

1. Given that  $x = 3$  and  $y = -5$ , find the following:

A:  $4x - 2y$

B:  $x + 11y$

C:  $3x - y$

D:  $9x - 4y$

2.  $f(x) = x^2 + 10x$        $g(x) = x - 2$

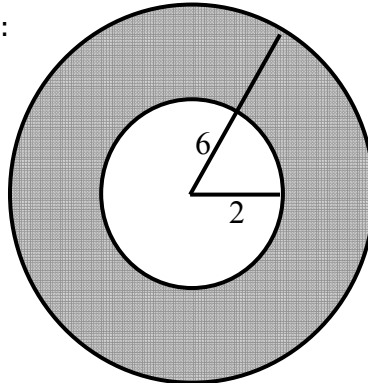
A:  $f(g(2))$

B:  $g(f(2))$

C:  $f(3) \times g(5)$

D:  $f(4) + 100 \times g(5)$

3. Given the two circles, find:



A: The area of the shaded region.

B: The circumference of the outer circle.

C: The area of the smaller circle.

D: The mean of the radii of the two concentric circles.

4. A deck has 52 cards, with 13 cards per suit. There is no replacement in the picking of cards. Find the following.

A: The probability of getting 2 spades in a row.

B: The number of cards with 9 on them.

A die has numbers from 1 to 8.

C: The probability of getting a prime number.

D: The sum of all the numbers on the die.

5. Esha is 17 years old. Three years ago, she was a third of her dad's age. Calculate:
- A: The sum of the current ages of Esha and her father.
  - B: The father's current age.
  - C: The number of years it will take Esha to be as old as the average of her and her father's current age.
  - D: The difference in her age and her dad's age 3 years ago.
6. An amount of 60% orange juice solution (juice plus water) is added to 20% 40 L cranberry juice solution. This addition makes the total mixture have a concentration of 50%.
- A: How much 60% orange juice solution is added?
  - B: What is the final volume?
  - C: What was the volume of water in the 60% orange juice solution?
  - D: Find the positive difference in the volumes of cranberry juice solution and orange juice solution.
7. Find the following.
- A: The lowest number which is divisible by the first 3 prime numbers.
  - B: The number of factors of 60.
  - C: The product of the Least Common Multiple and Greatest Common Factor of 42 and 24.
  - D: The products of the prime factors of 56.
8. A car starts from point A and drives 50 miles north to point B. At point B the car turns right and travels 85 miles, arriving at point C. The car then turns left and heads to Point D for 30 miles. To get to the final destination, point E, the car turns left once again and travels for 25 miles. Assume all turns are at right angles.
- A: The shortest distance between points A and E.
  - B: The total distance traveled in the southward direction.
  - C: The net distances traveled in the westward direction.
  - D: The area of triangle ABC.

9. Determine:

A: The number of pairs of parallel edges in a regular square pyramid.

B: The length of a space diagonal of a cube with edge 3.

C: The area of a right triangle with sides of 5, 12, and 13.

D: The perimeter of a regular octagon with side length 2.

10. Solve the following.

A:  $4^{2a} + 31 = 2^5$

B:  $(3 + 2)^4 = 5^2 + b10^2$

C:  $(-1)^{89} \times 6^{-2} = .5c$

D:  $4(3 \times d) + 10 = 7^2 - d$

11. Given that  $a \Delta \nabla b = a^3 - 9(a - 4) + b^{-1}$ . Find the following.

A:  $5 \Delta \nabla 1$

B:  $6 \Delta \nabla 4 - 3 \Delta \nabla 4$

C:  $\frac{2 \Delta \nabla 2}{0 \Delta \nabla 4}$

D:  $9 \Delta \nabla 1$

12. Determine if each statement is true or false.

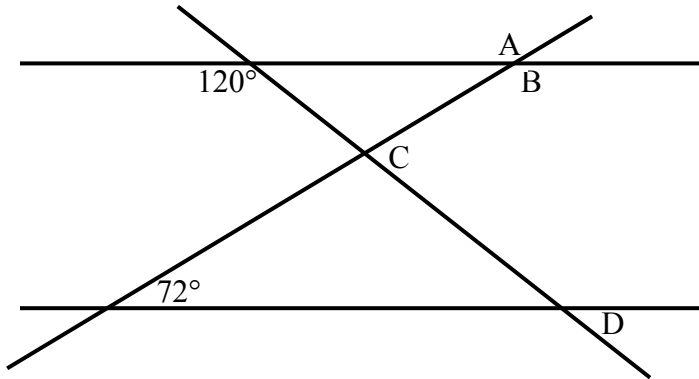
A: Parallel lines have the same slope.

B: The segment with shortest distance between a point and a line does not have to be perpendicular to the line.

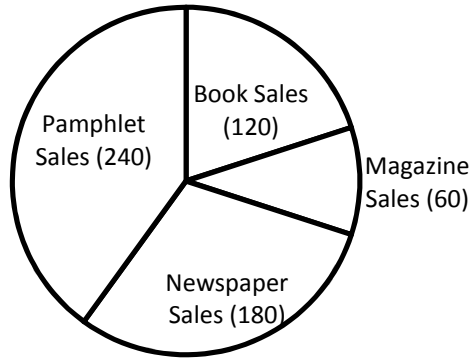
C: As the circumference a circles increases by a factor of 5 the area increases by a factor of 10.

D: A triangle can have sides of lengths 1, 3, and 4.

13.



14.



- A: The percent of book sales.
- B: The percent of pamphlet sales.
- C: The percent of newspaper sales.
- D: The percent of magazine sales.

15. Find the number of distinct ways of rearranging the following words.

- A: BUTTER
- B: EAT
- C: CARRIER
- D: CHAIR