

Chapter 5, continued

5. B;

Line 1: $m = \frac{3 - 7}{-2 - (-4)} = \frac{-4}{2} = -2$

Line 2: $m = \frac{6 - 2}{-4 - (-6)} = \frac{4}{2} = 2$

Line 3: $m = \frac{-3 - 1}{2 - 0} = \frac{-4}{2} = -2$

Line 1 and line 3 are parallel because they have the same slope.

6. D;

The equation $a = 25t$ relates the amount a the park receives in adult ticket sales and the number t of adult tickets sold.

7. B;

The table given in choice B does not represent direct variation because $-\frac{3}{2} \neq -\frac{5}{1} \neq \frac{7}{0} \neq \frac{11}{2}$.

Chapter 5 Problem (p. 308)

Steps 1–3. Answers will vary.

Extending the Problem

- Answers will vary.
- Answers will vary.

Chapter 5 Review (pp. 308–312)

- The *slope* of a nonvertical line is the ratio of vertical change to horizontal change.
- Sample answer:

GRAPH AN EQUATION IN SLOPE-INTERCEPT FORM

SEQUENCE:

Step 1.

Rewrite the equation in slope-intercept form.

EXAMPLE:

$$\begin{aligned} -2x + y &= -1 \\ y &= 2x - 1 \end{aligned}$$

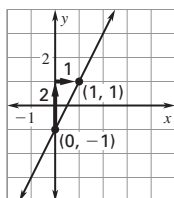
Step 2.

Identify the slope and y-intercept.

$$\begin{aligned} m &= 2 \\ b &= -1 \end{aligned}$$

Step 3.

Plot the point that corresponds to the y-intercept, $(0, -1)$.



Step 4.

Use the slope to locate a second point on the line. Draw a line through the two points.

3. a. $3x + y = 6$

Not in slope-intercept form.

$$y = -3x + 6$$

b. $y = 5x + 2$

In slope-intercept form.

c. $x = 4y - 1$

Not in slope-intercept form.

$$-4y = -x - 1$$

$$y = \frac{1}{4}x + \frac{1}{4}$$

d. $y = -x + 6$

In slope-intercept form.

x	10	12	15
$y = x - 5$	$10 - 5 = 5$	$12 - 5 = 7$	$15 - 5 = 10$

x	20	21
$y = x - 5$	$20 - 5 = 15$	$21 - 5 = 16$

Range: 5, 7, 10, 15, 16.

The domains have been changed.

x	0	2	3
$y = 3x + 1$	$3(0) + 1 = 1$	$3(2) + 1 = 7$	$3(3) + 1 = 10$

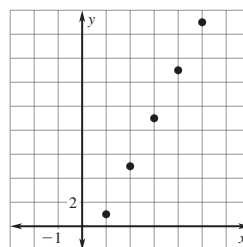
x	5	10
$y = 3x + 1$	$3(5) + 1 = 16$	$3(10) + 1 = 31$

Range: 1, 7, 10, 16, 31.

The domains have been changed.

6. $y = 4x - 3$

x	1	2	3	4	5
y	1	5	9	13	17



7.

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

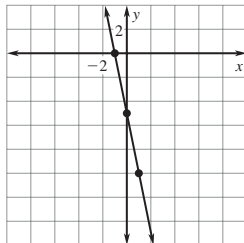
Notice from the table that each output y is 1 less than $\frac{1}{2}$ times the corresponding input x . So, a rule for the function is $y = \frac{1}{2}x - 1$. The domain of the function is $-2, 0, 2, 4$. The range is $-2, -1, 0, 1$.

Chapter 5, continued

8. $y + 5x = -5$

$y = -5x - 5$

x	-1	0	1
y	0	-5	-10

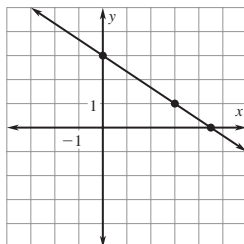


9. $2x + 3y = 9$

$3y = -2x + 9$

$y = -\frac{2}{3}x + 3$

x	0	3	$\frac{9}{2}$
y	3	1	0

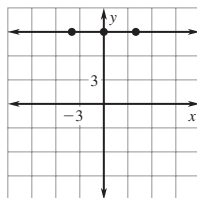


10. $2y - 14 = 4$

$2y = 18$

$y = 9$

x	-4	0	4
y	9	9	9



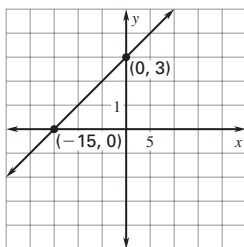
11. $-x + 5y = 15$

$-x + 5(0) = 15$

$x = -15 \leftarrow x\text{-intercept}$

$-0 + 5y = 15$

$y = 3 \leftarrow y\text{-intercept}$



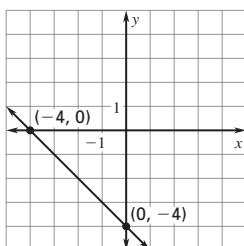
12. $4x + 4y = -16$

$4x + 4(0) = -16$

$x = -4 \leftarrow x\text{-intercept}$

$4(0) + 4y = -16$

$y = -4 \leftarrow y\text{-intercept}$



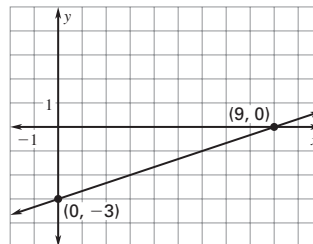
13. $2x - 6y = 18$

$2x - 6(0) = 18$

$x = 9 \leftarrow x\text{-intercept}$

$2(0) - 6y = 18$

$y = -3 \leftarrow y\text{-intercept}$



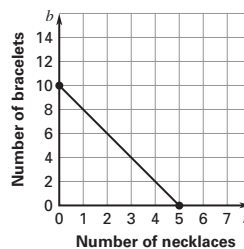
14. $10n + 5b = 50$

$10n + 5(0) = 50$

$n = 5 \leftarrow n\text{-intercept}$

$10(0) + 5b = 50$

$b = 10 \leftarrow b\text{-intercept}$



Sample answers:

0 bracelets and 5 necklaces,

4 bracelets and 3 necklaces,

10 bracelets, 0 necklaces

15. $(-1, 11), (2, 10)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 11}{2 - (-1)} = -\frac{1}{3}$

16. $(-2, 0), (4, 9)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 0}{4 - (-2)} = \frac{9}{6} = \frac{3}{2}$

17. $(-5, 4), (1, -8)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 - 4}{1 - (-5)} = \frac{-12}{6} = -2$

18. $(-5, 2), (-5, 7)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 2}{-5 - (-5)} = \frac{5}{0}$

The slope is undefined.

19. $(4, 0), (-2, 0)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 0}{-2 - 4} = \frac{0}{-6} = 0$

20. $(-3, -5), (-1, -17)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-17 - (-5)}{-1 - (-3)} = \frac{-12}{2} = -6$

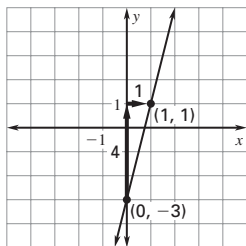
Chapter 5, continued

21. $4x - y = 3$

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

$$y = 4x - 3$$

$$m = 4, b = -3$$

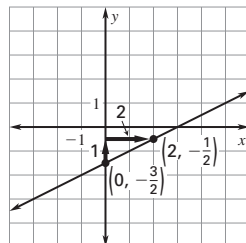


22. $3x - 6y = 9$

$$-6y = -3x + 9$$

$$y = \frac{1}{2}x - \frac{3}{2}$$

$$m = \frac{1}{2}, b = -\frac{3}{2}$$

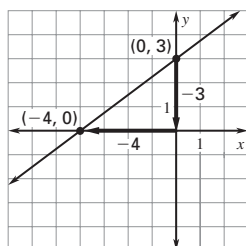


23. $-3x + 4y - 12 = 0$

$$4y = 3x + 12$$

$$y = \frac{3}{4}x + 3$$

$$m = \frac{3}{4}, b = 3$$



24. **Athlete 1:**

$$d = -6.4t + 60$$

$$m = -6.4, b = 60$$

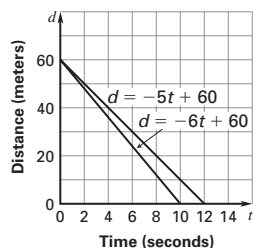
t-intercept:

$$0 = -6.4t + 60$$

$$6.4t = 60$$

$$t = 9.375$$

Athlete 1 finishes the race in 9.375 seconds.



$$12 - 9.375 = 2.625$$

The first athlete finishes the race about 2.625 seconds faster than the second athlete.

25. $x - y = 3$

$$-y = -x + 3$$

$$y = x - 3$$

No, the equation does not represent direct variation because it cannot be rewritten in the form $y = ax$.

Athlete 2:

$$d = -5t + 60$$

$$m = -5, b = 60$$

t-intercept:

$$0 = -5t + 60$$

$$5t = 60$$

$$t = 12$$

Athlete 2 finishes the race in 12 seconds.

26. $x + 2y = 0$

$$2y = -x$$

$$y = -\frac{1}{2}x$$

Yes, the equation represents direct variation because it can be rewritten in the form $y = ax$. The constant of variation is $-\frac{1}{2}$.

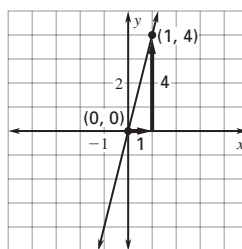
27. $8x - 2y = 0$

$$-2y = -8x$$

$$y = 4x$$

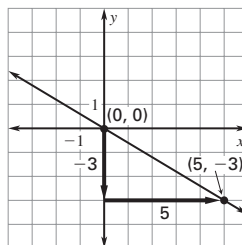
Yes, the equation represents direct variation because it can be rewritten in the form $y = ax$. The constant of variation is 4.

28. $y = 4x$



29. $-5y = 3x$

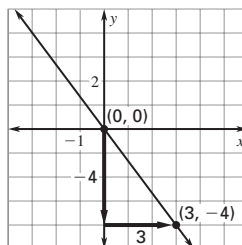
$$y = -\frac{3}{5}x$$



30. $4x + 3y = 0$

$$3y = -4x$$

$$y = -\frac{4}{3}x$$



Chapter 5 Test (p. 313)

1. A relation is a *function* if for each domain element there is exactly one range element.
2. Two variables x and y show *direct variation* provided $y = ax$ and $a \neq 0$.