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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, $f(x) = g(x)$?
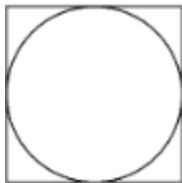
A. x = -12
B. x = -8
C. x = -14
D. x = -10

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 in². (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 in², the side length must therefore be $\sqrt{64 \text{ in}^2} = 8$ 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:

$$4x + 23 > -3x - 6$$
$$4x + 3x > -6 - 23$$
$$7x > -29$$

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

$$7x/7 > -29/7$$
$$x > -4.14$$

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:

$$2x + 5x = 3x + x + 30$$
$$2x + 5x - 3x - x = 30$$
$$7x - 4x = 30$$
$$3x = 30$$

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

$$3x/3 = 30/3$$
$$x = 10$$

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:

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

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 × $10 = S30. The other six students spend an average of $4, so the total amount they spend is 6 × $4 = $24. The total amount spent by all nine students is $30 + $24 = $54, and the average amount they spend is S54 ÷ 9 = $6.

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

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

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:

$$8w^2 - 12w + (4w - 5) + 6 = 8 \times 7^2 - 12(7) + (4 \times 7 - 5) + 6$$
$$= 8 \times 7^2 - 12(7) + (23) + 6$$
$$= 8 \times 49 - 84 + 23 + 6$$
$$= 392 - 84 + 23 + 6$$
$$= 337$$

Question: 8

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

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

Explanation:
First subtract 7 from both sides to isolate x:

$$\frac{x}{3} + 7 = 35$$
$$\frac{x}{3} + 7 - 7 = 35 - 7$$
$$\frac{x}{3} = 28$$

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

$$\frac{x}{3} \times 3 = 28 \times 3$$
$$x = 84$$

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

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

$$2x^2 - 7x - x^2 + 12 = 0$$
$$x^2 - 7x + 12 = 0$$
$$(x - 3)(x - 4) = 0$$

Finally, solve for x in both instances:

$$x - 3 = 0 \qquad\qquad\qquad\qquad x - 4 = 0$$
$$x = 3 \qquad\qquad\qquad\qquad\quad x = 4$$
$$x = 3, 4$$

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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