NAME

Module 8 Writing Linear Equations of Two Variables
Lesson 2 Writing Equations of Lines, Given the Slope and *y*-Intercept

Use the given information to write an equation of the line in slope-intercept form.

1. Slope: $\frac{4}{3}$ *y*-intercept: 2
$y = \frac{4}{3}x + 2$

2. Slope: $-\frac{1}{3}$ *y*-intercept: –1
$y = -\frac{1}{3}x - 1$

3. Slope: $\frac{2}{11}$ *y*-intercept: 10
$y = \frac{2}{11}x + 10$

4. Slope: $-\frac{1}{4}$ *y*-intercept: 6
$y = -\frac{1}{4}x + 6$

5. Slope: 0 Passes through: (–4, 2)
$y = 2$

6. Slope: $\frac{6}{7}$ *y*-intercept: –7
$y = \frac{6}{7}x - 7$

7. Slope: $-\frac{3}{7}$ *y*-intercept: –2
$y = -\frac{3}{7}x - 2$

8. Slope: undefined Passes through: (9, 1)
$x = 9$

9. Slope: –6 *y*-intercept: 2
$y = -6x + 2$

10. Slope: $\frac{4}{3}$ *y*-intercept: 3
$y = \frac{4}{3}x + 3$

11. Slope: $\frac{4}{7}$ *y*-intercept: –7
$y = \frac{4}{7}x - 7$

12. Slope: $\frac{5}{2}$ *y*-intercept: –4
$y = \frac{5}{2}x - 4$

Write the slope-intercept form of the equation of the line described.

13. The line is parallel to the line $y = -\frac{1}{2}x + 4$ and passes through the point (0, –3).
$y = -\frac{1}{2}x - 3$

14. The line is perpendicular to the line $y = -4x - 2$ and passes through the point (0, 4).
$y = \frac{1}{4}x + 4$

15. The line is perpendicular to the line $y = -\frac{2}{3}x - 8$ and passes through the origin.
$y = \frac{3}{2}x$

16. The line is parallel to the line $y = -\frac{1}{5}x$ and passes through the point (0, –1).
$y = -\frac{1}{5}x - 1$

17. The line is perpendicular to the line $y = 3x - 1$ and passes through the point (0, –6).
$y = -\frac{1}{3}x - 6$

18. The line is parallel to the line $y = \frac{1}{4}x + 1$ and passes through the point (0, –1).
$y = \frac{1}{4}x - 1$

19. The line is perpendicular to the line $y = \frac{6}{5}x + 2$ and passes through the point (0, 3).

$y = -\frac{5}{6}x + 3$

20. The line is parallel to the line $y = -9x + 2$ and passes through the point (0, –7).

$y = -9x - 7$

Journal

1. An iceberg is 50 feet high and melts at a rate so that its height decreases 5 feet each year. Write a linear equation that can be used to find the height of the iceberg at any time. Explain why the equation is correct and include slope and *y*-intercept in the explanation.

2. Explain how to convert $4x + 2y = 6$ into slope-intercept form.

3. Explain the relationship between the graphs of the two equations $y = 3x - 1$ and $-2y = -6x + 2$.

4. From the graph of a line, explain how the linear equation of the line in slope-intercept form can be determined.

5. Explain how to graph a line with a slope of 0 and a *y*-intercept of 0.

Cumulative Review

Solve each equation for *x*.

1. $y = x + 1$

$x = y - 1$

2. $y = -x + 14$

$x = -y + 14$

3. $y = 12 - 6x$

$x = -\frac{1}{6}y + 2$

4. $y = 4x - 16$

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

5. $y = 2x + 1$

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

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

$x = -3y - 6$

7. $y = \frac{1}{5}x - 3$

$x = 5y + 15$

8. $y = \frac{5}{2}x - \frac{5}{3}$

$x = \frac{2}{5}y + \frac{2}{3}$

9. $y = \frac{1}{4}x^2$

$x = \pm 2\sqrt{y}$

10. $y = 3x + 7s - 3t + 2$

$x = \frac{1}{3}y - \frac{7}{3}s + t - \frac{2}{3}$

Possible Journal Response

1. The rate of change is the slope. Since the height of the iceberg is decreasing at a rate of 5 feet per year, the slope is –5. The *y*-intercept is the initial height of the iceberg, or 50. So the linear equation is $y = -5x + 50$, with x = the number of years that have elapsed and y = the height of the iceberg in feet.
2. Slope-intercept form is $y = mx + b$, where m is the slope and b is the *y*-intercept. The goal is to isolate *y*. Starting with $4x + 2y = 6$, subtract $4x$ from both sides to get $2y = -4x + 6$. Then divide each side by 2 to get $y = -2x + 3$.
3. If the second equation is written in slope-intercept form, it is the same as the first equation. So the equations are equivalent and have the same graph.
4. First, find the *y*-intercept. Next, use two points to determine the slope m. The slope m is $\frac{\text{rise}}{\text{run}}$. Substitute the slope m and the *y*-intercept b into $y = mx + b$.
5. If the slope is 0, the equation is $y = 0x + b$, or $y = b$. Its graph is a horizontal line through the point $(0, b)$. If the *y*-intercept is 0, then $b = 0$ and the graph goes through the origin. When both the slope and *y*-intercept are 0, the graph is the *x*-axis.