

NOTES
LESSON 3.2

GOAL

Graph linear equations in a coordinate plane.

Vocabulary

A **solution of an equation in two variables** in x and y is an ordered pair (x, y) that produces a true statement when the values of x and y are substituted into the equation.

The **graph of an equation in two variables** is the set of points in a coordinate plane that represents all solutions of the equation.

A **linear equation** is an equation whose graph is a line.

The **standard form of a linear equation** is $Ax + By = C$ where A , B , and C are real numbers and A and B are not both zero.

The equation $Ax + By = C$ represents a **linear function** provided $B \neq 0$ (that is, provided the graph of the equation is not a vertical line).

EXAMPLE 1

Standardized Test Practice

Which ordered pair is a solution of $\frac{1}{2}x + y = 3$?

- (A) $(-2, 4)$
- (B) $(2, 3)$
- (C) $(0, 4)$
- (D) $(4, -1)$

Solution

Check whether each ordered pair is a solution of the equation.

Test $(-2, 4)$: $\frac{1}{2}x + y = 3$ Write original equation.

$\frac{1}{2}(-2) + 4 \stackrel{?}{=} 3$ Substitute -2 for x and 4 for y .

$3 = 3$ ✓ Simplify.

So, $(-2, 4)$ is a solution of $\frac{1}{2}x + y = 3$. The correct answer is A.

Exercises for Example 1

Tell whether the ordered pair is a solution of the equation.

1. $-2x + 3y = -7$; $(2, -1)$
2. $x = -3$; $(0, -3)$
3. $\frac{2}{3}x - y = 4$; $(9, 2)$

EXAMPLE 2

Graph an equation

Graph the equation $3y = x - 3$.

Solution

STEP 1 Solve the equation for y .

$$3y = x - 3$$

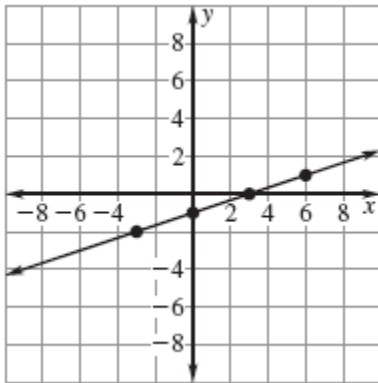
$$y = \frac{1}{3}x - 1$$

STEP 2 Make a table by choosing a few values for x and finding the values of y .

x	-3	0	3	6
y	-2	-1	0	1

STEP 3

Plot the points. Notice that the points appear to lie on a line.



STEP 4

Connect the points by drawing a line through them. Use arrows to indicate that the graph goes on without end.

EXAMPLE 3**Graph a linear function**

Graph the function $y = -x + 3$ with domain $-1 \leq x \leq 4$. Then identify the range of the function.

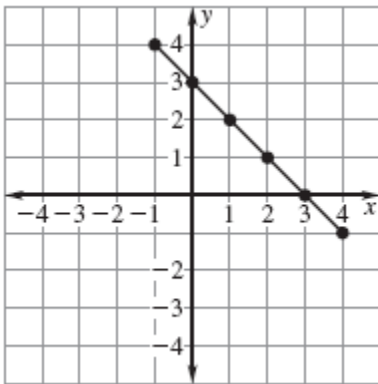
Solution

STEP 1 Make a table.

x	-1	0	1	2	3	4
y	4	3	2	1	0	-1

STEP 2 Plot the points.

STEP 3 Connect the points with a line segment because the domain is restricted.



STEP 4 Identify the range. From the graph, you can see that all points have a y-coordinate between -1 and 4, so the range of the function is $-1 \leq y \leq 4$.

Exercises for Examples 2 and 3

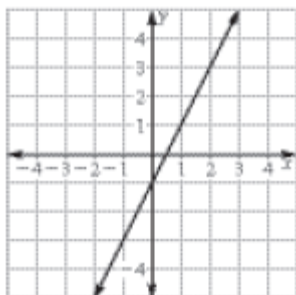
- 4 Graph the equation $4x - 2y = 2$.
- 5 Graph the function $y = \frac{1}{2}x - 5$ with domain $x \geq 4$. Then identify the range of the function.

Answer Key

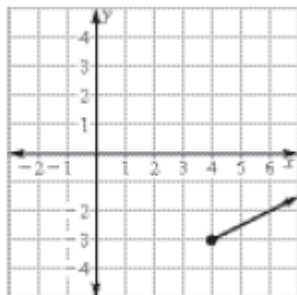
Lesson 3.2

Study Guide

1. yes
2. no
3. yes
- 4.



5.



range: $y \geq -3$