000.

1. Janet is now 25 years younger than her mother Carol. If in 6 years Janet's age will be half Carol's age, how old was Janet 5 years ago?
10 14 16 19 25

2. For which of the following values of x is $\{1-[2-(x^{1/2})]^{1/2}\}^{1/2}$ not defined as a real number?
1 2 3 4 5

3. In a shipment of 20 cars, 3 are found to be defective. If four cars are selected at random, what is the probability that exactly one of the four will be defective?

(A) $170/1615$ (B) $3/20$ (C) $8/19$ (D) $3/5$ (E) $4/5$

4. The value of x is one quarter of z . The sum of x , y , and z is equal to 26. If the value of y is twice the value of z , what is the largest factor of the sum of y and z ?

2 3 8 12 24

5. Is $n/18$ an integer?

(1) $5n/18$ is an integer.

(2) $3n/18$ is an integer.

6. If $4^{4x} = 1600$, what is the value of $(4^{x-1})^2$?

40 20 10 $5/2$ $5/4$

7. 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?

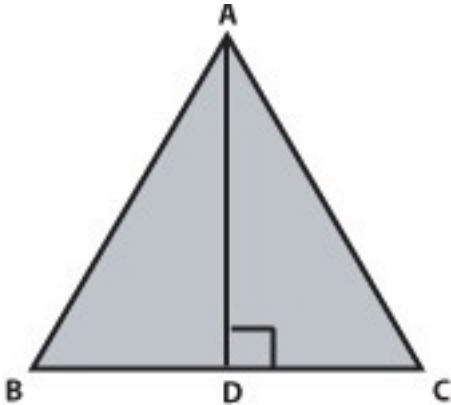
I. at least one of the homes was sold for more than \$165,000

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

8. If AD is $6\sqrt{3}$, and $\angle ADC$ is a right angle, what is the area of triangular region ABC ?

(1) $\angle ABD = 60^\circ$

(2) $AC = 12$



9. If $(\frac{1}{5})^m \times (\frac{1}{4})^{18} = \frac{1}{2} \times (10)^{35}$, then $m = ?$

10. If k and y are integers, and $10k + y$ is odd, which of the following must be true?

k is odd k is even y is odd y is even both k and y are odd

11. If k is a positive integer, then $20k$ is divisible by how many different positive integers?

1). k is prime.

2). $k = 7$

12. The height of isosceles trapezoid $ABDC$ is 12 units. The length of diagonal AD is 15 units. What is the area of trapezoid $ABDC$?

figure represents $ABCD$ isosceles trapezium

(A) 72 (B) 90 (C) 96 (D) 108 (E) 180

13. If $|a| = |b|$, which of the following must be true?

- I. $a = b$ II. $|a| = -b$ III. $-a = -b$

I only II only III only I and III only None

14. A group of men and women gathered to compete in a marathon. Before the competition, each competitor was weighed and the average weight of the female competitors was found to be 120 lbs. What percentage of the competitors were women?

- (1) The average weight of the men was 150 lb.
(2) The average weight of the entire group was twice as close to the average weight of the men as it was to the average weight of the women.

15. y and z are nonzero integers, is the square of $(y + z)$ even?

- (1) $y - z$ is odd.
(2) yz is even.

16. At 7:57 am, Flight 501 is at an altitude of 6 miles above the ground and is on a direct approach (i.e., flying in a direct line to the runway) towards The Airport, which is located exactly 8 miles due north of the plane's current position. Flight 501 is scheduled to land at The Airport at 8:00 am, but, at 7:57 am, the control tower radios the plane and changes the landing location to an airport 15 miles directly due east of The Airport. Assuming a direct approach (and negligible time to shift direction), by how many miles per hour does the pilot have to increase her speed in order to arrive at the new location on time?

17. Amy's grade was the 90th percentile of the 80 grades for her class. Of the 100 grades from another class, 19 was higher than Amy's and the rest was lower. If no other grade is the same as Amy's grade, then Amy's grade was what percentile of grades of two class combined.

72nd 80th 81st 85th 92nd

18. Is $a > c$?

(1) $b > d$

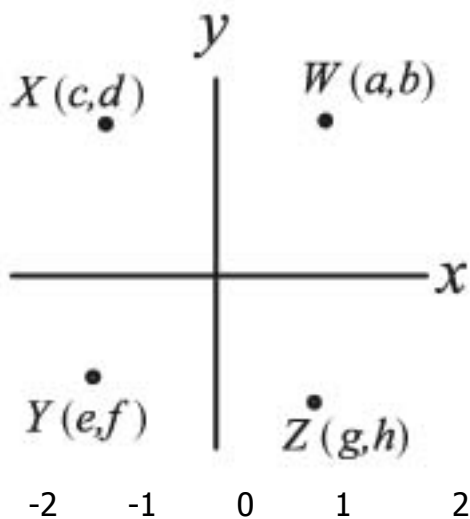
(2) $ab^2 - b > b^2c - d$

19. Set A consists of all positive integers less than 100; Set B consists of 10 integers, the first four of which are 2, 3, 5, and 7. What is the difference between the median of Set A and the range of Set B?

- (1) All numbers in Set B are prime numbers;
(2) Each element in Set B is divisible by exactly two factors.

20. Greg, Marcia, Peter, Jan, Bobby and Cindy go to a movie and sit next to each other in 6 adjacent seats in the front row of the theater. If Marcia and Jan will not sit next to each other, in how many ways different arrangements can the 6 people sit?

21. In the rectangular coordinate plane points X and Z lie on the same line through the origin and points W and Y lie on the same line through the origin. If $a^2 + b^2 = c^2 + d^2$ and $e^2 + f^2 = g^2 + h^2$, what is the value of length XZ – length WY?



22. Is $|x| > y^2$?

(1) $x > y$

(2) $y > 0$

23. If there are x men and y women in a choir, and there are z more men than there are women in that choir, what is z ?

(1) $x^2 - 2xy + y^2 - 9 = 0$

(2) $x^2 + 2xy + y^2 - 225 = 0$

24. Seven integers, $x_1, x_2, x_3, x_4, x_5, x_6$, and x_7 , are picked at random from the set of all integers between 10 and 110, inclusive. If each of these integers is divided by 7 and the 7 remainders are all added together, what would be the sum of the 7 remainders?

(1) The range of the remainders is 6.

(2) The seven integers are consecutive.

25. A small pool filled only with water will require an additional 300 gallons of water in order to be filled to 80% of its capacity. If pumping in these additional 300 gallons of water will increase the amount of water in the pool by 30%, what is the total capacity of the pool in gallons?

26. If x and y are positive integers and $n = 5^x + 7^{y+15}$, what is the units digit of n ?

(1) $y = 2x - 15$

(2) $y^2 - 6y + 5 = 0$

27. The third-place finisher of the Allen County hot dog eating contest, in which each contestant was given an equal amount of time to eat as many hot dogs as possible, required an average of 15 seconds to consume each hot dog. How many hot dogs did the winner eat?

(1) The winner consumed 24 more hot dogs than did the third-place finisher.

(2) The winner consumed hot dogs at double the rate of the third-place finisher.

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

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

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

29. Is x the square of an integer?

(1) $x = 12k + 6$, where k is a positive integer

(2) $x = 3q + 9$, where q is a positive integer

30. Is $|a| > |b|$?

(1) $b < -a$

(2) $a < 0$

31. At a certain laboratory, chemical substances are identified by an unordered combination of 3 colors. If no chemical may be assigned the same colors, what is the maximum number of substances that can be identified using 7 colors?

32. If the fraction d were converted into a decimal, would there be more than 3 nonzero digits to the right of the decimal point?

(1) The denominator of d is exactly 8 times the numerator of d .

(2) If d were converted into a decimal, d would be a non-repeating decimal.

33. Each person attending a fund-raising party for a certain club was charged the same admission fee, how many people attended the party?

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

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

34. Sequence S is defined as $S_n = 2S_{n-1} - 2$. If $S_1 = 3$, then $S_{10} - S_9 =$

2 120 128 250 256

35. If S is a finite set of consecutive even numbers, is the median of S an odd number?

(1) The mean of set S is an even number.

(2) The range of set S is divisible by 6.

36. In a room filled with 7 people, 4 people have exactly 1 friend in the room and 3 people have exactly 2 friends in the room (Assuming that friendship is a mutual relationship, i.e. if John is Peter's friend, Peter is John's friend). If two individuals are selected from the room at random, what is the probability that those two individuals are NOT friends?

5/21 3/7 4/7 5/7 16/21

37. $36^2 + 37^2 + 38^2 + 39^2 + 40^2 + 41^2 + 42^2 + 43^2 + 44^2 =$

(A) 14400 (B) 14440 (C) 14460 (D) 14500 (E) 14520