

1. $h(n)$ is the product of the even numbers from 2 to n , inclusive, and p is the least prime factor of $h(100)+1$. What is the range of p ?

Answer:

$h(100)=2*4*6*...*100$, $h(100)$ is the multiple of 2, 3, 5, 7, 11, 13.

If a integer m is multiple of integer n (none 1), $m+1$ is not the multiple of n definitely.

So, p is greater than 47.

Answer is $p > 40$

We can use reductio ad absurdum to prove it:

Let $m=k*n$ and $m+1=h*n$, where k and n are integers. So, $(m+1)-m=1=(h-k)*n$. It is impossible.

2. In the xy -plane, at what two points does the graph of $y=(x+a)(x+b)$ intersect the x -axis?

1). $a+b = -1$

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

Answer:

From 1, $a+b = -1$.

From 2, $x=0$, so $ab = -6$.

$$(x+a)(x+b)=0$$

$$x^2+(a+b)x+ab=0$$

So, $x = -3$, $x = 2$

The answer is C.

3. If 500 is the multiple of 100 that is closest to X and 400 is the multiple of 100 that is closest to Y , which multiple of 100 is closest to $X+Y$?

1). $X < 500$

2). $Y < 400$

Answer:

$$450 < x < 550, 350 < y < 450$$

Combined $450 < X < 500$ and $350 < y < 400$, we know that $800 < x+y < 900$, but we still don't know which multiple of 100 is closest to $x+y$.

The answer is E.

4. If set S consist of the numbers 1, 5, -2, 8, and n, is $0 < n < 7$?

- 1). the median of the numbers in S is less than 5.
- 2). the median of the numbers in S is greater than 1.

Answer:

From 1, we know that $n < 5$? 2, 1, n, 5, 8

From 2, we know that $n > 1$? 2, 1, n, 5, 8

Combined two, we can know that $1 < n < 5$

The answer is C

5. List K consists of 12 consecutive integers, if -4 is the least integer in list K, what is the range of the positive integers in the list K?

Answer:

The least number in the list is -4, so, the list contains -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7.

So, the range of the positive integers is $7 - 1 = 6$.

6. Is the three-digit number n less than 550?

- 1). the product of the digits in n is 30
- 2). the sum of the digits in n is 10

Answer:

From 1, $30 = 1 \cdot 2 \cdot 3 \cdot 5$, the three digits could be 1/6/5 or 2/3/5. So, the number could be 651, which is greater than 550. Insufficient.

From 2, sum is 10, three digits only could be 2, 3, and 5.

Combined 1 and 2, we can know that the number must less than 550.

Answer is C

7. On a certain day, Tim invest \$1,000 at 10 percent annual interest, compound annually, and Lana invested \$ 2,000 at 5 percent annual interest, compound annually. The total amount of interest earned by Tim's investment in the first 2 years was how much greater than the total amount of interest earned by Lana's investment in the first 2 years?

5, 15, 50, 100, 105

Answer:

$$1000(1+10\%)^2=1210$$

$$2000(1+5\%)^2=2205$$

$$\text{So, } 210-205=5$$

8. If m , r , x and y are positive, is the ratio of the m to r equal to the ratio of x to y ?

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

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

Answer:

1). $m/y=x/r$, the information is insufficient to determine whether $m/r=x/y$ or not.

2). $(m+x)/(r+y)=x/y \Rightarrow (m+x)*y=(r+y)*x \Rightarrow my=rx \Rightarrow m/r=x/y$, sufficient.

Answer is B.

9. At least 100 students at a certain high school study Japanese. If 4 percent of the students who study French also study Japanese, do more students at the school study French than Japanese?

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

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

Answer:

From 1, 16 students study both French and Japanese, so $16/0.04=400$ students study French, combine "at least 100 students study Japanese", insufficient.

From 2, we can know that, 10% Japanese studying students=4% French studying students.

Apparently, more students at the school study French than study Japanese.

Answer is B

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

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

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

Answer:

From 1, $V > 16 \text{ feet/second} = (16/5280)/(1/3600) = 10.9 \text{ mile/hour}$, the distance that he cycled is greater than $10.9 * \frac{1}{2} = 5.45$. We cannot know whether it greater than 6.

From 2, $V < 18 \text{ feet/second} = (18/5280)/(1/3600) = 12.27 \text{ mile/hour}$, the distance that he cycled is less than $12.27 * \frac{1}{2} = 6.135$.

Combine 1 and 2, $5.45 < \text{the distance} < 6.135$, insufficient.

Answer is E.

11. If $X^4 + Y^4 = 100$, then the greatest possible value of X is between:

A. 0 and 3

B. 3 and 6

C. 6 and 9

D. 9 and 12

E. 12 and 15

Answer:

$$X^4 + Y^4 = 100 \implies x^4 < 100 \implies x^2 < 10 \implies 3 < X < 6$$

Answer is B

12. Is $2X - 3Y < X^2$?

1). $2X-3Y=-2$

2). $X>2$ and $Y>0$

Answer:

Apparently, answer is D

13. In a work force, the employees are either managers or directors. What is the percentage of directors?

1). the average salary for manager is \$5,000 less than the total average salary.

2). the average salary for directors is \$15,000 more than the total average salary.

Answer:

Let the total average be t , percentage of director is d . Then,

$$t \cdot 100 = (t - 5000)(100 - d) + (t + 15000)d$$

d can be solve out.

Answer is C

14. If the integer a and n are greater than 1, and the product of the first 8 positive integers is a multiple of a^n , what is the value of a ?

1). $a^n = 64$

2). $n = 6$

Answer:

$$8! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 = 2^7 \cdot 3^2 \cdot 5 \cdot 7$$

From 1, $a^n = 64$, where 64 could be 8^2 , 4^3 , 2^6 , a could be 8, 4, and 2, insufficient.

From 2, $n=6$, only 2^6 could be a factor of $8!$, sufficient.

Answer is B

15. A hiker walking at a constant rate of 4 miles per hour is passed by a cyclist traveling in the same direction along the same path at a constant rate of 20 miles per hour. The cyclist stops to wait for the hiker 5 minutes after passing her, while the hiker continue to walk at her constant rate. How many minutes must the cyclist wait until the hiker catches up?

Answer:

When cyclist stops, the distance between he and the hiker is $20 \times 5 - 4 \times 580$

So, the cyclist will wait $80/420$ minutes.

16. If x and y are positive integers, is the product xy even?

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

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

Answer:

From 1, $4y$ is even, then, $5x$ is even, and x is even.

From 2, $6x$ is even, then, $7y$ is even, and y is even.

Answer is D

17. If x and y are integers, is $x(y+1)$ an even number?

1). x , and y are prime numbers.

2). $y > 7$

Answer:

From 1, $[x,y] = [2,2]$ & $[3,2]$ though fulfill requirement but results contradict each other

From 2, x , y are not specified to be odd or even

Together, prime > 7 is always odd thus make $y+1$ always even, therefore $x(y+1)$ is made always even.

Answer is C

18. If d is positive integer, f is the product of the first 30 positive integers, what is the value of d ?

1). 10^d is a factor of f

2). $d > 6$

Answer:

We have 5,10,15,20,25,30 and some 2s to see how many zeros there are in the tail of the result 5×2 , 15×2 contributes 1 zero each

10, 20, 30 \Rightarrow 3 zeros

$25 \times 4 \Rightarrow$ be careful, it contributes 2 zeros

So totally there are $1 \times 2 + 3 + 2 = 7$ zeros in the tails of 30!

For 1, d can be 1,2,3,4,5,6,7

For 2, d can be any integer > 6

Together, d can only be 7 to fulfill both requirements.

Answer is C

19. On a certain sight-seeing tour, the ratio of the number of women to the number of children was 5 to 2. What was the number of men on the sight-seeing tour?

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

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

Answer:

Given woman: children=5:2

1). children: man=5:11, you agree it is insufficient

2). $W < 30$, you also agree it alone is insufficient

Together, $w:c:m = 25:10:22$ (all have to be integers!) thus $w=25$ and $m=22$.

Answer is C

20. The rate of a certain chemical reaction is directly proportional to the square of the concentration of chemical A present and inversely proportional to the concentration of chemical B present. If the concentration of chemical B is increased by 100 percent, which of the following is closest to the percent change in the concentration of chemical A required to keep the reaction rate unchanged?

Answer:

Rate = A^2/B , the question asks how shall A change to cope with a 100% increase of B to make the rate constant.

$(xA)^2/(2B) = A^2/B \Rightarrow x^2=2 \Rightarrow x=1.414 \Rightarrow A$ has to increase to $1.414A$, equivalent to say an increase of approximate 40%

 21. Set S consists of five consecutive integers, and set T consists of seven consecutive integers. Is the median of the numbers in set S equal to the median of the numbers in set T?

- 1). The median of the numbers in set S is 0.
- 2). The sum of the numbers in set S is equal to the sum of the numbers in set T.

Answer:

Set S: $s-2; s-1; s; s+1; s+2$, set T: $t-3; t-2; t-1; t; t+1; t+2; t+3$

According to 2, $5s=7t$, insufficient. S could be 7, t could be 5.

According to 1, $s=0$.

Combining 1 and 2, $s=t=0$

Answer is C

22. A computer chip manufacturer expects the ratio of the number of defective chips to the total number of chips in all future shipments to equal the corresponding ratio for shipments S1, S2, S3 and S4 combined, as shown in the following table. What is the expected number of defective chips in a shipment of 60,000 chips?

Shipment

Number of defective chips in the shipment

Total number of chips in the shipment

S1

2

5,000

S2

5

12,000

S3

6

18,000

S4

4

16,000

a)14 b)20 c)22 d)24 e)25

Answer:

$$(2+5+6+4)/(5000+12000+18000+16000)*60000 = 20$$

Answer is B

23. At a certain bookstore, each notepad costs x dollars and each markers costs y dollars. If \$10 is enough to buy 5 notepads and 3 markers, is \$10 enough to buy 4 notepads and 4 markers instead?

- 1). each notepad cost less than \$1
- 2). \$10 is enough to buy 11 notepads

Answer:

When solve such kind of questions, we just need to know the ratio one price to another price. It is time waste to calculate one by one.

Both two statements do not give the information, as well as their combination.

Answer is E

24. stock number of shares

v 68

w 112

x 56

y 94

z 45

The table shows the number of shares of each of the 5 stocks owned by Mr. Sami. If Mr Sami was to sell 20 shares of Stock X and buy 24 shares of stock y, what would be the increase in range of the number of shares of the 5 stocks owned by Mr Sami?

A.4 B.6 C.9 D.15 E.20

Answer:

Range before transaction:

$$112-45=67$$

Range after transaction:

$$(94+24)-(56-20)=118-36=82$$

The difference is: $82-67=15$

Answer is D

25. 9.4, 9.9, 9.9, 9.9, 10.0, 10.2, 10.2, 10.5

The mean and the standard deviation of the 8 numbers shown are 10 and 0.3, respectively. what percentage of the 8 number's are within 1 standard deviation?

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

Answer:

$10-0.3=9.7$ $10+0.3=10.3$ the number within 1 standard deviation should be between 9.7-10.3 so there are six numbers within 1 standard deviation $6/8=75\%$

Answer is D

26. Of the 800 employees in a certain company, 70% have serviced more than 10 years. A number of y of those who have serviced more than 10 years will retire and no fresh employees join in. When is y if the 10 years employees become 60% of the total employees?

Answer:

let $y=x$, the number of people working more than 10 years=560

$$(560-x)/(800-x)=60\% \Rightarrow x=200$$

27. For all positive integers m , $(m) = 3m$ when m is odd and $(m) = 1/2m$ when m is even, which of the following is equivalent to $(9)*(6)$?

(81), (54), (36), (27), (18)

Answer:

$(9)=27$, $(6)=3$, so, $(9)*(6)=81$

Only (27) equals to 81.

28. 70, 75, 80, 85, 90, 105, 105, 130, 130, 130

The list shown consists of the times, in seconds, that it took each of 10 schoolchildren to run a distance of 400 on of meters. If the standard deviation of the 10 running times is 22.4 seconds, rounded to the nearest tenth of a second, how many of the 10 running times are more than 1 standard deviation below the mean of the 10 running times?

a) one b) two c) three d) four e) five

Answer:

Average=100

1 standard deviation below the mean: less than $100 - 22.4 = 77.6$

Obviously, 70 and 75 can fulfill the requirements.

Answer is B

29. For a finite sequence of nonzero numbers, the number of variations in sign is defined as the number of pairs of consecutive terms of the sequence for which the product of the two consecutive terms is negative. What is the number of variations in sign for the sequence. 1, -3, 2, 5, -4, -6?

Answer:

My understanding is that, the question asks you how many pairs of consecutive terms in the sequence have a negative product.

In the sequence shown, there are three pairs.

Namely, 1 & (-3), (-3) & 2, 5 & (-4)

Answer is 3

30. For which of the following function f is $f(x) = f(1-x)$?

Answer: $f(x) = x^2(1-x)^2$

$f(1-x) = (1-x)^2[1-(1-x)]^2 = (1-x)^2x^2 = f(x)$

31. Does the integer k have a factor p such that $1 < p < k$?

1). $k > 4!$

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

Answer:

For 1, $k > 4! = 24$, it may be 29, 31, ?insufficient

For 2, $k = n!(1 + 13!/n)$, where $2 \leq n \leq 13$, we are sure to find $p = n$ to fulfill the requirement.

Answer is B

32. Is $m + z > 0$

1). $m - 3z > 0$

2). $4z - m > 0$

Answer:

1)+2), we can know that $z > 0$, then, $m > 3z > 0$

Together, $m + z > 0$

Answer is C

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

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

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

Answer:

For 1), $x = 3y^2 + 7y = y(3y + 7)$, x must be a multiple of y

For 2), $x^2 - x = x(x - 1)$ is multiple of y , does not mean that x is a multiple of y . For example:
 $x = 7$, $y = 3$

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

- 1). Jane's payment was credited on the 21st day of the billing cycle.
- 2). The average daily balance through the 25th day of the billing cycle was \$540.

Answer:

Before she made the payment, the average daily balance was \$600, from the day, balance was \$300. When we find in which day she made the payment, we can get it.

Statement 1 is sufficient.

For statement 2, let the balance in x days is \$600, in y days is \$300.

$$X+Y=25$$

$$(600X+300Y)/25=540$$

x=20, y=5 can be solved out.

We know that on the 21 day, she made the payment.

Answer is D

35. The temperatures in Celsius recorder at 6 in the morning in various parts of a certain country were 10,5,-2,-1,-5 and 15

What is the median of these temperatures?

A -2

B -1

C 2

D 3

E 5

Answer:

First, we arrange the 10,5,-2,-1,-5 and 15 at sequence: -5, -2, -1, 5, 10, 15. So, the median is $(-1+5)/2=2$

36. A certain stock exchange designates each stock with a one-, two-, or three-letter code, where each letter is selected from the 26 letters of the alphabet. If the letter may be repeated and if the same letters used in a different order constitute a different code, how many different stocks is it possible to uniquely designate with these codes?

A 2951

B 8125

C 15600

D 15302

E 18278

Answer:

With one letter, 26 stocks can be designated.

With two letters, 26×26 stocks can be designated.

With three letters, $26 \times 26 \times 26$ stocks can be designated.

So, $26 + 26^2 + 26^3$, the units digit is 8.

Answer is E

37. 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

Answer:

Let the cost of each coat be x , the sales price be y . We just want to know what is $20(y-x)$.

For 1, we knew that $20(2y-x)=2400$, insufficient to find $y-x$

For 2, we knew that $20(y+2-x)=440$, we can get $20(y-x)=400$. It's sufficient.

Answer is B

38. Before being simplified, the instructions for computing income tax in Country R were to add 2 percent of one's annual income to the average (arithmetic mean) of 100 units of Country R's currency and 1 percent of one's annual income. Which of the following represents the simplified formula for computing the income tax, in Country R's currency, for a person in that country whose annual income is A ?

A. $50+A/200$

B. $50+3A/100$

C. $50+A/40$

D. $100+A/50$

E. $100+3A/100$

Answer:

$$2\%A + (100 + 1\%A) / 2 = 50 + A/40$$

39. Each employee of Company Z is an employee of either Division X or Division Y, but not both. If each division has some part-time employees, is the ratio of the number of full-time employees to the number of part-time employees greater for Division X than for Company Z?

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

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

Answer:

Let X_f/Y_f is the full time in Division X/Y, and X_p/Y_p is part time in X/Y, X,Y, and Z are number of employees in X, Y, and Z.

$$X = X_f + X_p$$

$$Y = Y_f + Y_p$$

$$Z = X + Y$$

For 1, $Y_f/Y_p < Z_f/Z_p$, as a compensation, X_f/X_p should be greater than Z_f/Z_p

For 2, More than $\frac{1}{2}Z_f$ /less than $\frac{1}{2}$ of the Z_p should be greater than Z_f/Z_p

Answer is D

40. Of the 60 animals on a certain farm, $\frac{2}{3}$ are either pigs or cows. How many of the animals are cows?

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

2). the farm has more than 12 pigs

Answer:

The total number of pigs and cows is 40.

For 1, $C > 2P$

For 2, $P > 12$

Combine 1 and 2, if $P=13$, C is 14; if $P=14$, C is 12, it is impossible.

Answer is C

41. A student worked for 20 days .For each of the amounts shown in the first row of the table, the second row gives the number of days that the students earned that amount. What is the median amount of money that the student earned per day for the 20 days?

Amount earned per day

\$96

\$84

\$80

\$70

\$48

Number of days

4

7

4

3

2

Answer:

Median: the middle measurement after the measurements are ordered by size (or the average of the two middle measurements if the number of measurements is even)

In this question, the median is the average of the amount in 10th and 11th day after ordered by size.

Both the 10th and 11th amounts are \$84, so, the median is \$84

42. The numbers of books read by 7 students last year were 10, 5, p , q , r , 29 and 20. What was the range of the numbers of books read by the 7 students last year?

1). $5 < p < q$

2). $p < r < 15$

Answer:

Range: the difference between the greatest measurement and the smallest measurement.

In the question, combine 1 and 2, we still cannot know the value of q , then, we cannot determine which number of is the greatest measurement.

Answer is E

43. A certain list consists of several different integers .Is the product of all the integers in the list positive?

1). the product of the greatest and the smallest of the integers in the list are positive.

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

Answer:

Statement 1: the greatest number*the least number is positive, means all the numbers should be positive or negative.

All are positive integers, the product of all integers is positive.

All are negative integers, we need to know even or odd the number of the integers is.

From 2, we know the number of the integers is even. Thus, the product is positive.

Answer is C

44. A certain jar contains only B black marbles, W white marbles, and R red marbles, if one marble is to be chosen at random from the jar, is the probability that the marble chosen will be red greater than the probability that marble chosen will be white?

1). $r/(B+W) > w/(B+R)$

2). $B-W > R$

Answer:

We need to know whether $R/(B+W+R) > W/(B+W+R)$. B, W, R are positive, so, we just need to know is $R > W$.

For 1, $R/(B+W) > W/(B+R) \Rightarrow R/(B+W) - W/(B+R) > 0$

$$[R(B+R) - W(B+W)] / (B+W)(B+R) > 0$$

$$(R-W)(R+W+B) / (B+W)(B+R) > 0$$

As $(R+W+B) > 0$, $(B+W)(B+R) > 0$, so, $R-W > 0$.

Statement 1 is sufficient.

For 2, $B-W > R$ is insufficient to determine $R > W$.

Answer is A

45. If $X > Y^2 > Z^4$, which of the following statements could be true?

I. $X > Y > Z$

II. $Z > Y > X$

III. $X > Z > Y$

A. I only

B. I and II only

C. I and III only

D. II and III only

E. I, II, and III

Answer:

Please notice that it says "could be true", not "must be true"

I. $X=1, Y=1/2, Z=1/3$, can fulfill $X > Y > Z$ and $X > Y^2 > Z^4$

II. $Z=1/2, Y=1/3, X=1/4$, can fulfill $Z > Y > X$ and $X > Y^2 > Z^4$

III. $X=1, Z=1/2, Y=1/3$, can fulfill $X > Z > Y$ and $X > Y^2 > Z^4$

Answer is E

46. Score Number and Interval of Scores

50-59 2

60-69 10

70-79 16

80-89 27

90-99 18

The table above shows the distribution of test scores for a group of management trainees, which score interval contains the median of the 73 scores?

A. 60-69

B. 70-79

C. 80-89

D. 90-99

E. It cannot be determined from the information given

Answer:

There are 73 scores, so, $(73+1)/2=37$, the 37th number is the median. It is contained by interval 80-89.

Answer is C

47. If each term in the sum $a_1 + a_2 + a_3 + \dots + a_n$ is either 7 or 77 and the sum is equal to 350, which of the following could equal to n ?

38 39 40 41 42

Answer:

The answer only could be 40

48. A certain library assesses fines for overdue books as follows. On the first day that a book is overdue, the total fine is \$0.10. For each additional day that the book is overdue the total fine is either increased by \$0.30 or double, whichever results in the lesser amount. What is the total fine for a book on the fourth day it is overdue?

A \$0.60 B \$0.70 C \$0.80 D \$0.90 E \$1.00

Answer:

The fine for one day: \$0.1

The fine two days: \$0.2, as it is less than $\$0.1 + \0.3

The fine for three days: \$0.4, as it is less than $\$0.2 + \0.3

The fine for four days: $\$0.4 + \$0.3 = \$0.7$, as it is less than $\$0.4 \times 2$

Answer is B

49. A certain city with population of 132,000 is to be divided into 11 voting districts, and no district is to have population that is more than 10 percent greater than the population of any other district. What is the minimum possible population that the least population district could have?

A 10700 B 10800 C 10900 D 11000 E 11100

Answer:

Let the least one is x . When other 10 populations have the greatest value, x will have the minimum value.

$$x + 10 \times 1.1x = 132000$$

$$x = 11000$$

Answer is D

50. If $xy + z = x(y+z)$, which of the following must be true?

A $x=0$ and $z=0$

B $x=1$ and $y=1$

C $y=1$ and $z=0$

D $x=1$ or $y=0$

E $x=1$ or $z=0$

Answer:

$$xy + z = x(y+z)$$

$$xy + z = xy + xz$$

$$z = xz$$

$$z(x-1) = 0$$

$$x = 1 \text{ or } z = 0$$

Answer is E

51. L spends total \$6.00 for one kind of D and one kind of C. How many D did he buy?

1). the price of 2D was \$0.10 less than the price of 3C

2). the average price of 1 D and 1 C was \$0.35

Answer:

Combine 1 and 2, we can solve out price for C and D, $C = \$0.3$, $D = \$0.4$

To fulfill the total cost \$6.00, number of C and D have more than one combination, for example: 4C and 12D, 8C and 9D...

Answer is E

52. Is $X + Y < 1$

1). $x < 8/9$

2). $Y < 1/8$

Answer:

Since if 1) $x < 8/9$ 2) $Y < 1/8$

$x + y$ could be > 1 , $= 1$ or < 1 .

E is right.

53. If c and d are integers, is C even?

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

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

Answer:

Even=even*even or Even=even*odd

We know that $d+1$ and $d+4$ cannot be even together, and both $c(d+1)$, $(c+2)(d+4)$ are even. Therefore, c or $c+2$ must be even to fulfill the requirement. That is, c must be even.

Answer is C

54. There are eight magazines, including 4 fashion books and 4 sports books. If three books are to be selected at random without replacement, what is the probability that at least one fashion book will be selected?

A. $1/2$ B. $2/3$ C. $32/35$ D. $11/12$ E. $13/14$

Answer:

The probability that none fashion book will be selected is:

$$4/8 * 3/7 * 2/6 = 1/14$$

Then the probability asked is $1 - 1/14 = 13/14$

Answer is E

55. The function f is defined for all positive integers n by the following rule. $f(n)$ is the number of positive integers each of which is less than n and has no positive factor in common with n other than 1. If p is any prime number then $f(p) =$

A $p-1$ B $p-2$ C $(p+1)/2$ D $(p-1)/2$ E 2

Answer:

Because P is a prime number, so, all the positive numbers less than p can fulfill the requirements. The number of these numbers is $p-1$.

Answer is A

56. What is the probability that a number selected from $(-10, -6, -5, -4, -2.5, -1, 0, 2.5, 4, 6, 7, 10)$ can fulfill $(x-5)(x+10)(2x-5)=0$?

A $1/12$ B $1/6$ C $1/4$ D $1/3$ E $1/2$

Answer:

When $x=-10$ or 2.5 , the function is equal to 0.

So, the probability is $\frac{1}{6}$

Answer is B

57. R bought two kinds of candy bars, C and T, that came in packages of 2 bars each. He handed out $\frac{2}{3}$ of C bars and $\frac{3}{5}$ of the T bars. How many packages of C bars did R buy?

- 1). R bought 1 fewer package of C bars than T bars
- 2). R handed out the same number of each kind of candy bars

Answer:

Let the number of C bars be x , the number of T bars be y .

For 1, $y - x = 1$

For 2, $\frac{2}{3}x = \frac{3}{5}y$

Together, we can get $x = 9$, $y = 10$

Answer is C

58. Is the measure of one of the interior angles of quadrilateral ABCD equal to 60 degrees?

- 1). two of the interior angles of ABCD are right angles
- 2). the degree measure of angle ABC is twice the degree measure of angle BCD

Answer:

The figure can fulfill the entire requirement, but there is no any angle that equal to 60.

Answer is E

59. Symbol $*$ denote to be one of the operations add, subtract, multiply, or divide. Is $(6*2)*4 = 6*(2*4)$?

- 1). $3*2 > 3$
- 2). $3*1 = 3$

Answer:

For 1, $3*2>3$, * can be multiply or add, while $(6*2)*4=6*(2*4)$.

For 2, $3*1=3$, * can be multiply or divide. The information cannot determine whether $(6*2)*4=6*(2*4)$.

Answer is A

60. When a coin is tossed 3 times, what is the probability obtaining twice head up?

Answer:

$$(1/2*1/2*1/2)*C3,1=0.375$$

61. The average of 100 numbers is 6, and the standard deviation is D, where D is positive. When added which of the following numbers, the new deviation will be less than D?

A. -6 and 0

B. 0 and 0

C. 0 and 6

D. 0 and 12

E. 6 and 6

Answer:

$$D=\{[(x_1-m)^2+(x_2-m)^2+\dots+(x_n-m)^2]/n\}^{1/2}, \text{ where } m \text{ is the average value.}$$

When 6 and 6 are added in, the numerator remains unchanged, while n changes to n+2. Therefore, the standard deviation declines.

Answer is D

62. Is the hundredth digit of decimal d greater than 5?

1). The tenth digit of 10d is 7

2). The thousandth digit of d/10 is 7

Answer:

Obviously is D

63. If y is an integer and $y = x + |x|$, is $y = 0$?

1). $x < 0$

2). $y < 1$

Answer:

For 1, $x < 0$, $x + |x| = 0$

For 2, $y < 1$, noticed that y is an integer, y only can be 0

Answer is D

64. A cold water tube can fulfill a pool in C hours; a hot water tube can fulfill it in H hours. $C < H$. Two tubes together can fulfill the pool in T hours. Which of the following must be true?

I. $0 < T < H$

II. $C < T < H$

III. $C/2 < T < H/2$

Answer:

$$(1/c + 1/h)T = 1$$

$$T = 1 / (1/c + 1/h)$$

$$\text{As } c < h, \quad c/2 = 1/(2/c) < T = 1/(1/c + 1/h) < 1/(2/h) = h/2$$

Answer is I + III

65. In the fraction x/y , where x and y are positive integers, what is the value of y ?

1). The least common denominator of x/y and $1/3$ is 6

2). $x = 1$

Answer:

$x/y = 1/2$ or $1/6$ both can fulfill the requirement.

Answer is E

66. Whenever Martin has a restaurant bill with an amount between \$10 and \$99, he calculates the dollar amount of the tip as 2 times the tens digit of the amount of his bill. If the amount of Martin's most recent restaurant bill was between \$10 and \$99, was the tip calculated by Martin on this bill greater than 15 percent of the amount of the bill?

- 1). The amount of the bill was between \$15 and \$30
- 2). The tip calculated by Martin was \$8

Answer:

For 1, the tip for a \$15 bill will be \$2, which is less than $15 \times 15\% = 2.25$; the tip for a \$20 will be \$4, which is greater than $15 \times 15\% = 2.25$. Insufficient.

For 2, tip is \$8, means the tens digit of the bill is 4, and the largest possible value of the bill is \$49. $8 > 49 \times 15\% = 7.35$. Sufficient alone.

Answer is B

67. If m and r are two numbers on a number line, what is the value of r ?

- 1). The distance between r and 0 is 3 times the distance between m and 0.
- 2). 12 is halfway between m and r

Answer:

As the following shows, the value of r cannot be determined.

-----0---m(6)-----12-----r(18)-----

--m(-12)---0-----12-----r(36)--

On the other way, r also could be -18 and -36

Answer is E

68. The residents of town x participated in a survey to determine the number of hours per week each resident spent watching television. The distribution of the result of the survey had a mean of 21 hours and a standard deviation of 6 hours. The number of hours of that participated, a resident of town x watching television last week was between 1 and 2 standard deviations below the mean. Which of the following could be the number of hours the participated watched television last week?

- a.30 b.20 c.18 d.12 e.6

Answer:

1 and 2 standard deviations below the mean=>number of the hours at most is $21-6=15$, at least is $21-2*6=9$.

Answer is D

+
x
y
z

4
1
-5
m

e
7
n
10

f
2
-4
5

69. As the table shows, $m+n=?$

Answer:

$$x+4=1, y+4=-5 \Rightarrow x=-3, y=-9, z+4=m$$

$$x+e=7, y+e=n \Rightarrow e=10, n=1, z=0, z+e=10$$

$$z=0 \text{ and } z+4=m, m=4 \Rightarrow m+n=4+1=5$$

70. At a certain college there are twice as many English majors as history majors and three times as many English majors as math majors. What's the ratio of the number of history majors to the number of math majors?

Answer:

$$E=2H$$

$$E=3M$$

$$\text{So, } 2H:3M=1, H:M=3:2$$

71. Six countries in a certain region sent 75 representatives to an international congress, and no two countries sent the same number of representatives. Of the six countries, if country A sent the second greatest number of representatives, did country A send at least 10 representatives?

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

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

Answer:

For 1, country A can send 9 representatives, total number will $9+8+7+6+5+41=76 > 75$.

Answer is E

72. On his drive to work, Leo listens to one of three radio stations A, B, or C. He first turns to A, if A is playing a song he likes, he listens to it; if not, he turns to B. If B is playing a song he likes, he listens to it; if not, he turns to C. If C is playing a song he likes, he listens to it; if not, he turns off the radio. For each station, the probability is 0.3 that at any given moment the station is playing a song Leo likes, on his drive to work, what is the probability that Leo will hear a song he likes?

Answer:

The probability that A is playing a song he likes is 0.3;

The probability that B is playing a song he likes is $0.7 \cdot 0.3 = 0.21$;

The probability that C is playing a song he likes is $0.7 \cdot 0.7 \cdot 0.3 = 0.147$;

So, the total probability is $0.3 + 0.21 + 0.147 = 0.657$

73. At the end of the first quarter, the share price of a certain mutual fund was 20 percent higher than it was at the beginning of the year. At the end of the second quarter, the share price was 50 percent higher than it was at the beginning of the year. What was the percent increase in the share price from the end of the first quarter to the end of the second quarter?

20%; 25%; 30%; 33%; 40%

Answer:

Let the price at the beginning is 1, then at the end of the first quarter, it was 1.2, at the end of the second quarter, it was 1.5.

$$(1.5-1.2)/1.2=25\%$$

Answer is B

74. If $(1/5)^m \cdot (1/4)^{18} = 1/2(10)^{35}$, then $m=?$

Answer:

$$(1/5)^m \cdot (1/4)^{18} = (1/5^m) \cdot (1/2^{36}) = 1/(5^m \cdot 2^{35}) = 1/2(5^m \cdot 2^{35})$$

$$1/2(5^m \cdot 2^{35}) = 1/2(10)^{35}, \text{ means that } 5^m \cdot 2^{35} = 10^{35}.$$

Obviously, m is 35

75. Jack and Mark both received hourly wage increases of 6 percent. After the increases, Jack's hourly wage was how many dollars per hour more than Mark's?

- 1). Before the wage increases, Jack's hourly wage is \$5 per hour more than Mark's
- 2). Before the wage increases, the ratio of the Jack's hourly wage to Mark's hourly wage is 4 to 3.

Answer:

Let their hourly wage are x and y .

Therefore, after the increases, the difference between their wages is $1.06x - 1.06y$

From 1, $x - y = 5$, we can solve out $1.06x - 1.06y$

From 2, $x/y = 4/3$, insufficient.

Answer is A

76. For any triangle T in the xy -coordinate plan, the center of T is defined to be the point whose x -coordinate is the average (arithmetic mean) of the x -coordinates of the vertices of T and whose y -coordinate is the average of the y -coordinates of the vertices of T . If a certain triangle has vertices at the points $(0,0)$ and $(6,0)$ and center at the point $(3,2)$, what are the coordinates of the remaining vertex?

A. $(3,4)$

B. $(3,6)$

C. (4,9)

D. (6,4)

E. (9,6)

Answer:

$$(0+6+x)/3=3, x=3$$

$$(0+0+y)/3=2, y=6$$

Answer is B

77. Circle C and line k lie in the xy-plane. if circle C is centered at the origin and has radius 1, does line k intersect circle C?

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

2). the slope of line k is $-1/10$

Answer is E

78. A manufacturer produced x percent more video cameras in 1994 than in 1993 and y percent more video cameras in 1995 than in 1994. If the manufacturer produced 1,000 video cameras in 1993, how many video cameras did the manufacturer produce in 1995?

1). $xy=20$

2). $x+y+xy/100 = 9.2$

Answer:

Let M be the number of the cameras produced in 1995.

$$[M/(1+y\%)]/(1+x\%)=1000$$

$$M=1000+10x+10y+xy/10$$

Knowing that $x+y+xy/100 = 9.2$, M can be solved out.

Answer is B

79. What fraction of this year's graduation students at a certain college are males?

1). of this year's graduation students, 35% of male and 20% of female transferred from another college.

2). of this year's graduation students, 25% transferred from another college.

Answer:

Let x and y be the numbers of the male and female students.

Combined 1 and 2, $35\%X + 20\%Y = 25\%(X+Y)$

$$10\%X = 5\%Y$$

$$Y = 2X$$

$$X/(X+Y) = X/3X = 1/3$$

Answer is C

80. If y is greater than 110 percent of x , is y greater than 75?

1). $x > 75$

2). $y - x = 10$

Answer:

For statement 1, $x > 75$, then $y > 1.1 \cdot 75 > 75$

For statement 2, $x = 10$, $y = 20$ can fulfill the requirement, but the $y < 75$

Answer is A

81. In the rectangular coordinate system, are the points (r,s) and (u,v) equidistant from the origin?

1). $r+s=1$

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

Answer:

We need to know whether $r^2 + s^2 = u^2 + v^2$ or not.

From statement 2,

$$u^2 + v^2 = (1-r)^2 + (1-s)^2 = r^2 + s^2 + 2 - 2(r+s)$$

Combined statement 1, $r+s=1$, we can obtain that $r^2 + s^2 = u^2 + v^2$.

Answer is C.

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

6 8 10 14 16

Answer: 10

83. When positive integer n is divided by 3, the remainder is 2; and when positive integer t is divided by 5, the remainder is 3. What is the remainder when the product nt is divided by 15?

1). $n-2$ is divisible by 5

2). t is divisible by 3

Answer:

According to the information given, $n=3k+2$. Combined statement 1, $n-2=5m$, that is $n=5m+2$, we can obtain $n=15p+2$.

According to the information given, $t=5s+3$. Combined statement 2, t is divisible by 3, we can obtain $t=15q+3$.

$nt=(15p+2)(15q+3)=(15^2)pq+45p+30q+6$, when divided by 15, the remainder is 6.

Answer is C

84. In the x - y plane, what is the y -intercept of the line l ?

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

2). The x -intercept of line l is $-1/3$

Answer:

$$y=kx+b$$

1). $k=3b$

2). $-b/k=-1/3 \Rightarrow k=3b$

So, answer is E

85. A circular jogging track forms the edge of a circular lake that has a diameter of 2 miles, Johanna walked once around the track at the average rate of 3 miles per hour. If t represents the number of hours it took Johanna to walk completely around the lake, which of the following is a correct statement?

$0.5 < t < 0.75$; $1.75 < t < 2.0$; $2.0 < t < 2.5$; $2.5 < t < 3.0$

Answer:

The circumference of the lake is 2π , so, $t = 2\pi/3 = 6.28/3 = 2.07$.

Answer is $2.0 < t < 2.5$

86. In a certain deck of cards, each card has a positive integer written on it. In a multiplication game, a child draws a card and multiplies the integer on the card by the next larger integer. If each possible product is between 15 and 200, then the least and greatest integers on the cards could be

3 and 15; 3 and 20; 4 and 13; 4 and 14

Answer:

If the least number was 3, then $3 \cdot 4 = 12 < 15$, does not fulfill the requirement. So, the least number is 4.

If the greatest number is 14, then $14 \cdot 15 = 210 > 200$, does not fulfill the requirement.

So, answer is "4 and 13"

87. 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

Answer:

From statement 1, $p/4 = n$, n is prime number, could be 2, 3, 5, 7, 11, ... insufficient.

From statement 2, $p/3 = n$, n is an integer, could be 1, 2, 3, 4, 5, ... insufficient.

Combined 1 and 2, only when $p = 12$ can fulfill the requirement.

Answer is C.

88. In a certain conference room each row of chairs has the same number of chairs, and the number of rows is 1 less than the number of chairs in a row. How many chairs are in a row?

1). There is a total of 72 chairs.

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

Answer:

Let number of rows is a, number of the chairs in a row is b.

So, $b - a = 1$

From 1, $ab = 72$, $a = 8$, $b = 9$, sufficient alone.

From 2, $2b - 1 = 17$, $b = 9$, sufficient alone.

Answer is D.

89. A thin piece of wire 40 meters long is cut into two pieces. One piece is used to form a circle with radius r , and the other is used to form a square. No wire is left over. Which of the following represents the total area, in square meters, of the circular and the square regions in terms of r ?

Answer:

The area of the circle is πr^2

The wire for the square is $40 - 2\pi r$, so, the side length of the square is $(40 - 2\pi r)/4 = (10 - \frac{1}{2}\pi r)$, area of the square is $(10 - \frac{1}{2}\pi r)^2$

Total area is $\pi r^2 + (10 - \frac{1}{2}\pi r)^2$

90. A furniture dealer purchased a desk for \$150 and then set the selling price equal to the purchase price plus a markup that was 40 percent of the selling price. If the dealer sold the desk at the selling price, what was the amount of the dealer's gross profit from the purchase and the sale of the desk?

\$40; \$60; \$80; \$90; \$100

Answer:

$(150 + \text{profit}) * 40\% = \text{profit}$

So, the profit is \$100

91. 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

Answer:

$1^2 + 5^2 + 7^2 = 75$, so the sum of these 3 integers is 13.

Is there any other better ways?

92. Is $x - y + 1$ greater than $x + y - 1$?

1) $x > 0$

2) $y < 0$

Answer:

$x - y + 1 - (x + y - 1) = 2 - 2y$, we just need to know the situation of y .

From statement 2, we know that $y < 0$, so, $2 - 2y > 0$

Answer is B

93. An integer greater than 1 that is not prime is called composite. If the two-digit integer n is greater than 20, is n composite?

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

2). the tens digit of n is 2.

Answer:

Let tens digit of n be x , units digit could be kx

Then, $n = 10x + kx = x(10 + k)$

$n > 20$, then $x > 2$, n contains at least two nonzero factors x and $10 + x$.

Statement 2 alone is insufficient.

Answer is A

94. A boat traveled upstream a distance of 90 miles at an average speed of $(V - 3)$ miles per hour and then traveled the same distance downstream at an average of $(V + 3)$ miles per hour. If the trip upstream took half an hour longer than the trip downstream, how many hours did it take the boat to travel downstream?

Answer:

$$90 / (v + 3) - 90 / (v - 3) = 0.5$$

$$v = 33$$

$$\text{So, } t = 90 / 36 = 2.5$$

95. If n is a multiple of 5 and $n = p^2q$, where p and q are prime numbers, which of the following must be a multiple of 25?

p^2 ; q^2 ; pq ; p^2q^2 ; p^3q

Answer:

p^2q is a multiple of 5, only can ensure that pq is a multiple of 5.

So, only $(pq)^2$ can surely be a multiple of 25.

96. If x is an integer, is $(x^2 + 1)(x + 5)$ an even number?

1). x is an odd number.

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

Answer:

Statement 1 alone is sufficient.

Statement 2 means that the units digit of x^2 cannot be 2, 4, 5, 6, 8, and 0, only can be 1, 3, 7, 9. Then, the units digit of x must be odd, and $(x^2+1)(x+5)$ must be even.

Answer is D

97. If n is a positive integer and r is the remainder when $(n-1)(n+1)$ is divided by 24, what is the value of r ?

1). n is not divisible by 2

2). n is not divisible by 3

Answer:

To resolve such questions, at first we must find a general term for the number.

Usually, general term is in the following form:

$S = Am + B$, where A and B are constant numbers.

How to get A and B ?

A is the least multiple of A_1 and A_2 ; B is the least possible value of S that let $S_1 = S_2$.

For example:

When divided by 7, a number has remainder 3, when divided by 4, has remainder 2.

$$S_1 = 7A_1 + 3$$

$$S_2 = 4A_2 + 2$$

The least multiple of A_1 and A_2 is 28; when $A_1 = 1$, $A_2 = 2$, $S_1 = S_2$ and have the least value of 10.

Therefore, the general term is: $S = 28m + 10$

Back to our question:

1). $n = 2k + 1$

2). $n = 3s + 1$ or $3s + 2$

Combine 1 and 2, $n = 6m + 1$ or $n = 6m + 5$ ($n = 6m - 1$)

So, $(n-1)(n+1) \div 6m(6m+2) = 12m(3m+1)$. Because $m \cdot (3m+1)$ must be even, then

$12m(3m+1)$ must be divisible by 24, the remainder r is 0

Or, $(n-1)(n+1) \div \frac{1}{2}(6m-2)6m = 12m(3m-1)$. Result is the same.

Answer is C

98. 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

Answer:

In order to solve the question easier, we simplify the numbers such as 150, 000 to 15, 130,000 to 13, and so on.

I. Median is 13, so, the greatest possible value of sum of eight prices that no more than median is $13 \cdot 8 = 104$. Therefore, the least value of sum of other seven homes that greater than median is $(15 \cdot 15 - 104) / 7 = 17.3 > 16.5$. It's true.

II. According the analysis above, the price could be, 13, 13, 13, 13, 13, 13, 13, 17.3, 17.3, 17.3... So, II is false.

III. Also false.

Answer: only I must be true.

Median:

If the number of the numbers in a list is odd, the median is exactly the middle number.

For example, median of 1, 2, 3, 4, 5 is 3.

If the number of the numbers in a list is even, the median is the average of two middle numbers. For example, median of 1,2,3,4 is $5/2$.

99. 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.

Answer:

Statement 1 is obviously insufficient

Statement 2, let Friday be x . To obtain the least value of x , the other five days should be, $x-1$, $x-2$, $x-3$, $x-4$, $x-5$

So, $38+x+x-1+x-2+x-3+x-4+x-5=90$

$6x=67$

$x=67/6 > 11$

100. Is W greater than 1?

1). $W + 2 > 0$

2). $W^2 > 1$

Answer:

1. $w > -2$, insufficient.

2. $w > 1$ or $w < -1$, insufficient.

1+2, $W > 1$ or $-2 < w < -1$, still insufficient.

Answer is E

101. 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.

Answer:

Let attend fee be x , number of person be y :

Form 1, $(x-0.75)(y+100)=xy$ ---- $100x-0.75y-75=0$

From 2, $(x+1.5)(y-100)=xy$ ---- $100x+1.5y-150=0$

Combine 1 and 2, we can get specific value of x and y .

Answer is C

102. The perimeter of a certain isosceles right triangle is $16+16\sqrt{2}$, what is the length of the hypotenuse of the triangle?

Answer:

Let the hypotenuse be x , then the length of the leg is $x/\sqrt{2}$.

$$x + 2x/\sqrt{2} = 16 + 16\sqrt{2}$$

$$x + \sqrt{2}x = 16 + 16\sqrt{2}$$

So, $x = 16$

103. If Bob produces 36 or fewer in a week, he is paid X dollars per item. If Bob produces more than 36 items, he is paid X dollars per item for the first 36 items, and $3/2$ times that amount for each additional item. How many items did Bob produce last week?

- 1). Last week Bob was paid total of \$480 for the items that he produced that week.
- 2). This week produced 2 items more than last week and was paid a total of \$510 for the item that he produced this week.

Answer:

Combined 1 and 2, three situations need to be studied:

----Last week+this week < 36 , then $x = (510 - 480)/2 = 15$, the number of the items is $480/15 = 32$

----Last week $= 35$, then $x = 480/35 = 160/7$. Or x can be resolved in the way:

$x = (510 - 480)/(1 + 3/2) = 12$, two result are conflict.

----Last week ≥ 36 , then $x = 30/(2 \cdot 3/2) = 10$. The number of the items more than 36 $= (480 - 36 \cdot 10)/20 = 6$, so, total number is $36 + 6 = 42$

Above all, answer is E

104. 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 $1/5$ taller than it was at the end of 4th year. By how many feet did the height of the tree increase each year?

$3/10, 2/5, 1/2, 2/3, 6/5$

Answer:

Let x be the height of the tree increase each year, then:

$$[4 + 6x - (4 + 4x)] / (4 + 4x) = 1/5$$

$$10x = 4 + 4x$$

$$x = 2/3$$

105. At least 10 percent of the people in Country X who are 65 year old or older employed?

1). In country X, 11.3 percent of the population is 65 year old or older

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

Answer:

Obviously, $20\% \text{men} + 10\% \text{women} > 10\%(\text{men} + \text{women})$.

Answer is B

106. If $5^{21} * 4^{11} = 2 * 10^n$, what is the value of n?

A, 11, b, 21, c 22, d, 23 e 32

$5^{21} * 4^{11}$ can be expressed at the format $2 * 10^n$, $5^{21} * 4^{11} = 5^{21} * 2^{22} = 2 * 10^{21}$.

So, $n=21$

107. A certain junior class has 1000 students and a certain senior class has 800 students. Among these students, there are 60 siblings pairs each consisting of 1 junior and 1 senior. If 1 student is to be selected at random from each class, what is the probability that the 2 students selected will be a sibling pair?

A, $3/40000$, B $1/3600$, C. $9/2000$, D, $1/60$, E, $1/15$

Answer:

$$(60/1000) * (1/800) = ((60/800) * (1/1000)) = 3/40000$$

Please notice that, the question is "will be a sibling pair", so, answer is not:

$$(60/1000) * (60/800) = 9/2000$$

108. ----r---- s---- t---

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

1). s is to the right of zero

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

Answer:

$$\text{From 2, } |t-r| = |t-(-s)| = |t+s|.$$

From 1, we know that $s > 0$, so $t + s > 0$; t is to the right of r , so $t - r > 0$.

Combine 1 and 2, $t + s = t - r \Rightarrow s = -r \Rightarrow s + r = 0$. Zero is halfway between r and s .

Answer is C

109. For any positive integer n , the length of n is defined as number of prime factors whose product is n . For example, the length of 75 is 3, since $75 = 3 \cdot 5 \cdot 5$. How many two-digit positive integers have length 6?

0, 1, 2, 3, 4

Answer:

The least prime number is 2. We notice that $2^6 = 64$ and $2^5 \cdot 3 = 96$. Any 2 combined, the number will be greater than 100. So, only 64 and 96 fulfill the requirement.

So, answer is 2.

110. If n is a positive integer and r is the remainder when $n^2 - 1$ is divided by 8, what is the value of r ?

1). n is odd

2). n is not divisible by 8

Answer:

1). N is odd, then $n = 2k + 1$, $n^2 - 1 = (2k + 1)^2 - 1 = 4k^2 + 4k = 4k(k + 1)$. One of k and $k + 1$ must be even, therefore, $4k(k + 1)$ is divisible by 8.

Answer is A

111. If m and n are integers, is m odd?

1). $m + n$ is odd

2). $m + n = n^2 + 5$

Answer:

Statement 1, m and n could be both odd or one odd, one even. Insufficient.

Statement 2, when n is odd, $n^2 + 5$ is even, then $m + n$ is even, m is odd; when n is even, $n^2 + 5 = \text{odd}$, $m + n$ is odd, then m is odd. Sufficient.

So, answer is B

112. 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

Answer:

To get the maximum length of the shortest piece, we must let other values as little as possible.

That is, the values after the median should equal the median, and the value before the median should be equal to each other.

Let the shortest one be x:

$$x+x+140*3=124*5$$

$$x=100$$

113. A certain city with a population of 132000 is to be divided into 11 voting districts, and no district is to have a population that is more than 10 percent greater than the population of any other district. What is the minimum possible population that the least populated district could have?

$$\text{Answer: } 132000 / (1*1 + 1.1*10) = 11,000$$

114. The residents of Town X participated in a survey to determine the number of hours per week each resident spent watching TV. The distribution of the results of the survey had a mean of 21 hours and a standard deviation of 6 hours. The number of hours that Pat, a resident of Town X, watched TV last week was between 1 and 2 standard deviations below the mean. Which of the following could be the number of hours that Pat watched TV last week?

30; 20; 18; 12; 6

Answer:

One standard deviation is 6, then 1 and 2 standard deviations below the mean:

Between $(21 - 2*6)$ and $21 - 6 \Rightarrow$ between 9 and 15.

Answer is 12.

115. $2+2+22+23+24+25+26+27+28=?$

Answer:

$2+2^2+2^3+2^4+2^5+2^6+2^7+2^8$ is a geometric progression

$$S = (A_1 + A_n \cdot q) / (1 - q) = 2 + 2^9$$

$$2 + S = 2^9$$

116. Set A, B, C have some elements in common. if 16 elements are in both A and B, 17 elements are in both A and C, and 18 elements are in both B and C, how many elements do all three of the sets A, B, and C have in common?

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

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

Answer:

Statement 1 is sufficient.

For 2, $I = A + B + C - AB - AC - BC + ABC$, we know A, B, C, AB, AC, BC, but we don't know I, so, ABC cannot be resolved out.

Answer is A

117. Each of the 25 balls in a certain box is either red, blue, or white and has a number from 1 to 10 painted on it. If one ball is to be selected at random from the box, what is the probability that the ball selected will either be white or have an even number painted on it?

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

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

Answer:

$$P(\text{white} + \text{even}) = P_w + P_e - P(w \& e)$$

From 1, we know that $P(w \& e)$

From 2, we know that $P_w - P_e = 0.2$.

But we still don't know what is $P_w + P_e$, so answer is E

118. Bobby bought two shares of stock, which sold for \$96 each. If he had a profit of 20 percent on the sale of one of the shares but a loss of 20 percent on the sale of the other share, then on the sale of both shares combined Bobby had

- A. a profit of \$10
- B. a profit of \$8
- C. a loss of 8
- D. a loss of 10
- E. neither profit nor loss

Answer:

The profit is sale price-cost

For one stock, $(\text{sale price}-\text{cost})/\text{cost}=20\%$, its cost is $96/1.2=80$

For the other stock, $(\text{sale price}-\text{cost})/\text{cost}=-20\%$, cost is $96/0.8=120$

Then, the total profit for the two stocks is:

$$96-80+96-120=-8$$

Answer is C

119. If ab is not 0 and points $(-a,b)$ and $(-b,a)$ are in the same quadrant of the xy -plane, is point $(-x,y)$ in this same quadrant?

1). $xy>0$

2). $ax>0$

Answer:

Firstly, we assume that $a*b>0$. Let $a=1$, $b=2$, then $(-a,b)=(-1,2)$, $(-b,a)=(-2,1)$, the two point are in the second quadrant.

From 2), $ax>0$, x and a are both positive or both negative, as well as the $-x$ and $-a$.

From 1), $xy>0$, x and y are both positive or both negative, while $-x$ and y are different.

Above all, point $(-a,b)$ and $(-x,y)$ are in the same quadrant.

Then we assume that $a*b<0$. Let $a=1$, $b=2$, then $(-a,b)=(-1,2)$, $(-b,a)=(-2,-1)$, in different quadrant. This is conflict to the question, need no discussion.

Answer is C

120. To celebrate a colleague's retirement, the T coworkers in an office agreed to share equally the cost of a catered lunch. If the lunch cost a total of x dollars and S of the coworkers fail to pay their share, which of the following represents the additional amount, in dollars, that each of the remaining coworkers would have to contribute so that the cost of the lunch is completely paid?

Answer:

In the origin plan, each one should pay X/T .

Actually, each of the remaining coworkers paid $X/(T-S)$.

Then, $X/(T-S) - X/T = S \cdot X / T(T-S)$

121. In the figure shown, point $P(-\sqrt{3}, 1)$ and $Q(s, t)$ lie on the circle with center O . What is value of s ?

Answer:

Slope of line OP is $-1/\sqrt{3}$ and slope of OQ is t/s , so $(t/s) \cdot (-1/\sqrt{3}) = -1, t = \sqrt{3}s$

$OQ = OP = 2, t^2 + s^2 = 4$

Combined above, $s = +/\sqrt{3} \Rightarrow s = 1$

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

32, 37, 40, 43, 50

Answer:

Prior to median 25, there are 7 numbers.

To make the greatest number as greater as possible, these 7 numbers should cost the range as little as possible. They will be, 24, 23, 22, 21, 20, 19, 18.

So, the greatest value that can fulfill the range is: $18 + 25 = 43$

123. If n and t are positive integers, what is the greatest prime factor of nt ?

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

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

Answer:

1). $n=k_1*5; t=k_2*5$ (k_1, k_2 are natural numbers), $n*t=k_1*k_2*5^2$. k_1 and k_2 are unknown, thus, we cannot obtain the greatest prime factor of nt .

2). $105=1*3*5*7$.

The least common multiple of n and t is 105 \Rightarrow the greatest value of n and t is 105, and the other one must be less than 105 and be composed with numbers of 1, 3, 5, 7.

So, the greatest prime factor is 7

Answer is B

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

1). $n+1>0$

2). $np>0$

Answer:

From 1, $n+1>0$, $n>-1$. n is an integer, so, $n\geq 0$

From 2, $np>0$.

Combined 1 and 2, $p>0$

Answer is C

125. The number x and y are not integers, the value of x is closest to which integer?

1). 4 is the integer that is closest to $x+y$

2). 1 is the integer that is closest to $x-y$

Answer:

1). $3.5<x+y<4.5$

2). $0.5<x-y<1.5$

Combined 1 and 2, $4<2x+6\leq 2x+3$. We know that x is not an integer, then, we cannot determine the specify value of x .

Answer is E

126.

7.51 8.22 7.86 8.36

8.09 7.83 8.30 8.01

7.73 8.25 7.96 8.53

A vending machine is designed to dispense 8 ounces of coffee into a cup. After a test that recorded the number of ounces of coffee in each of 1,000 cups dispensed by the vending machine, the 12 listed amounts, in ounces, were selected from the data. If the 1,000 recorded amounts have a mean of 8.1 ounces and a standard deviation of 0.3 ounce, how many of the 12 listed amounts are within 1.5 standard deviations of the mean?

Answer:

mean 8.1

standard deviation 0.3

Within 1.5 standard deviations of the mean = $[8.1 - 0.3 \cdot 1.5, 8.1 + 0.3 \cdot 1.5] = [7.65, 8.55]$

All the numbers except 7.51 fall within such interval

Answer is 11

127. Which of the following inequalities has a solution set that when graphed on the number line, is a single segment of finite length?

A. $x^4 \geq 1$

B. $x^3 \leq 27$

C. $x^2 \geq 16$

D. $2 \leq |x| \leq 5$

E. $2 \leq 3x + 4 \leq 6$

Answer:

A. $x^4 \geq 1 \Rightarrow (x^4 - 1) \geq 0 \Rightarrow (x^2 - 1)(x^2 + 1) \geq 0 \Rightarrow (x + 1)(x - 1)(x^2 + 1) \geq 0$

$(x^2 + 1) > 0$, so $(x + 1)(x - 1) \geq 0 \Rightarrow x < -1, x > 1$

B. $x^3 \leq 27 \Rightarrow (x^3 - 3^3) \leq 0 \Rightarrow (x-3)(x^2+3x+3^2) \leq 0$, with $d=b^2-4ac$ we can know that (x^2+3x+3^2) has no solution, but we know that $(x^2+3x+3^2) = [(x+3/2)^2 + 27/4] > 0$, then, $(x-3) \leq 0$, $x \leq 3$

C. $x^2 \geq 16$, $[x^2 - 4^2] \geq 0$, $(x-4)(x+4) \geq 0$, $x > 4, x < -4$

D. $2 \leq |x| \leq 5$, $2 \leq |x|$, $x \geq 2$, or $x \leq -2$

So, answer is E

128. In May Mr. Lee's earnings were 60 percent of the Lee family's total income. In June Mr. Lee earned 20 percent more than in May. If the rest of the family's income was the same both months, then, in June, Mrs. Lee's earnings were approximately what percent of the Lee Family's total income?

Answer:

$$60\% * 120\% / (40\% + 60\% * 120\%) = 64\%$$

129. If n is a positive integer and r is the remainder when $4+7n$ is divided by 3, what is the value of r ?

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

2). $n > 20$

Answer:

$$4+7n = 3+3n+3n+1+n = 3(1+n)+3n+(1+n)$$

From 1), $n+1$ is divisible by 3, then $4+7n$ is divisible by 3. Thus, $r=0$

Answer is A

130. In the figure above, what is the ratio KN/MN ?

1). the perimeter of the rectangle KLMN is 30 meters.

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

Answer:

2). three rectangles have the same dimensions means that they are congruent.

$$\text{Thus, } KN/MN = KN/(MB+BN) = KN/(KN+KN/2) = 2/3$$

Answer is B

131. 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.

A. 72th

B. 80th

C. 81th

D. 85th

E. 92th

Answer:

Amy was the 90th percentile of the 80 grades for her class, therefore, 10% are higher than Amy's, $10\% \cdot 80 = 8$.

19 of the other class was higher than Amy. Totally, $8 + 19 = 27$

Then, the percentile is:

$$(180 - 27) / 180 = 85 / 100$$

Answer is D

132. If n is a positive integer less than 200 and $14n/60$ is an integer, then n has how many different positive prime factors?

A. two

B. three

C. five

D. six

E. eight.

Answer:

$14n/60$ is an integer, then $n = 30 \cdot k$, $k = 1, 2, \dots, 6$

30 has 3 prime factors, 2, 3, and 5.

k is from 1 to 6, at most contains 2,3 and 5.

Above all, 30k has three different positive prime factors: 2, 3, and 5

Answer is B

133. In 1999 company X's gross profit was what percent of its revenue?

- 1). In 1999 company X's gross profit was $\frac{1}{3}$ of its expenses.
- 2). In 1999 company X's expenses were $\frac{3}{4}$ of its revenue.

Answer:

We know that: revenue=gross profit + expense

- 1). Revenue= $\frac{1}{3}$ expense+expense= $\frac{4}{3}$ expense, gross profit is $\frac{1}{4}$ of its revenue.
- 2). Gross profit=revenue -Cexpense= $\frac{1}{4}$ revenue, gross profit is $\frac{1}{4}$ of its revenue.

Answer is D

134. The positive integers x, y and z are such that x is a factor of y and y is a factor of z. Is z even?

- 1). xz is even
- 2). y is even

Answer:

- 1). xy is even, means that x or z is even. If x is even, then y is even, then z is even.

Statement 1 is sufficient.

- 2). Y is even then z is even.

Answer is D

135. If r is the remainder when integer n is divided by 7, what is the value of r?

- 1). When n is divided by 21, the remainder is an odd number
- 2). When n is divided by 28, the remainder is 3

Answer:

- 1). n could be 22,24, 26, ...insufficient
- 2). $n=28K+3$, then $(28K+3)/7$, the remainder is 3

Answer is B

136. Did one of three members of a certain team sell at least 2 raffle tickets yesterday?

- 1). The three members sold a total of 6 raffle tickets yesterday.
- 2). No two of the three members sold same number of raffle tickets yesterday.

Answer:

- 1) is sufficient.
- 2). No two members sold same number of tickets; the least numbers of the tickets they sold would be 0, 1, 2.

Answer is D

137. Henry purchased 3 items during a sale. He received a 20 percent discount off the regular price of the most expensive item of a 10 percent discount off the regular price of each of the other 2 items. Was the total discount of these three items greater than 15 percent of the sum of the regular prices of the 3 items?

- 1). The regular price of the most expensive item was \$50, and the regular price of the next most expensive item was \$20
- 2). The regular price of the least expensive item was \$15

Answer:

- 1). The discount of the most expensive item was $20\% \cdot 50 = \$10$, the discount of the next expensive item was $10\% \cdot 20 = 2$

let the regular price of the other item is x , then $x \leq 20$ and discount is $10\%x$

So, total discount is $10+2+0.1X$, sum of the regular price is $50+20+X$

Then, total discount/sum of the regular prices was:

$$(12+0.1x)/(70+x) = (7+0.1X+5)/(70+x) = 0.1+5/(70+x)$$

We know that $0 < X \leq 20$, so, $1/18 \leq 5/(70+x) < 1/14$

Then, $(12+0.1x)/(70+X) \geq 0.1+1/18 = 7/45 > 0.15$

2) is insufficient.

Answer is D

138. For any integer k from 1 to 10, inclusive, the k th of a certain sequence is given by $[(-1)^{(k+1)}] \cdot (1/2^k)$. If T is the sum of the first 10 terms of the sequence, then T is:

- A. greater than 2
- B. between 1 and 2
- C. between $1/2$ and 1
- D. between $1/4$ and $1/2$
- E. less than $1/4$

Answer:

$$T = 1/2 - 1/2^2 + 1/2^3 - \dots - 1/2^{10}$$

$$= 1/4 + 1/4^2 + 1/4^3 + 1/4^4 + 1/4^5$$

Notice that $1/4^2 + 1/4^3 + 1/4^4 + 1/4^5 < 1/4$, we can say that $1/4 < T < 1/2$.

Answer is D

139. 5 people are to be seated around a circular table. Two seating arrangement are considered different only when the positions of the people are different relative to each other. What is the total number of different possible seating arrangements for the group?

Answer:

When solve such circular permutation questions, we just count one element less than the line permutation question.

The answer is $P_{4,4} = 24$

140. Is Z equal to the median of the 3 positive integers X, Y, Z ?

- 1). $X < Y + Z$
- 2). $Y = Z$

Answer:

- 1). $1 < 2+3$, or $1 < 3+2$ can fulfill the requirements. We cannot determine whether z is the median or not.

- 2). $Y=Z$, then $y=z < x$, or $y=z > x$. For any situations, z is equal to the median of x, y, z .

Answer is B

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

1). k is prime.

2). $k=7$

Answer:

1). k is prime, $20k=2^2 \cdot 5 \cdot k$, k could be 2, 5, or other prime, so, number of the different prime factors of $20k$ can not be determined.

2). $k=7$, $20k=2^2 \cdot 5 \cdot 7$, has 3 different prime factors.

Answer is B

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

1). $Y > 0.15$

2). $C \geq 7.30$

Answer:

"one kilogram of a certain coffee blend consists of X kilogram of type I and Y kilogram of type II" means that $X+Y=1$

Combined $C=6.5X+8.5Y$, we get:

$$X=(8.5-C)/2, Y=(C-6.5)/2$$

$$\text{Combined } C \geq 7.3, X=(8.5-C)/2 < 1.2/2=0.6$$

Answer is B

143. Tanya prepared four different letters to be sent to four different addresses. For each letter, she prepared an envelope with its correct address. If the 4 letters are to be put into the envelopes at random, what is the probability that only one letter will be put into the envelope with its correct address?

Answer:

$$(C4,1 \cdot C2,1) / P44 = 1/3$$

C4,1: firstly, there are four chances for a letter is put into the correct envelope.

C2,1: secondly, there are two chances for a letter is put into the incorrect envelope.

Then, there is only one choice to put a letter into the incorrect envelope in the third and fourth time.

144. A certain business company produced x rakes each month from November through February and shipped $x/2$ at the beginning of each month from March through October. The business paid no storage cost for the rakes from November through February, but it paid storage costs of \$0.10 per rake each month from March through October for the rakes had not been shipped. In terms of x , what was the total storage cost, in dollars, that the business will paid for the rakes for the 12 months from November through October?

Answer:

The business produced a total of $4x$ rakes from November through February. The storage situations were shown in the following table:

So, the total cost is $14X \cdot 0.1 = 1.4X$

Month

Mar.

Apr.

May

June

July

Aug.

Sept.

Oct.

Total

Storage

$7x/2$

$3x$

$5x/2$

$2x$

$3x/2$

x

$x/2$

0

$14x$

145. The figure shows the top side of a circular medallion made of a circular piece of colored glass surrounded by a metal frame, represented by the shaded region. If the radius of the medallion is r centimeter and width of the metal frame is s centimeter, then, in terms of r and s , what is the area of the metal frame, in square centimeter?

Answer:

The area of the large circle is πr^2

The area of the large circle is $\pi(r-s)^2$

Then the area of the shade region:

$$\pi r^2 - (\pi r^2 - 2\pi rs + \pi s^2)$$

$$= 2\pi rs - \pi s^2$$

146. x and y are positive integers such that $x = 8y + 12$, what is the greatest common divisor of x and y ?

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

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

Answer:

From 1: $12u = 8y + 12 \Rightarrow 3u = 2y + 3$ (inconclusive)

From 2: $x = 12(8z + 1) \Rightarrow x = 12 \cdot \text{an odd number}$

Given $y = 12z \Rightarrow$ the greatest common divisor between z and $(8z + 1)$ is 1 \Rightarrow the greatest common divisor between x and y is 12

Answer is B

147. Is the measure of one of the interior angles of quadrilateral ABCD equal to 60 degrees?

1). Two of the interior angles of ABCD are right angles

2). The degree measure of angle ABC is twice the degree measure of angle BCD

Answer:

$$\text{Sum of 4 angles} = (n - 2) \cdot 180 = 360$$

From 1: sum of the remaining angles are $360 - 2 \cdot 90 = 180$

From 2: either $x + 2x = 180 \Rightarrow x = 60$

Or $x = 90/2 = 45$ and $y = 180 - 45 = 135$.

Answer is E

148. On the number line above, the segment from 0 to 1 has been divided into fifths, as indicated by the large tick marks, and also into sevenths, as indicated by the small tick marks. What is the least possible distance between any two of the tick marks?

Answer:

$1/5, 2/5, 3/5, 4/5 \Rightarrow 7/35, 14/35, 21/35, 28/35$

$1/7, 2/7, 3/7, 4/7, 5/7, 6/7 \Rightarrow 5/35, 10/35, 15/35, 20/35, 25/35, 30/35$

It is easy to find that the least distance between any two of the marks is $1/35$

149. Working alone at its own constant rate, a machine seals k cartons in 8 hours, and working alone at its own constant rate, a second machine seals k cartons in 4 hours. If the two machines, each working at its own constant rate and for the same period of time, together sealed a certain number of cartons, what percent of the cartons were sealed by the machine working at the faster rate?

Answer:

$1/4 / (1/4 + 1/8) = 2/3$

150. Marta bought several pencils. If each pencil was either a 23-cent pencil or a 21-cent pencil, how many 23-cent pencils did Marta buy?

1). Marta bought a total of 6 pencils.

2). The total value of the pencils Marta bought was 130 cents.

Answer:

It was somewhat tricky.

Usually, we need two equations to solve two variables.

For example, in this question, from 1, $x=y=6$, from 2, $21x+23y=130$, the answer should be C.

Actually, the variables in such questions should be integers. Thus, hopefully, we can solve them with only one equation.

$21x + 23y = 130$, we try $x = 1, 2, 3, 4, 5$..and find that only $x = 4, y = 2$ can fulfill the requirements. Answer is B.

To sum up, please be careful when you met such questions.

151. Juan bought some paperback books that cost \$8 each and hardcover books that \$25 each. If Juan bought more than 10 paperback books, how many hardcover books did he buy?

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

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

Answer:

More than 10 Paperback books, at least is 11, and cost at least \$88

From 1, $150/25 = 6$, at least 6 hardcover books.

From 2, $260 - 150 - 88 = 22$, is not enough to buy a hardcover book.

Combined 1 and 2, we know that Juan bought 6 hardcover books.

Answer is C

152. What is the greatest prime factor of $4^{17} - 2^{28}$?

Answer:

$$4^{17} = (2^2)^{17} = 2^{34}$$

$$2^{34} - 2^{28} = 2^{28}(2^6 - 1) = 2^{28} \cdot 63 = 2^{28} \cdot 7 \cdot 3^2$$

Answer is 7

153. In the xy-plane, line k has positive slope and x-intercept 4. If the area of the triangle formed by line k and the two axes is 12, what of the y-intercept of line k?

Answer:

The two intersections: (0,4) and (y, 0)

$$\text{So, } 4 \cdot y / 2 = 12 \Rightarrow y = 6$$

Slope is positive \Rightarrow y is below the x-axis \Rightarrow y = -6

154. Is the positive integer J divisible by a greater number of different prime numbers than the positive integer k?

1). J is divisible by 30

2). $k=1000$

Answer:

1) $J = 2 * 3 * 5 \Rightarrow$ J has 3 different prime factors, insufficient.

2) $K = 2^3 * 5^3 \Rightarrow$ K has 2 different prime factors, insufficient.

$1 + 2 \Rightarrow$ J has more different prime factors

Answer is C

155. How much time did it take a certain car to travel 400 kilometers?

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

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

Answer:

1). Insufficient, no idea about the car's speed for the next 200 kms

2) $(\text{Actual speed} + 20) * (\text{actual time} - 1 \text{ hour}) = 400 \text{ kms} = \text{actual speed} * \text{actual time}$

Can solve for actual time

Answer is B

156. For Manufacturer M, the cost C of producing X Units of its product per month is given by $c=kx+t$, where c is in dollars and k and t are constants. Last month if Manufacturer M produced 1,000 units of its product and sold all the units for $k+60$ dollars each, what was Manufacturer M's gross profit on the 1,000 units?

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

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

Answer:

$$c=kx+t$$

In last month, $\text{cost}=1000k+t$; $\text{profit}=1000(k+60) - (1000k+t) = 60000-t$, so, we need to solve t .

From 1, $150000=1000*(k+60)$, there is no information about t .

From 2, $(1000k+t)-(500k+t)=45000$, still cannot solve out t .

Answer is E

157. Circle C and line k lie in the xy -plane. If circle c is centered at the origin and has radius 1, does line k intersect circle c ?

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

2). the slope of line k is $-1/10$

Answer:

Just image that, when we let the x -intercept great enough, the line k would not intersect circle c , even the absolute value of its slope is very little.

Answer is E

158. For which of the following functions is $f(a+b)=f(b)+f(a)$ for all positive numbers a and b ?

A. $f(x)=x^2$

B. $f(x)=x+1$

C. $f(x)=\sqrt{x}$

D. $f(x)=2/x$

E. $f(x)=-3x$

Answer:

I have found any shortcut to solve such question. So, we must try it one by one.

E: $f(x)=-3x$, then $F(a)=-3a, f(b)=-3b, f(a+b)=-3(a+b)=-3a-3b=F(a)+f(b)$

Answer is E

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

Answer:

$990 = 11 \cdot 9 \cdot 5 \cdot 2$, where 11 is a prime number. So, to guarantee that the product will be a multiple of 990, the least possible value of n is 11

Ann
\$450,000

Bob
\$360,000

Cal
\$190,000

Dot
\$210,000

Ed
\$680,000

160. The table above shows the total sales recorded in July for the five salespeople. It was discovered that one of Cal's sales was incorrectly recorded as one of Ann's sales. After this error was corrected, Ann's total sales were still higher than Cal's total sales, and the median of 5 sales totals was \$330,000. What was the value of the incorrectly recorded sale?

Answer:

Ann's actual sale is $450 - x$, Cal's $190 + x$, after corrected, Ann still higher than Cal, so Ann is the median.

Or we can explain it in another way:

$$450 - x = 330, \text{ so } x = 120$$

Ann's actual sale is $450 - x$ Cal's $190 + x$,

Suppose that either Ann or Cal can be the median, if Ann is the median, then we get the previous answer; however, if Cal is median (330), we will have $190 + x = 330$, $x = 140$, then Ann($450 - 140 = 310$) will be less than Cal(330), that is incorrect.

This can explain why Cal can not be the median and Ann must.

161. The point A, B, C, and D are on the number line, not necessarily in the order. If the distance between A and B is 18 and the distance between C and D is 8, what is the distance between B and D?

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

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

Answer:

A-----9-----C-----8-----D--1--B

A--1--D--8-----C-----9-----B

Both the two situations can fulfill the requirements.

Answer is E

162. Three grades of milk are 1 percent, 2 percent, and 3 percent by volume. If x gallons of 1 percent grade, y gallons of 2 percent grade, z gallons of 3 percent grade are mixed to give $x+y+z$ gallons of a 1.5 percent grade, what is x in terms of y and z ?

Answer:

Fat in milk is $x*1\%$, $y*2\%$ and $z*3\%$, respectively.

So we have the equation: $x*1\%+y*2\%+z*3\%=(x+y+z)*1.5\%$

Simplify the equation, we can obtain that $x=y+3z$

163. 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

Answer:

$2-\sqrt{5}$ is less than zero, so $\sqrt{2-\sqrt{5}}$ is not the real number

Note:

positive or negative is the idea only in the realm of real number, so a real number can be greater than, less than or equal to zero. It's true that a nonnegative number is the real number because there is no such conception in the imaginary number system. See the numeral system below:

Numeral system

Complex number:

1. real number

1). rational number

a). integer

b). fraction

2). irrational number

2. Imaginary number

164. 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

Answer:

$$d^2 = \frac{(a_1 - a)^2 + (a_2 - a)^2 + \dots + (a_n - a)^2}{n}$$

When we added 6 and 6, the numerator remained unchanged but the denominator increased, so, the new deviation is less than d .

Answer is E

165. If there are more than two numbers in certain list, is each of the numbers in the list equal to 0?

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

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

Answer:

For statement 1, for example, 0, 0, 0, 2 can fulfill the requirement. Insufficient.

So, B

166. Is $XY > 0$?

1). $X - Y > -2$

2). $X - 2Y < -6$

Answer:

$$X - 2Y < -6 \Rightarrow -X + 2Y > 6$$

Combined $X - Y > -2$, we know $Y > 4$

$$X - Y > -2 \Rightarrow -2X + 2Y < 4$$

Combined $X - 2Y < -6$, we know $-X < -2 \Rightarrow X > 2$

Therefore, $XY > 0$

Answer is C

167. The sum of positive integers x and y is 77. What is the value of xy ?

1). $x = y + 1$

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

Answer:

For statement 1, the two numbers can only be 38, 39

For statement 2, the tens digit of x and y must be 3, then, only 9+8 can get the value 17.

Two numbers must be 38, 39 as well.

Answer is D

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

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

2) 16% of the distribution is less than $m - d$

Answer:

For statement 1, we know that 68% are within $[m - d, m + d]$, so, the percent greater than $m + d$ will be $(1 - 0.68)/2$.

For statement 2, we know that 16% is less than $m - d$, considering the distribution is symmetric about the mean m , we can get, 16% is greater than $m + d$.

Answer is D

169. On his trip from Alba to Bento, Julio drove the first x miles at an average rate of 50 miles per hour and the remaining distance at an average rate of 60 miles per hour, how long did it take Julio to drive the x miles?

- 1). on this trip, Julio drove for a total of 10 hours and drove a total of 530 miles
- 2). on this trip, it took Julio 4 more hour to drive the first x miles than to drive the remaining distance

Answer:

- 1). $x/50 + (530-x)/60 = 10$, so, x can be solve out and $x/50$ will be the answer
- 2). The time cost on two distances could be 5h, 1h; 6h, 2h;... insufficient.

Answer is A

170. Malik's recipe for 4 servings of a certain dish requires $3/2$ cups of pasta. According to this recipe, what is the number of cups of pasta that Malik will use the next time he prepares this dish?

- 1). The next time he prepares this dish, Malik will make half as many servings as he did the last time he prepared the dish.
- 2). Malik used 6 cups of pasta the last time he prepared this dish.

Answer:

Premise: one serving includes a certain number of dishes.(we don't know the exact number),and a dish requires $3/2$ cups of pasta.(it means $4Y=mX$, and $X=3/2$ pasta.)

Question: nY require how many cups of pasta?

- 1). if Malik make X servings next time. He did prepare $2X$ dishes last time.
- 2). Malik used 6 cups of pasta the last time he prepared this dish.(it means $2X=6$).

In this case, either condition one or condition two cannot deduce the final answer in that the decisive factors m , n are unknown.

As a result, the correct answer is C.

171. A certain law firm consists of 4 senior partners and 6 junior partners. How many different groups of 3 partners can be formed in which at least one member of the group is a senior partner? (Two groups are considered different if at least one group member is different.)

- A 48
- B 100
- C 120
- D 288
- E 600

Answer:

$$C(4,1)C(6,2) + C(4,2)C(6,1) + C(4,3) = 60 + 36 + 4 = 100$$

172. A company plans to assign identification numbers to its employees. Each number is to consist of four different digits from 0 to 9, inclusive, except that the first digit cannot be 0. How many different identification numbers are possible?

Answer:

$$C(9,1)C(9,1)C(8,1)C(7,1) = 4536$$

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

- 1). 120 students eat in the cafeteria.
- 2). 40 of the students like lima beans.

Answer:

waiting a picture undated...

As the figure shows, the left part represents the students who dislike Beans, then the right part is the students who like Beans; the super part is the students who like Sprout, then the sub part is the students who dislike the Sprout. Then, we need to solve out the super-left part(blue part)

- 1). The total number is 120, then the number is: $120 \times \frac{2}{3} \times (1 - \frac{3}{5}) = 32$
- 2). 40 students like beans, then total number is $40 / \frac{1}{3} = 120$, we can get the same result.

Answer is D

174. What is the remainder when the positive integer is divided by 6?

- 1). When x is divided by 2, the remainder is 1; and when x is divided by 3, the remainder is 0
- 2). When x is divided by 12, the remainder is 3.

Answer:

- 1). The general term is $x = 6k + 3$. So, the remainder is 3. [look for the "general term" in this page, you can find the explanation about it.]
- 2). The general term is $x = 12k + 3$. So, remainder is 3 as well.

Answer is D

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

- 1). four different prime numbers are factors of $2n$.
- 2). four different prime numbers are factors of n^2 .

Answer:

1). When n is 105, or 210, $2n$ has four different prime factors: 2, 3, 5, 7, but 105 has 3 prime factors, and 210 has 4 prime factors.

2). Sufficient.