

EXPLANATIONS

1. **(C)** Substitute the approximation $\pi = 3.14$ into each expression, and solve to determine the expression results in a negative value:

$$4 - \pi = 0.86$$

$$3\pi - 9 = 0.42$$

$$12 - 4\pi = -0.56$$

$$36 - 9\pi = 7.74$$

So, the answer is $12 - 4\pi$.

2. After the triangle is reflected across the line $y = -1$:

A' is at $(-7, -9)$

B' is at $(-7, -4)$

C' is at $(-4, -4)$

3. **(C)** $x = 3$, $y = 4$, and $z = 8$. Substitute those values into the equation and simplify.

$$\frac{(3 \cdot 8) + (3 \cdot 4)}{2} + (8 \cdot 4) =$$

$$\frac{24 + 12}{2} + 32 =$$

$$\frac{36}{2} + 32 =$$

$$18 + 32 = 50$$

4. (D)

$$\frac{p^{12} \cdot p^0}{p^{-4}} = (p^{12} \cdot p^0) \frac{p^4}{1} = p^{(12+0+4)} = p^{(12+4)} = p^{16}$$

5. Solution:

First drop-down answer: $0.60x$

Second drop-down answer: $0.80x$

Third drop-down answer: 15

Let x represent the total number of gallons the container can hold.

Immediately after the student adds 15 gallons of water, the container is 60% full. Multiply 60% or 0.60 by the total number of gallons the container can hold, x , and set it equal to the number of gallons in the container (initial amount, n , plus 15 gallons).

So, the equation is: $n + 15 = 0.60x$

After the student adds 10 more gallons of water, the container is now 80% full. Multiply 80% or 0.80 by the total number of gallons the container can hold, x , and set it equal to the number of gallons in the container (initial amount, n , plus 15 gallons plus 10 gallons).

So, the equation is: $n + 25 = 0.80x$.

To solve these two equations for x , the total number of gallons the container can hold, and n , the number of gallons in the container initially, subtract the first equation from the second to eliminate the variable n :

$$(n + 25) - (n + 15) = 0.80x - 0.60x$$

Then distribute the negative and combine like terms to solve for x :

$$n + 25 - n - 15 = 0.2x ; 10 = 0.2x ; x = \frac{10}{0.2} ; x = 50$$

Then substitute 50 into the first equation for x and solve for n , the number of gallons in the container initially:

$$n + 15 = 0.60(50) ; n + 15 = 30 ; n = 15$$

6. **(D)** Use the slope formula to determine the slope of line l .

$$\text{Slope of line } l = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2b - b}{2a - a} = \frac{b}{a}$$

7. Solution:

The line of best fit is accurate if about half of the data points are above the line and half are below the line.

The line of best fit should capture the overall trend of the data.

A correct feature of an accurate line of best fit is that approximately half of the data points should be above the line, and half should be below the line.

One of the main purposes of a line of best fit is to model the general direction or trend of the data, even if it does not pass through any of the specific data points.

8. **(C)** Set up the two equations and subtract them from one another to find the price per hour:

$$\begin{aligned}(y + 7x = 420) - (y - 4x = 270) \\ 3x = 150 \\ x = 50\end{aligned}$$

To find the fixed fee, use one of the equations ($y + 7x = 420$ or $y - 4x = 270$) and solve for y using $x = 50$.

$$\begin{aligned}y + 4x &= 270 \\ y + 4(50) &= 270 \\ y + 200 &= 270 \\ y &= 70\end{aligned}$$

9. **(D)** Point R is at (4, 3). If (x, y) is rotated 180° about the origin: $R(x, y) \rightarrow (-x, -y)$.
Therefore, $R(4, 3) \rightarrow (-4, -3)$.
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10. **(B)**

$$\frac{15.3 \times 10^{-8}}{1.5 \times 10^4} = \left(\frac{15.3}{1.5} \right) \times \frac{10^{-8}}{10^4} = 10.2 \times \frac{10^{-8}}{10^4}$$

Use the rule of exponents to simplify.

$$10.2 \times 10^{(-8-4)} = 10.2 \times 10^{-12}$$

Rewrite the answer so that it is standard scientific notation form.

$$1.02 \times 10^{-11}$$

11. Graph line 1: $y = -2x + 5$ with slope -2 and y-intercept (0, 5) using points (0, 5) and (1, 3).

Graph line 2: $y = x - 1$ with slope 1 and y-intercept (0, -1) using points (-1, -2) and (2, 1).

The lines intersect at the point (2, 1).

12. **(12)** $S(x)$ is the sum of all positive even integers less than or equal to x. 1, 2, 3, 4, 5, and 6 are all integers less than 7. Take the positive integers from the list and find the sum:

$$S(7) = 2 + 4 + 6 = 12$$

- 13. (B)** Triangles NPQ and MPR are similar. Corresponding sides of the triangles are proportional.
Set up a proportion to find $\overline{MR}$.

$$\frac{\overline{MR}}{\overline{MP}} = \frac{\overline{NQ}}{\overline{NP}}$$

$$\frac{\overline{MR}}{x + 5} = \frac{10}{5}$$

$$5(\overline{MR}) = 10(x + 5)$$

$$5(\overline{MR}) = 10x + 50$$

$$\overline{MR} = 2x + 10$$