2-2 Linear Relations and Functions

State whether each equation or function is a linear function. Write *yes* or *no*. Explain.

18. $h(x) = 6$

SOLUTION:

A linear function is a function with ordered pairs that satisfy a linear equation of the form $y = mx + b$.

Yes; it can be written in $f(x) = mx + b$ form, where $m = 0$ and $b = 6$.

21. $f(x) = \sqrt{7 - x}$

SOLUTION:

A linear function is a function with ordered pairs that satisfy a linear equation of the form $y = mx + b$.

No; it cannot be written in $f(x) = mx + b$ form.

24. $f(x) = \frac{4x}{5} + \frac{8}{3}$

SOLUTION:

A linear function is a function with ordered pairs that satisfy a linear equation of the form $y = mx + b$.

Yes; it can be written in $f(x) = mx + b$ form, where $m = \frac{4}{5}$ and $b = \frac{8}{3}$.

Write each equation in standard form. Identify *A, B,* and *C*.

27. $8x + 3y + 6 = 0$

SOLUTION:

The standard form of a linear equation is $Ax + By = C$, where A, B, and C are integers with a greatest common factor of 1, $A \geq 0$, and A and B are not both zero.

$$8x + 3y + 6 = 0$$
$$8x + 3y = -6$$

$A = 8$, $B = 3$, and $C = -6$.

30. $3y = 9x - 12$

SOLUTION:

The standard form of a linear equation is $Ax + By = C$, where A, B, and C are integers with a greatest common factor of 1, $A \geq 0$, and A and B are not both zero.

$$3y = 9x - 12$$
$$-9x + 3y = -12$$
$$9x - 3y = 12$$
$$3x - y = 4$$

$A = 3$, $B = -1$, and $C = 4$.

33. $\frac{4}{5}y + \frac{1}{8}x = 4$

SOLUTION:

The standard form of a linear equation is $Ax + By = C$, where A, B, and C are integers with a greatest common factor of 1, $A \geq 0$, and A and B are not both zero.

$$\frac{4}{5}y + \frac{1}{8}x = 4$$
$$32y + 5x = 160$$
$$5x + 32y = 160$$

$A = 5$, $B = 32$, and $C = 160$.

Find the *x*-intercept and the *y*-intercept of the graph of each equation. Then graph the equation using the intercepts.

36. $5y = 15x - 90$

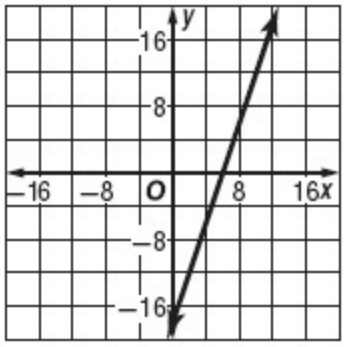
SOLUTION:

The *y*-coordinate of the point at which a graph crosses the *y*-axis is called the *y*-intercept. Likewise, the *x*-coordinate of the point at which it crosses the *x*-axis is called the *x*-intercept.

The equation is $5y = 15x - 90$.

The *x*-intercept is the value of *x* when $y = 0$.
So, the *x*-intercept is 6.

The *y*-intercept is the value of *y* when $x = 0$.
So, the *y*-intercept is –18.



39. $\frac{1}{3}x - \frac{2}{9}y = 4$

SOLUTION:

The *y*-coordinate of the point at which a graph crosses the *y*-axis is called the *y*-intercept. Likewise, the *x*-coordinate of the point at which it crosses the *x*-axis is called the *x*-intercept.

The equation is $\frac{1}{3}x - \frac{2}{9}y = 4$.

The *x*-intercept is the value of *x* when $y = 0$.
So, the *x*-intercept is 12.

The *y*-intercept is the value of *y* when $x = 0$.
So, the *y*-intercept is –18.