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Common Core Grade 8 Mathematics Exam

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Question: 1

Which fraction is equivalent to 0.375?

- a. $\frac{4}{25}$
- b. $\frac{1}{6}$
- c. $\frac{3}{8}$
- d. $\frac{3}{20}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: C

Explanation:

Changing 0.375 into a fraction by writing $\frac{375}{1000}$ because 0.375 is in the thousandths. Then reduce the fraction by dividing the numerator and the denominator by the greatest common factor of 125 to get $\frac{3}{8}$.

Question: 2

$2\sqrt{5}$ is between which two numbers?

- A. 4 and 5
- B. 2 and 3
- C. 3 and 4
- D. 10 and 11

Answer: A

Explanation:

Compare the square of $2\sqrt{5}$ to the square of the whole numbers. $(2\sqrt{5})^2 = 2^2\sqrt{5}^2 = 4 \times 5 = 20$. See that 20 is between 16 and 25, or 4^2 and 5^2 , so $2\sqrt{5}$ is between 4 and 5. Checking with a calculator, $2\sqrt{5} \approx 4.472$

Question: 3

A square has an area of 64 square units. What is the length of one side square?

- A. 7
- B. 6
- C. 10
- D. 8

Answer: D

Explanation:

The formula for the area of a square is $A = s^2$, where s is the length of one side of the square. In this case, $64 = s^2$. To solve for s , just square root both sides of the equation and $s=8$.

Question: 4

The total length of the world's coastlines is about 315,000 miles. Which answer expresses this in scientific notation?

- a. 3.15×10^{-6}
- b. 3.15×10^{-5}
- c. 3.15×10^6
- d. 3.15×10^5

- A. Option A
- B. Option B
- C. Option C
- D. Option D

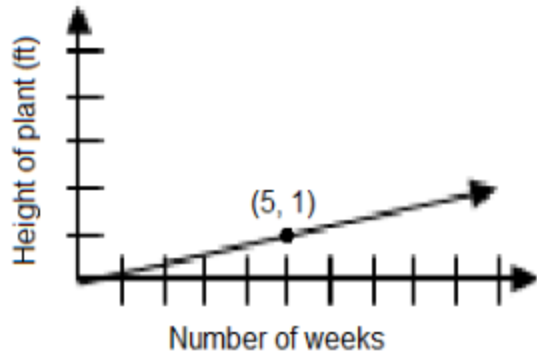
Answer: D

Explanation:

To write a number in scientific notation, the form is $a \times 10^n$, where $1 \leq a < 10$. The decimal need to move 5 spaces to the left so it is immediately to the right of the 3. Because it moved 5 spaces to the left, $n = 5$, so the answer is 3.15×10^5

Question: 5

Marla is growing a plant. The plant's growth is graphed below. Based on the graph how many feet does the plant grow each week?

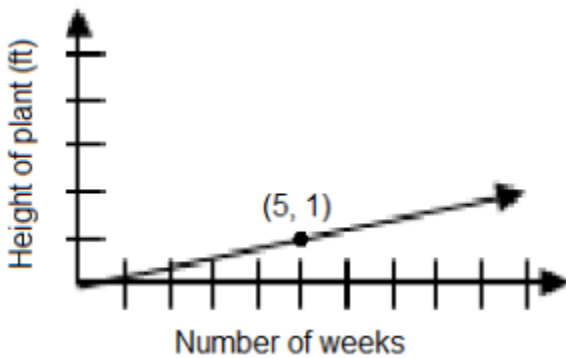


A. For answer see Explanation below.

Answer: A

Explanation:

The point on the graph is at (5,1), which shows that after 5 weeks the plant has grown 1 foot. This means that the plant grows $\frac{1}{5}$ ft. per week.



Question: 6

John's Gym charges its members according to the equation $C = 40m$ where m is the number of months and C represents the total cost to each customer after m months. Ralph's Recreation Room charges its members according to the equation $C = 45m$. What relationship can be determined about the monthly cost to the members of each company?

- A. John's monthly membership fee is equal to Ralph's monthly membership fee.
- B. John's monthly membership fee is more than Ralph's monthly membership fee.
- C. John's monthly membership fee is less than Ralph's monthly membership fee.
- D. No relationship between the monthly membership fees can be determined.

Answer: C

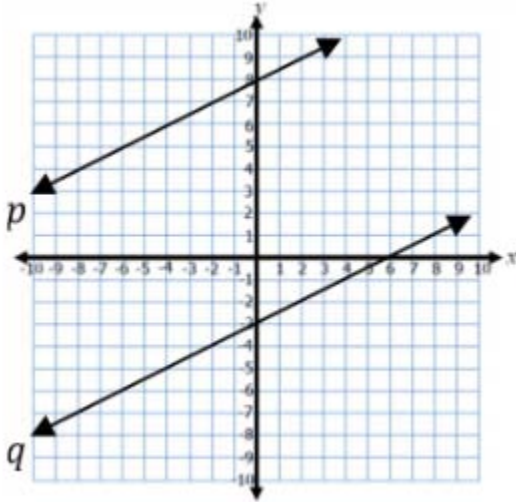
Explanation:

In both equations, the coefficient of m is the rate of change. In this problem, the rate of change

represents the customer's monthly cost. Therefore the customers at John's Gym pay \$40 per month, and the customers at Ralph's Recreation Room pay \$45 per month. Thus, John's monthly membership fee is less than Ralph's monthly membership fee.

Question: 7

What relationship can be determined about the slopes of line p and line q ?



- A. The slope of line p is equal to the slope of line q .
- B. The slope of line p is greater than the slope of line q .
- C. The slope of line p is less than the slope of line q .
- D. No relationship can be determined from the graph.

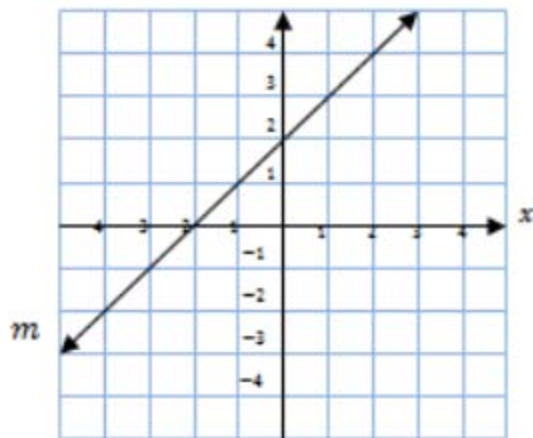
Answer: A

Explanation:

The slope of a line is its rate of change, or vertical change over horizontal change. For every 2 the line p moves right, it moves up 1. The slope for line p is $\frac{1}{2}$ and the slope of line q is also $\frac{1}{2}$. Therefore, the slope of line p is equal to the slope of line q .

Question: 8

Write an equation for line m in slope-intercept form.



- A. $y = x - 1$
- B. $y = x + 2$
- C. $y = x + 3$
- D. $y = x + 4$

Answer: B

Explanation:

Writing the equation of the line in slope-intercept form $y = mx + b$, the y-intercept, b , is $(0, 2)$ and the slope, m , or rate of change is $\frac{1}{1} = 1$. Substituting these numbers into the equation the answer is $y = x + 2$.

Question: 9

Given the equation $+1 = _ x + _$. Create an equation with no solutions, one solution, and infinitely many solutions.

Equation with no solutions

$$6x + 1 = \boxed{}x + \boxed{}$$

Equation with one solution

$$6x + 1 = \boxed{}x + \boxed{}$$

Equation with infinitely many solutions

$$6x + 1 = \boxed{}x + \boxed{}$$

- A. $x = 1$
- B. $x = 2$
- C. $x = 3$
- D. $x = 4$

Answer: D

Explanation:

An example of an equation with no solutions is $6x + 1 = 6x + 3$.

To solve this equation, we can subtract $6x$ off of both sides. This leaves $3=1$ which is not true so there is no solution to this equation.

An example of an equation with one solution is $6x + 1 = 4x + 9$.

The equation is solved below:

$$\begin{array}{ll} 6x+1=4x+9 & \text{Subtract } 4x \text{ from both sides of the equation} \\ 2x+1=9 & \text{Subtract } 1 \text{ from both sides of the equation} \\ 2x=8 & \text{Divide by } 2 \text{ on both sides of the equation} \\ x=4 & \text{So there is one solution to this equation.} \end{array}$$

An example of an equation with infinite solutions is $6x + 1 = 6x + 1$. For any value of x that is plugged in each side will always equal the other side.

Question: 10

How many solutions does the equation $2(7x - 5) = 14x - 8$ have?

- A. None
- B. One
- C. Two
- D. Infinitely many solutions

Answer: A

Explanation:

The equation is solved below:

$$\begin{array}{ll} 2(7x - 5) = 14x - 8 & \text{Distribute } 2 \text{ across the parentheses} \\ 14x - 10 = 14x - 8 & \text{Subtract } 14x \text{ from both sides of the equation} \\ -10 = -8 & \end{array}$$

Because $-10 \neq -8$, no solution exists for the equation.



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