3.5 Start Thinking

Tractor-trailers often weigh in excess of 50,000 pounds. With all the weight on board, these trucks need an extra warning when traveling down steep hills.

Research the term *roadway grade* and explain its importance to tractor-trailer drivers. How would you represent a 13% grade as a fraction when traveling downhill?

3.5 Warm Up

Make a table of points and plot them in a coordinate plane. Connect the points with a line.

1. $y = -2x - 3$

2. $y = 6x + 6$

3. $-x - 2y = 3$

4. $-4x = 7 + 2y$

5. $y = 5x$

6. $y = 0$

3.5 Cumulative Review Warm Up

Solve the inequality. Graph the solution, if possible.

1. $|x| > 4$

2. $|d - 8| < 4$

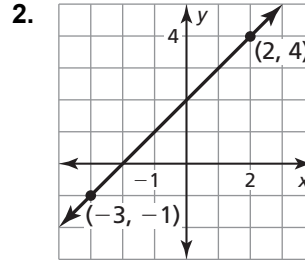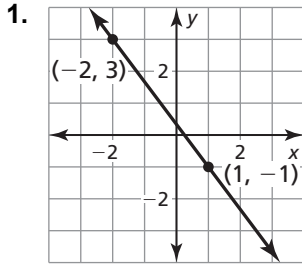**3.** $|s + 8| \leq 0$

4. $|4p - 3| > -5$

5. $|y| \leq 5.4$

6. $|h + 6| \geq 9$

7. $|5c - 7| < 8$

8. $|8 + 5n| > 12$

3.5 Practice A

In Exercises 1 and 2, describe the slope of the line. Then find the slope.

1.

2.

In Exercises 3 and 4, the points represented by the table lie on a line. Find the slope of the line.

3.

x	−2	1	4	7
y	0	1	2	3

4.

x	0	2	5	7
y	3	3	3	3

In Exercises 5–8, find the slope and the *y*-intercept of the graph of the linear equation.

5. $y = -6x + 2$

6. $y = 7x$

7. $y = -3$

8. $x - y = 9$

In Exercises 9–12, graph the linear equation. Identify the *x*-intercept.

9. $y = x + 4$

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

11. $y = -2x$

12. $4x + y = 3$

In Exercises 13 and 14, graph the function with the given description. Identify the slope, *y*-intercept, and *x*-intercept of the graph.

13. A linear function f models a relationship in which the dependent variable decreases 3 units for every 2 units the independent variable increases. The value of the function at 0 is 5.

14. A linear function g models a relationship in which the dependent variable increases 2 units for every 7 units the independent variable increases. The value of the function at 0 is −1.

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3.5 Practice B

In Exercises 1 and 2, describe the slope of the line. Then find the slope.
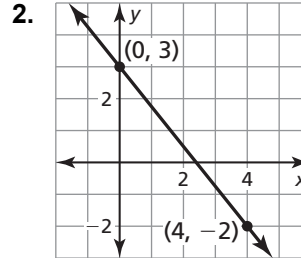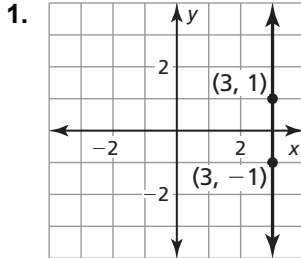
1.

(3, 1)
(3, −1)

2.

(0, 3)
(4, −2)

In Exercises 3 and 4, the points represented by the table lie on a line. Find the slope of the line.

3.

x	4	4	4	4
y	−2	1	4	7

4.

x	3	1	−1	−3
y	−4	1	6	11

In Exercises 5–8, find the slope and the y-intercept of the graph of the linear equation.

5. $y = 12$

6. $-3x + y = 7$

7. $-4x = 9 - 2y$

8. $0 = 2 - 3y + 12x$

In Exercises 9–12, graph the linear equation. Identify the x-intercept.

9. $y = x$

10. $x + 3y = 9$

11. $-y + 2x = 0$

12. $3x - y + 1 = 0$

13. A linear function g models the growth of your hair. On average, the length of a hair strand increases 1.25 centimeters every month.

 a. Graph g when $g(0) = 10$.

 b. Identify the slope and interpret the y-intercept of the graph.

 c. By how much, in inches, does the length of a hair strand increase each month?

In Exercises 14 and 15, find the value of k so that the graph of the equation has the given slope or y-intercept.

14. $y = 6kx - 2; m = \frac{2}{3}$

15. $y = -\frac{1}{2}x + \frac{4}{3}k; b = -8$

3.5 Enrichment and Extension

Challenge: Slope and Slope-Intercept Form

In Exercises 1–4, find the slope of the line through the given points. Assume that *a* and *b* are nonzero real numbers.

1. (a, b) and $(-2, 1)$

2. $(2a, 3b)$ and $(-2a, b)$

3. (a, b) and (b, a)

4. $(5a, b)$ and $(-5b, -a)$

Two lines are *parallel* if they both have the same slope. Two lines are *perpendicular* if the product of their slopes is –1, unless the slopes are 0 and undefined. In Exercises 5–8, find the value of *x* so that the line through the pair of points is *parallel* to a line with the slope given. Then find the value of *x* so that the line through the pair of points is *perpendicular* to a line with the slope given.

5. $m = \frac{1}{2}$; $(-3, x)$ and $(1, 4)$

6. $m = 0$; $(x, -3)$ and $(5, x)$

7. $m = -3$; $(3, -2x)$ and $(-4, 5)$

8. $m = \frac{5}{4}$; $(-1, 4)$ and $(x, -2)$

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3.5 Puzzle Time

What Did The Pelican Say When It Finished Shopping?

Write the letter of each answer in the box containing the exercise number.

Find the slope of the line passing through the given points.

1. $(-10, -12), (-8, -8), (-6, -4), (-4, 0)$

2. $(-4, 2), (0, 1), (4, 0), (8, -1)$

3. $(-7, -7), (0, -8), (7, -9), (14, -10)$

4. $(-2, 2), (0, 3), (2, 4), (4, 5)$

5. $(2, -11), (4, -25), (6, -39), (8, -53)$

6. $(-11, -38), (-5, -14), (1, 10), (7, 34)$

Find the slope and the *y*-intercept of the graph of the linear equation.

7. $y = -4x + 6$

8. $y = -\dfrac{1}{4}$

9. $4x + y = -1$

10. $y = 6x - 4$

11. $-x - 4y + 8 = 0$

12. $2x - 12y + 10 = 0$

13. The local service center advertises that it charges a flat fee of $50 plus $8 per mile to tow a vehicle. The function $C(x) = 8x + 50$ represents the cost C (in dollars) of towing a vehicle, where x is the number of miles the vehicle is towed. Identify the slope and *y*-intercept.

Answers

I. $m = \dfrac{1}{2}$

M. $m = 6, b = -4$

U. $m = -\dfrac{1}{4}$

N. $m = -4, b = -1$

P. $m = -4, b = 6$

I. $m = -7$

L. $m = -\dfrac{1}{4}, b = 2$

O. $m = 2$

L. $m = 4$

T. $m = 0, b = -\dfrac{1}{4}$

B. $m = 8, b = 50$

Y. $m = -\dfrac{1}{7}$

T. $m = \dfrac{1}{6}, b = \dfrac{5}{6}$

7	2	12		5	8		1	9		10	3		13	4	11	6