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Question: 1

Given the functions, $f(x) = 3x + 6$ and $g(x) = 2x - 8$, what is the solution of the equation, $f(x) = g(x)$?

- A. $x = -12$
- B. $x = -8$
- C. $x = -14$
- D. $x = -10$

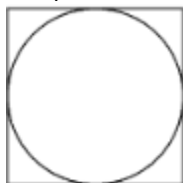
Answer: C

Explanation:

The solution of $f(x) = g(x)$ can be determined by setting the two functions equal to one another. Thus, the following may be written $3x + 6 = 2x - 8$. Solving for x gives $x = -14$

Question: 2

Suppose the area of the square in the diagram to the right is 64 in^2 . (The square is not shown actual size.) What is the area of the circle?



- A. $16\pi \text{ in}^2$
- B. $64\pi \text{ in}^2$
- C. $\frac{64}{\pi} \text{ in}^2$
- D. $(64 + \pi) \text{ in}^2$

Answer: A

Explanation:

The area of a square is equal to the square of the length of one side. If the area is 64 in^2 , the side length must therefore be $\sqrt{64 \text{ in}^2} = 8 \text{ in}$. The circle is inscribed in the square, so the side length of the square is the same as the circle's diameter. If the circle's diameter is 8 in , then the circle's radius must be half of that, or 4 in . The area of a circle is equal to $A = \pi r^2 = \pi(4 \text{ in})^2 = 16\pi \text{ in}^2$.

Question: 3

Solve for x in the following inequality: $4x + 23 > -3x - 6$

- A. $x > -4.14$
- B. $x < -4.14$
- C. $x > 4.14$
- D. $x < 4.14$

Answer: A

Explanation:

A: First, bring the $-3x$ to the left side of the equation and the 23 to the right side of the equation to make it easier to solve:

$$\begin{aligned}4x + 23 &> -3x - 6 \\4x + 3x &> -6 - 23 \\7x &> -29\end{aligned}$$

Then, divide both side by 7 to solve for x :

$$\begin{aligned}7x/7 &> -29/7 \\x &> -4.14\end{aligned}$$

Question: 4

If $2x + 5x = 3x + x + 30$, what is the value of x ?

- A. 2.72
- B. 4.29
- C. 6
- D. 10

Answer: D

Explanation:

First, bring all of the terms containing x to the left side of the equation to make it easier to solve:

$$\begin{aligned}2x + 5x &= 3x + x + 30 \\2x + 5x - 3x - x &= 30 \\7x - 4x &= 30 \\3x &= 30\end{aligned}$$

Then, divide both sides by 3 to solve for x :

$$\begin{aligned}3x/3 &= 30/3 \\x &= 10\end{aligned}$$

Question: 5

What is the value of $3x^2y + y/2 - 6x$, if $x = 4$ and $y = 10$?

- A. 221
- B. 461
- C. 872
- D. 1916

Answer: B

Explanation:

First, substitute the given values into the expression and then follow the order of operations to simplify:

$$\begin{aligned} 3x^2y + y/2 - 6x &= 3 \times 4^2 \times 10 + 10/2 - 6 \times 4 && \text{Exponents} \\ &= 3 \times 16 \times 10 + 10/2 - 6 \times 4 && \text{Multiplication and Division} \\ &= 480 + 5 - 24 && \text{Addition and Subtraction} \\ &= 461 \end{aligned}$$

Question: 6

At a school carnival, three students spend an average of \$10. Six other students spend an average of \$4. What is the average amount of money spent by all nine students?

- A. \$5
- B. \$6
- C. \$7
- D. \$8

Answer: B

Explanation:

The average is the total amount spent divided by the number of students. The first three students spend an average of \$10, so the total amount they spend is $3 \times \$10 = \30 . The other six students spend an average of \$4, so the total amount they spend is $6 \times \$4 = \24 . The total amount spent by all nine students is $\$30 + \$24 = \$54$, and the average amount they spend is $\$54 \div 9 = \6 .

Question: 7

If $w = 7$, calculate the value of the following expression: $8w^2 - 12w + (4w - 5) + 6$

- A. 279
- B. 285
- C. 337
- D. 505

Answer: C

Explanation:

First, substitute the given value of w into the expression each time it appears. Then, follow the order of operations to find the result:

$$\begin{aligned}8w^2 - 12w + (4w - 5) + 6 &= 8 \times 7^2 - 12(7) + (4 \times 7 - 5) + 6 \\&= 8 \times 7^2 - 12(7) + (23) + 6 \\&= 8 \times 49 - 84 + 23 + 6 \\&= 392 - 84 + 23 + 6 \\&= 337\end{aligned}$$

Question: 8

If $x/3 + 7 = 35$, what is the value of x ?

- A. 9.33
- B. 14
- C. 84
- D. 126

Answer: C

Explanation:

First subtract 7 from both sides to isolate x :

$$\begin{aligned}\frac{x}{3} + 7 &= 35 \\ \frac{x}{3} + 7 - 7 &= 35 - 7 \\ \frac{x}{3} &= 28\end{aligned}$$

Then, multiply both sides by three to solve for x :

$$\begin{aligned}\frac{x}{3} \times 3 &= 28 \times 3 \\ x &= 84\end{aligned}$$

Question: 9

In the following equation, solve for x by factoring: $2x^2 - 7x = x^2 - 12$

- A. $x = -3, -4$
- B. $x = 3, 4$
- C. $x = 3, -4$
- D. $x = -3, 4$

Answer: B

Explanation:

First bring all terms to the left side of the equation and combine like terms to make it easier to factor:

$$\begin{aligned}2x^2 - 7x - x^2 + 12 &= 0 \\x^2 - 7x + 12 &= 0 \\(x - 3)(x - 4) &= 0\end{aligned}$$

Finally, solve for x in both instances:

$$\begin{aligned}x - 3 &= 0 \\x &= 3\end{aligned}$$

$$x = 3, 4$$

$$\begin{aligned}x - 4 &= 0 \\x &= 4\end{aligned}$$

Question: 10

If x is 25% of 250, what is the value of x ?

- A. 62.5
- B. 100
- C. 1000
- D. 6250

Answer: A

Explanation:

Another way of expressing the fact that x is 25% of 250 is: $x = (0.25)250$

Then, it is simply a matter of multiplying out the right side of the equation: $x = 62.5$

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