Chapter 0 Posttest

State the domain and range of each relation. Then determine whether each relation is a function. Write *yes* or *no*.

1. $\{(4, 5), (5, -1), (0, 12), (0, -2), (7, 9)\}$

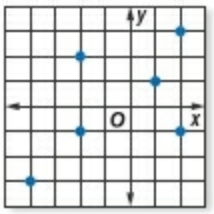
SOLUTION:

The domain is the set of x-coordinates; in set notation, $D = \{0, 4, 5, 7\}$

The domain is the set of y-coordinates; in set notation, $R = \{-2, -1, 5, 9, 12\}$

Because 0 is paired with −2 and 12, this is not a function.

2.



SOLUTION:

The domain is the set of x-coordinates; in set notation, $D = \{-4, -2, 1, 2\}$

The domain is the set of y-coordinates; in set notation, $R = \{-3, -1, 1, 2, 3\}$

Because −2 is paired with −1 and 2, and similarly 2 is paired with −1 and 3, this is not a function.

Name the quadrant in which each point is located.

3. (–3, 7)

SOLUTION:

The point (–3, 7) has a negative x-coordinate and a positive y-coordinate. The point is located in Quadrant II.

4. (10, –11)

SOLUTION:

The point (10, –11) has a positive x-coordinate and a negative y-coordinate. The point is located in Quadrant IV.

5. (–15, –3)

SOLUTION:

The point (–15, –3) has a negative x-coordinate and a negative y-coordinate. The point is located in Quadrant III.

Find each product.

6. $(4n - 3)(2n + 2)$

SOLUTION:

Use the FOIL method to find the product.

$$\begin{aligned}&(4n - 3)(2n + 2)\\ &= (4n)(2n) + (4n)(2)\\ &\quad + (-3)(2n) + (-3)(2)\\ &= 8n^2 + 8n - 6n - 6\\ &= 8n^2 + 2n - 6\end{aligned}$$

7. $(5p - 1)(6p - 10)$

SOLUTION:

Use the FOIL method to find the product.

$$\begin{aligned}&(5p - 1)(6p - 10)\\ &= (5p)(6p) + (5p)(-10)\\ &\quad + (-1)(6p) + (-1)(-10)\\ &= 30p^2 - 50p - 6p + 10\\ &= 30p^2 - 56p + 10\end{aligned}$$

8. $(7x + 4)(7x + 4)$

SOLUTION:

$$\begin{aligned}&(7x + 4)(7x + 4)\\ &= (7x + 4)^2\\ &= (7x)^2 + 2(7x)(4) + (4)^2\\ &= 49x^2 + 56x + 16\end{aligned}$$

9. $(3k-2)(6k+9)$

SOLUTION:

Use the FOIL method to find the product.

$$(3k-2)(6k+9)$$
$$=(3k)(6k)+(3k)(9)$$
$$+(-2)(6k)+(-2)(9)$$
$$=18k^2+27k-12k-18$$
$$=18k^2+15k-18$$

10. **GEOMETRY** The height of a rectangle is 3 millimeters less than twice the width.
a. Write an expression for each measure.
b. Write a polynomial expression for the area of the rectangle.

SOLUTION:

a. Let w be the width of the rectangle.
The height of the rectangle is 3 millimeters less than twice the width, or $(2w - 3)$.
b. The area of the rectangle is the product of the expressions for the width and height.

$$w(2w-3)$$
$$=w(2w)+(w)(-3)$$
$$=2w^2-3w$$

Factor each polynomial.

11. $4x^2+4xy+y^2$

SOLUTION:

This is a perfect square trinomial.

$$4x^2+4xy+y^2$$
$$=(2x)^2+2(2x)(y)+(y)^2$$
$$=(2x+y)^2$$

12. $25a^2-20a+4$

SOLUTION:

This is a perfect square trinomial.

$$25a^2-20a+4$$
$$=(5a)^2-2(5a)(2)+(2)^2$$
$$=(5a-2)^2$$

13. $4a^2+16ab+16b^2$

SOLUTION:

Remove the common factor of 4 first and the remaining polynomial is a perfect square trinomial.

$$4a^2+16ab+16b^2$$
$$=4(a^2+4ab+4b^2)$$
$$=4\left((a)^2+2(a)(2b)+(2b)^2\right)$$
$$=4(a+2b)^2$$

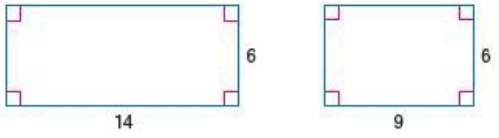
14. $81t^2-36$

SOLUTION:

Remove the common factor of 9 first and the remaining polynomial can be factored as a difference of squares.

$$81t^2-36$$
$$=9(9t^2-4)$$
$$=9\left((3t)^2-2^2\right)$$
$$=9(3t+2)(3t-2)$$

23. Determine whether the rectangles are *similar, congruent,* or *neither*.



SOLUTION:

$\frac{6}{6} \neq \frac{14}{9}$

Since the sides of the rectangles are neither congruent nor proportional, the rectangles are neither congruent nor similar.

24. **TABLETS** An image of a painting on a tablet is 320 pixels wide by 240 pixels high. If the actual painting is 42 inches wide, how high is it?

SOLUTION:

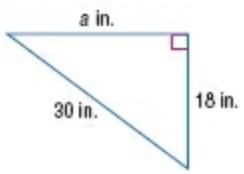
Let x be the height of the actual painting.

$$\frac{x}{240} = \frac{42}{320}$$
$$x = \frac{42 \cdot 240}{320}$$
$$x = \frac{10080}{320}$$
$$x = 31.5$$

The height of the actual painting is 31.5 inches.

Find each missing measure. Round to the nearest tenth, if necessary.

25.



SOLUTION:

$$c^2 = a^2 + b^2$$
$$30^2 = a^2 + 18^2$$
$$900 = a^2 + 324$$
$$900 - 324 = a^2 + 324 - 324$$
$$576 = a^2$$
$$a^2 = 576$$
$$a = \sqrt{576}$$
$$a = 24$$

The missing measure of the leg of the right triangle is 24 inches.

26. a = 33 cm, b = ? cm, c = 45 cm

SOLUTION:

$$c^2 = a^2 + b^2$$
$$45^2 = 33^2 + b^2$$
$$2025 = 1089 + b^2$$
$$2025 - 1089 = 1089 + b^2 - 1089$$
$$936 = b^2$$
$$b^2 = 936$$
$$b = \sqrt{936}$$
$$b \approx 30.6$$

The missing measure of the leg of the right triangle is about 30.6 cm.