Name _____ Date _____

LESSON 3.2

Study Guide

For use with the lesson "Graph Linear Equations"

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

Name _____ Date _____

LESSON 3.2

Study Guide *continued*

For use with the lesson "Graph Linear Equations"

EXAMPLE 2 Graph an equation

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

Solution

STEP 1 **Solve** the equation for y.

$3y = x - 3$

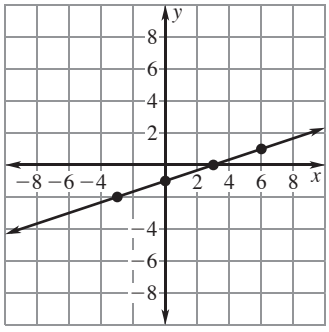
$y = \frac{1}{3}x - 1$

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 $-1 \le x \le 4$. Then identify the range of the function.

Solution

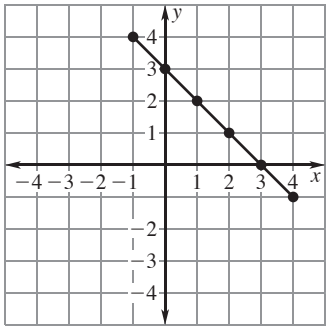
STEP 1 **Make** a table.

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 $-1 \le y \le 4$.

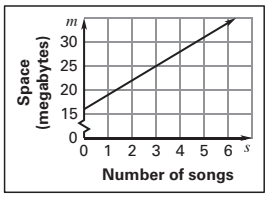


Exercises for Examples 2 and 3

4. Graph the equation $4x - 2y = 2$.

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

Lesson 3.2 Graph Linear Equations, continued

21. a. 

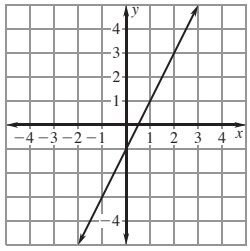
domain: $s \geq 0$
range: $m \geq 16$

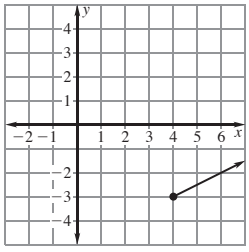
b. domain: $0 \leq s \leq 80$; range: $16 \leq m \leq 256$; The original graph was a ray. By restricting the domain, the graph becomes a line segment.

c. domain: $0 \leq s \leq 165\frac{1}{3}$; range: $16 \leq m \leq 512$

Study Guide

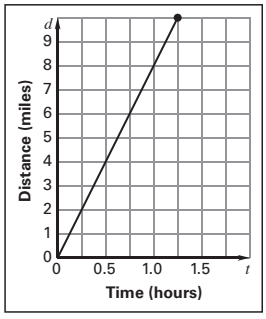
1. yes **2.** no **3.** yes

4. 

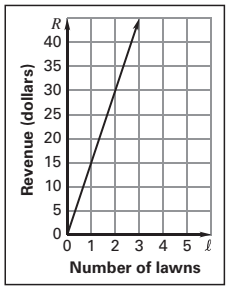
5. 

range: $y \geq -3$

Problem Solving Workshop: Worked-Out Example

1. 

domain: $0 \leq t \leq 1.25$,
range: $0 \leq d \leq 10$;
1.25 hours

2. 

domain: $0 \leq \ell \leq 3$,
range: $0 \leq R \leq 45$; \$45

Challenge Practice

1. \$16 **2.** 2 dogs **3.** 1 dog **4.** at least 3 cars **5.** 6 cars **6.** 2 cars **7.** at least 3 lawns **8.** at least 4 lawns **9.** less than 2 lawns

Lesson 3.3 Graph Using Intercepts

Teaching Guide

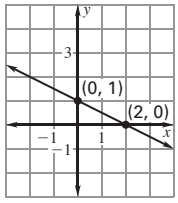
1. Answers will vary. **2.** Students whose coordinates are (1, 0) and (0, 1) should stand.

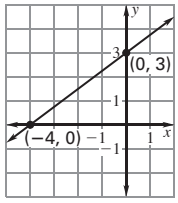
3. They form the graph of equation $x + y = 1$.

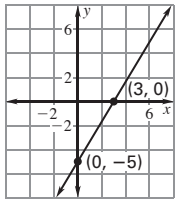
4. Students whose coordinates are (0, −2) and (2, 0) should stand. They form the graph of equation $x - y = 2$. **5.** *Sample answer*: Find and plot the points where the graph of the equation crosses the axes. Connect the points to draw the line.

Practice A

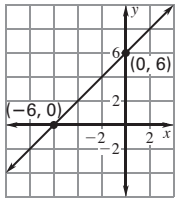
1. x: 5; y: 5 **2.** x: 2; y: −3 **3.** x: 5; y: 2
4. x: −3, y: 1 **5.** x: −4, y: −3 **6.** x: 1, y: 5
7. x: 9 **8.** x: 4 **9.** x: −1 **10.** x: 5 **11.** x: −18
12. x: 7 **13.** x: 6 **14.** x: −5 **15.** x: $\frac{10}{9}$ **16.** y: −7
17. y: −11 **18.** y: 2 **19.** y: 6 **20.** y: −7
21. y: 8 **22.** y: 4 **23.** y: 3 **24.** y: −3

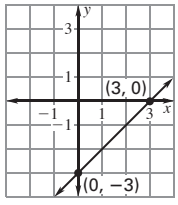
25. 

26. 

27. 

28. C **29.** B **30.** A

31. 

32. 

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