

K-12

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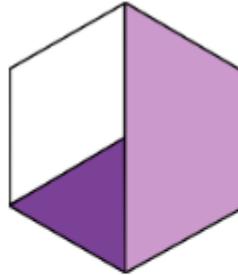
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Question: 1

Olga drew the regular figure shown here. She painted part of the figure a light color and part of it a darker color. She left the rest of the figure white.



Which of the following equations best models the part of the figure Olga left white?

- a. $1 - \frac{1}{3} - \frac{1}{3} = \frac{1}{3}$
- b. $1 - \frac{1}{6} - \frac{1}{6} = \frac{2}{3}$
- c. $1 - \frac{1}{6} - \frac{1}{2} = \frac{1}{3}$
- d. $1 - \frac{1}{2} - \frac{1}{3} = \frac{1}{3}$

Answer: C

Explanation:

To answer this question, notice that this figure is a regular hexagon, having 6 equal sides and angles. The part painted darker can be represented by $\frac{1}{6}$. The part painted lighter is clearly $\frac{1}{2}$, which is equivalent to $\frac{3}{6}$. The whole figure is represented by the number 1. So, 1 minus $\frac{1}{6}$ minus $\frac{3}{6}$ equals $\frac{2}{6}$ which is equivalent to $\frac{1}{3}$. Therefore, the equation, $1 - \frac{1}{6} - \frac{1}{2} = \frac{1}{3}$ best models the part of the figure Olga left white.

Question: 2

On a floor plan drawn at a scale of 1:100, the area of a rectangular room is 30 cm². What is the actual area of the room?

- a. 30 m²
- b. 300 cm²
- c. 3,000 m²
- d. 30,000 cm²

Answer: A

Explanation:

Since there are 100 cm in a meter, on a 1:100 scale drawing, each centimeter represents one meter. Therefore, an area of one square centimeter on the drawing represents one square meter in actuality. Since the area of the room in the scale drawing is 30 cm², the room's actual area is 30 m².

Another way to determine the area of the room is to write and solve an equation, such as this one:

$$\frac{l}{100} \cdot \frac{w}{100} = 30 \text{ cm}^2, \text{ where } l \text{ and } w \text{ are the dimensions of the actual room}$$

$$\frac{lw}{10,000} = 30 \text{ m}^2$$

$$lw = 300,000 \text{ cm}^2$$

$$\text{Area} = 300,000 \text{ cm}^2$$

Since this is not one of the answer choices, convert cm² to m²: $300,000 \text{ cm}^2 \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ m}}{100 \text{ cm}} = 30 \text{ m}^2$.

Question: 3

How many one-fourths are contained in $8\frac{1}{2}$?

- a. 17
- b. 34
- c. 36
- d. 64

Answer: B

Explanation:

The number of one-fourths contained in $8\frac{1}{2}$ can be determined by dividing $8\frac{1}{2}$ by $\frac{1}{4}$. In order to find the quotient, $8\frac{1}{2}$ can be multiplied by the reciprocal of $\frac{1}{4}$, or 4. Thus, the quotient can be found by writing $\frac{17}{2} \times 4$, which equals 34.

Question: 4

Restaurant customers tip their server only 8 percent for poor service. If their tip was \$4, how much was their bill?

- a. \$40
- b. \$44
- c. \$46
- d. \$50

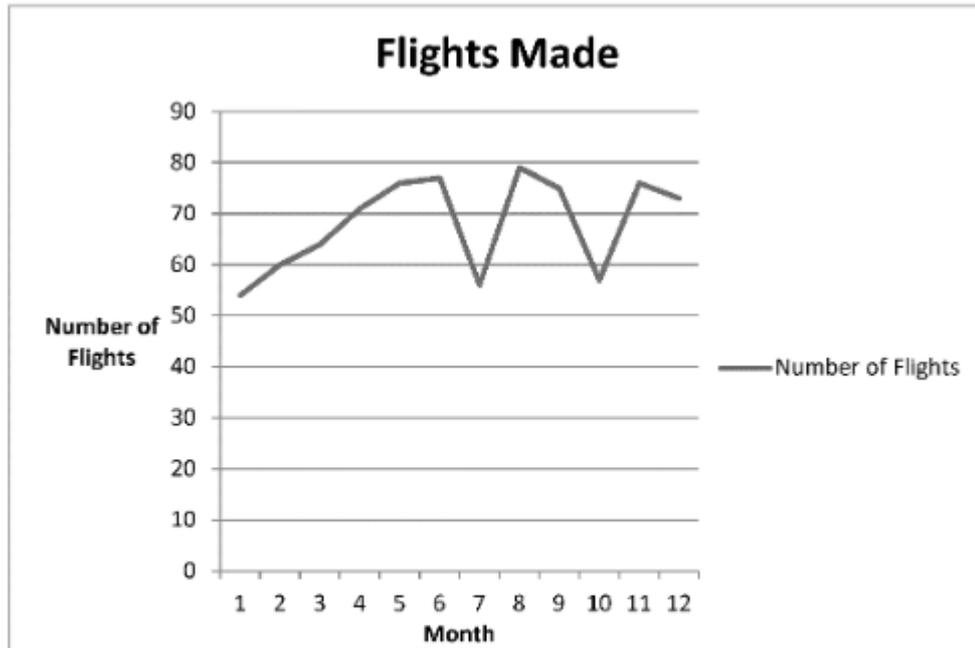
Answer: D

Explanation:

The total amount of the bill is: $\frac{4}{x} = \frac{8}{100}$; $400 = 8x$; $x = \$50$.

Question: 5

The number of flights a flight attendant made per month is represented by the line graph below.



What is the range in the number of flights the flight attendant made?

- a. 20
- b. 25
- c. 29
- d. 32

Answer: B

Explanation:

The line graph shows the largest number of flights made during a month as 79 with the smallest number of flights made during a month as 54. The range is equal to the difference between the largest number of flights and smallest number of flights, i.e., $79 - 54 = 25$. Therefore, the range is equal to 25.

Question: 6

In Figure 1 (pictured below), the distance from A to D is 48. The distance from A to B is equal to the distance from B to C . If the distance from C to D is twice the distance of A to B , how far apart are B and D ?



Figure 1

- a. 12
- b. 16
- c. 24
- d. 36

Answer: D

Explanation:

Segment $AD = 48$. Because the length of CD is 2 times the length of AB , let $AB = x$ and let $CD = 2x$. Since $AB = BC$, let $BC = x$ also. The total length of $AD = AB + BC + CD = x + x + 2x = 4x = 48$. Thus, $x = 12$ and $BC + CD = x + 2x = 3x = 3 \times 12 = 36$.

Question: 7

John buys 100 shares of stock at \$100 per share. The price goes up by 10% and he sells 50 shares. Then, prices drop by 10% and he sells his remaining 50 shares. How much did he get for the last 50?

- a. \$4,900
- b. \$4,950
- c. \$5,000
- d. \$5,500

Answer: B

Explanation:

The stock first increased by 10%, or \$10 (10% of \$100), to \$110 per share. Then, the price decreased by \$11 (10% of \$110), so that the sell price was $\$110 - \$11 = \$99$ per share, and the sell price for 50 shares was $99 \times 50 = \$4,950$.

Question: 8

Given the sequence represented in the table below, where n represents the position of the term and a_n represents the value of the term, which of the following describes the relationship between the position number and the value of the term?

n	1	2	3	4	5	6
a_n	5	2	-1	-4	-7	-10

- a. Multiply n by 2 and subtract 4
- b. Multiply n by 2 and subtract 3
- c. Multiply n by -3 and add 8
- d. Multiply n by -4 and add 1

Answer: C

Explanation:

The equation that represents the relationship between the position number, n , and the value of the term, a_n , is $a_n = -3n + 8$. Notice each n is multiplied by -3, with 8 added to that value. Substituting position number 1 for n gives $a_n = -3(1) + 8$, which equals 5. Substitution of the remaining position numbers does not provide a counterexample to this procedure.

Question: 9

A long-distance runner does a first lap around a track in exactly 50 seconds. As she tires, each subsequent lap takes 20% longer than the previous one. How long does she take to run 3 laps?

- A. 72 seconds
- B. 160 seconds
- C. 180 seconds

D. 182 seconds

Answer: D

Explanation:

If the first lap takes 50 seconds, the second one takes 20% more, or $T_2 = 1.2 \times T_1 = 1.2 \times 50 = 60$ seconds, where T_1 and T_2 are the times required for the first and second laps, respectively. Similarly, $T_3 = 1.2 \times T_2 = 1.2 \times 60 = 72$ seconds, the time required for the third lap. To find the total time, add the times for the three laps together: $50 + 60 + 72 = 182$ seconds.

Question: 10

Hannah draws two supplementary angles. One angle measures 34° . What is the measure of the other angle?

- A. 56°
- B. 66°
- C. 146°
- D. 326°

Answer: C

Explanation:

Supplementary angles add to 180 degrees. Therefore, the other angle is equal to the difference between 180 degrees and 34 degrees: $180 - 34 = 146$. Thus, the other angle measures 146° .

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