

## MATH -2

1. If  $m$  and  $u$  are positive integers  $(2^m)(5^u) = 500$ , then  $(2^u)(5^m) =$ 
  1. 100
  2. 200
  3. 400
  4. 500
  5. 1000
  
2. One side of Triangle is 7 inches long and another side is 10 inches long.  
Which of the following CANNOT be the length in inches of the third side?
  1. 2
  2. 4
  3. 8
  4. 12
  5. 16
  
3. 1 million seconds is approximately how many days?
  1. 1
  2. 12
  3. 36
  4. 120
  5. 270
  
4. In a certain country, 53% of a the children are boys. Of 7% of the boys and 1 percent of the girls in the country have a certain gene, What percentage of all the children in the country have this gene.
  1. 4.36%
  2. 4.24%
  3. 4.18%
  4. 4.00%
  5. 3.72%

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5. The odometer reading, in miles ,on Miki's Van was  $m$ , where  $m > 10,000$  , when she bought the van and  $n$ , where  $n > 20,000$ , when she sold it. While she owned the van, Miki had oil changed every  $x$  miles( that is, when the odometer reading, in miles, was rotated every  $y$  miles, what was the odometer reading, in miles, the first time Miki had the oil changed and the tires rotated at the same time?

1.  $x = 3500$  and  $y = 6000$
2. The odometer reading the first time Miki had the tires rotated was 61,000.

6. If  $x$ ,  $y$  and  $z$  are positive numbers, what is the value of  $x+y+z$ ?

1. The ratio of  $x$  to  $y$  is 2 to 3.
2. The ratio of  $y$  to  $z$  is 6 to 1.

7. Set A contains 21 numbers and the average( arithmetic mean ) of the numbers in set A is 85. Set B contains 22 numbers, 21 of which are the same as the 21 numbers in set A. What is the average of numbers in set B?

1. Set B contains the number 93, but set A does not contain 93.
2. The sum of the numbers in Set B is 1,878.

8. Which of the following statements are true for all values of  $x$ ?

- A.  $\sqrt{x^2} = x^{1/4}$
- B.  $\sqrt{x^2} = x^{1/2}$
- C.  $\sqrt{x^2} = x$
- D.  $\sqrt{x^2} = |x|$
- E.  $\sqrt{x^2} = x^2$

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9. What is the remainder when  $7^{381}$  is divided by 5?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

10. Does the quadratic Equation  $3x^2 + bx + c = 0$  have at least 1 real number solution?

- 1.  $c < 0$
- 2.  $b < 0$

11. A certain catering company's cost to cater a dinner for  $n$  people is  $50 + \frac{n}{2}$  dollars per person. Based on this formula how much more was the companies cost per person for a dinner that is catered on Wednesday than for a dinner that is catered on Tuesday?

- 1. The number of people for whom the company catered the dinner on Wednesday was twice the number for whom it catered on Tuesday?
- 2. The number of people for whom the company catered the dinner on Tuesday was 25 less than the number for whom it catered on Wednesday.

12. Is  $4 < -3x < 6$  ?

- 1.  $x < -1$
- 2.  $x > -2$

13. If  $8.3k = 0.083$ , then  $\frac{1}{K} =$

- 1. 1000
- 2. 100
- 3. 10

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4.  $\frac{1}{10}$

5.  $\frac{1}{100}$

14. For work she does for Family and Friends , an electrician charges 35% less per hour than her regular hourly rate, last week, she charged her regular rate for some of her work and the family and friends rate for the rest. The total amount she charged last week was \$x . And the electrician charged regular rate for a her work last week. The total amount she would have charged would have been what percentage greater than \$x?

1. Last week, the electrician charged twice as many hours at her regular rate as she charged at the family and friends rate.
2. Last week, the electrician worked a total of 45 hours.

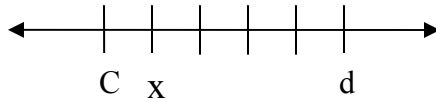
15. How much money must be invested for one year at y percent Simple Interest to yield the same amount of interest as \$5,000 invested for one year at x percent simple annual interest?

2.  $5000 \left[ \frac{x}{100} \right] = 300$

3.  $y = 2x$

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16. The tick marks on the number line shown are equally spaced. What is  $x$  in terms of  $c$  and  $d$



- A.  $\frac{d-5c}{5}$   
B.  $\frac{d-c}{5}$   
C.  $\frac{3c+d}{5}$   
D.  $\frac{4c+d}{5}$   
E.  $\frac{6c-d}{5}$

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17. In the rectangular co-ordinate system, line contains the point  $(n,0)$ . Is  $n$  a positive number?

- 1) Line contains a point  $(x_1, y_1)$  where  $x_1 < 0$  and  $y_1 > 0$
- 2) Line  $l$  contains a point  $(x_2, y_2)$ , where  $x_2 > 0$  and  $y_2 > 0$ .

18. Which of the following is equal to  $(2^k)(5^{k-1})$

- (A)  $2(10^{k-1})$
- (B)  $5(10^{k-1})$
- (C)  $10^k$
- (D)  $2(10^k)$
- (E)  $10^{2k-1}$

19. Let  $C$  be the collection of a integers between 1,00,000 and 9,99,999, inclusive. What is the probability that a number randomly selected from  $C$  has exactly 50 occurrences of the digit 3 in its decimal representation?

- (A)  $\frac{1}{150000}$
- (B)  $\frac{899999}{54}$
- (C)  $\frac{899999}{53}$
- (D)  $\frac{900000}{3}$
- (E)  $\frac{50,000}{3}$

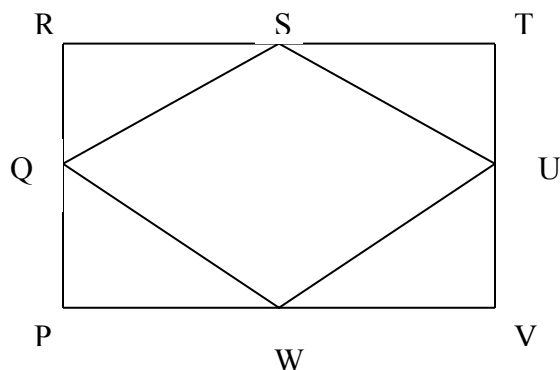
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20. In sequence S each term after the first is one-half the previous term. In the first term of S is  $\frac{1}{2}$  and the eleventh term of S is w, then w satisfies which of the following inequalities?

- (A)  $0.0001 < w < 0.0001$
- (B)  $0.0001 < w < 0.001$
- (C)  $0.00 < w < 0.01$
- (D)  $0.01 < w < 0.1$
- (E)  $0.1 < w < 1$

21. Is the size of a certain particle closer to  $10^{-3}$  centimeter than it is to  $10^{-2}$  centimeter?

1. The size of the particle is closer to  $10^{-4}$  centimeters than it is to  $10^{-1}$  centimeter.
2. The size of the particle is closer to  $10^{-3}$  centimeter than it is to  $10^{-1}$  centimeter.



22.

In the figure shown, points Q, S, U and W are the midpoints of the sides of rectangle PRTV. If the rectangle PRTV has perimeter 68 and area 240, what is the perimeter of quadrilateral QSUW?

- A. 34
- B. 20
- C. 48

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D. 52

E. 60

23. If  $x$  and  $y$  are integers, is  $x-y$  odd?

1.  $2x + 3y$  is even

2.  $3x + 2y$  is odd.

24. Yesterday, the price of plums at a certain fruit stand was \$1.20 per pound. If Jay purchased \$6.00 worth of plums at the fruit stand yesterday, did she purchase more than 20 plums?

1. Yesterday, any 10 plums at the fruit stand weighed more than one pound.

2. Yesterday, the number of plums in 5 pounds of plums purchased at the fruit stand varied from 30 to 40.

25. If  $ab < 0$  and  $bc > 0$ , which of the following must be true?

i.  $|ab| < |bc|$

ii.  $|a+b| < |b+c|$

iii.  $|a-b| < |b-c|$

A. None

B. I Only

C. II Only

D. III Only

E. II and III

26. The average (arithmetic Mean) of the three integers  $y$ ,  $3y-5$ , and  $x$  is the integer  $3y-2$ . If  $15 \leq x \leq 23$ . What is the value of  $x$ ?

A. 16

B. 17

C. 18

D. 19

E. 20

27. How many ordered pairs of integers  $(x,y)$  exist such that  $-2 \leq x \leq 2$  and  $-3 \leq y \leq 3$ ?



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- A. 12
- B. 19
- C. 24
- D. 30
- E. 35

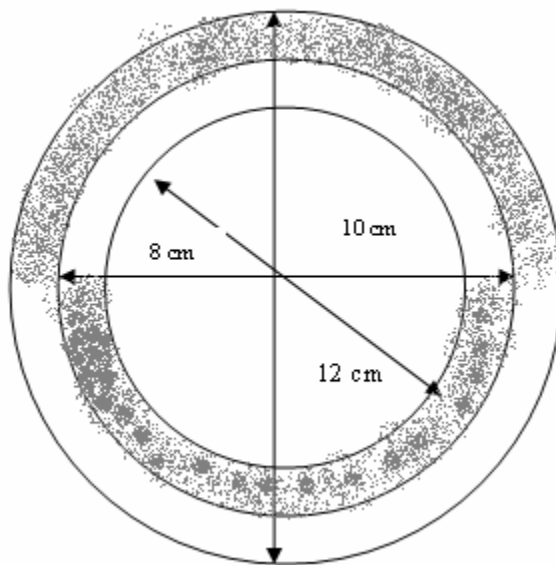
28. In a certain geographical region, 13 towns have fire departments and 7 towns have libraries. How many towns in this region have both fire department and libraries?

1. In this region, 4 towns have neither fire departments nor libraries.
2. There are 20 towns in this region.

29. Last year Manufacturer M's revenues for April and May were 5 percent and 8 percent, respectively; of its annual revenue. What was Manufacturer M's annual revenue last year?

1. Last Year Manufacturer M's revenue for April was 41.2 million less than its revenue for May.
2. Last year Manufacturer M's total revenue for April and May was \$5.2 million.

30.



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The figure above shows 3 circles with the same center and diameters of 8 cm , 10 cm and 12 cm , respectively. What is the total area, in square centimeters, of the shaded regions in this figure?

- A.  $10\pi$
- B.  $11\pi$
- C.  $20\pi$
- D.  $40\pi$
- E.  $80\pi$

31. Does  $2x + 5y = 7$ ?

- 1.  $x + 2.5y = 3.5$
- 2.  $x + y = 2$  and  $x/y = 1$ .

32. An Aerosol can is designed so that its bursting pressure,  $B$ , in pounds per square inch, is 120% of the pressure,  $F$ , in pounds per square inch, to which it is initially filled. Which of the following formulae expresses the relationship between  $B$  and  $F$ ?

- a.  $B = 1.2F$
- b.  $B = 120F$
- c.  $B = 1 + 0.2F$
- d.  $B = F/1.2$
- e.  $B = 1.2/F$

33. If  $x < -1$ , which of the following expressions has the greatest value?

- A.  $x$
- B.  $x - 1$
- C.  $(-x)^2$
- D.  $x^2 - x$
- E.  $(x - 1)^3$

34. Working alone, Harry can paint a certain room in 4 hours. Working alone, Antino can paint the same room in 5 hours. If they work together, each at his own rate, what fraction of the room can they paint in 1 hour?

- A.  $1/20$
- B.  $1/9$

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- C.  $\frac{2}{9}$
- D.  $\frac{9}{40}$
- E.  $\frac{9}{20}$

35. The total weight of 7 stones and 5 bricks is equal to the total weight of K stones and n bricks. If the weight of each stone is 0.4 kilogram and the weight of each brick is x kilograms, what is the weight of each brick.

- 1.  $k = 11$
- 2.  $k = 3n + 2$

36. If the product of the digits of the two digit positive integer n is 2, what is the value of n?

- 1. n is Odd
- 2. n is greater than 20.

37. A fruit basket contains oranges, apples, pears, and peaches. The total cost of the oranges in the basket is twice the total cost of the apples and it is  $\frac{2}{3}$  of the total cost of the pears. The peaches account for half the cost of all the fruit in the basket. If the apples cost a total of \$1.20, what is the cost of all the fruit in the basket?

- A. \$3.60
- B. \$4.80
- C. \$7.20
- D. \$10.80
- E. 14.40