NAME _____

Module 8 Writing Linear Equations of
Two Variables
Lesson 3 Writing Equations of Lines, Given a
Point and the Slope or Two Points

independent practice

Write the equation in slope-intercept form of the line that passes through the given point with the given slope.

1. Passes through: (3, –1) Slope: $-\frac{1}{2}$
$y = -\frac{1}{2}x + \frac{1}{2}$

2. Passes through: (6, –3) Slope: $-\frac{1}{3}$
$y = -\frac{1}{3}x - 1$

3. Passes through: (–2, 1) Slope: $\frac{8}{9}$
$y = \frac{8}{9}x + \frac{25}{9}$

4. Passes through: (3, –7) Slope: $\frac{2}{7}$
$y = \frac{2}{7}x - \frac{55}{7}$

5. Passes through: (–3, 6) Slope: $-\frac{2}{3}$
$y = -\frac{2}{3}x + 4$

6. Passes through: (–5, –2) Slope: $\frac{2}{5}$
$y = \frac{2}{5}x$

7. Passes through: (2, –8) Slope: 4
$y = 4x - 16$

8. Passes through: (–2, –2) Slope: undefined
$x = -2$

Write the equation in slope-intercept form of the line that passes through the given points.

9. (2, –1) and (2, 3)
$x = 2$

10. (7, –3) and (–1, 5)
$y = -x + 4$

11. (9, 3) and (3, 2)
$y = \frac{1}{6}x + \frac{3}{2}$

12. (–5, 8) and (–2, –1)
$y = -3x - 7$

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

13. Parallel to the line $y = \frac{3}{4}x + 7$ and passes through the point (1, 8).
$y = \frac{3}{4}x + \frac{29}{4}$

14. Perpendicular to the line $y = -\frac{1}{5}x + 2$ and passes through the point (–4, –1).
$y = 5x + 19$

15. Perpendicular to line containing the points (4, 2) and (–1, 9) and passes through the point (0, –1).
$y = \frac{5}{7}x - 1$

16. Parallel to line containing the points (–7, 2) and (–5, 1) and passes through the point (2, –6).
$y = -\frac{1}{2}x - 5$

Journal

1. Explain how to find the slope-intercept form of the equation of the line passing through (3, 5) and (5, –3).
2. Suppose that a certain type of bird chirps five times per minute when the temperature is 0°C. Suppose that with each increase of one degree in temperature the bird chirps four more times per minute. Write a linear equation in slope-intercept form that can be used to find the number of chirps at a given temperature.
3. 212°F is equal to 100°C and 32°F is equal to 0°C. Use these values to write a linear equation for converting temperatures from Fahrenheit to Celsius. Justify your answer.
4. Explain how to determine the equation of a line ℓ in slope-intercept form given:
   - a point on the line ℓ
   - the equation of a line that is perpendicular to line ℓ.
5. Explain how to find the equation of a horizontal line that passes through point (1, 4).

Cumulative Review

Solve each equation using the given information.

1. $2y = |x|$ when $x = 2$

   $y = 1$

2. $|y| + 3 = x$ when $y = –3$

   $x = 6$

3. $|–y| – 3 = 4 + x$ when $y = –1$

   $x = –6$

4. $–|–x| = y – 7$ when $x = 5$

   $y = 2$

5. $|3 – y| + 4 = x$ when $y = 6$

   $x = 7$

6. $|x + 4| = y$ when $x = 2$

   $y = 6$

7. $|x – 5| – 3 = y$ when $x = –1$

   $y = 3$

8. $|y – 5| + |4 – y| = x$ when $y = 10$

   $x = 11$

9. $|x – 4| – |7 + x – 3| = y$ when $x = 4$

   $y = –8$

10. $|y – x| + x|y| = z$ when $x = –2$, $y = 3$

   $z = –1$

Possible Journal Response
1. Use the slope formula to find the slope m, –4. Substitute the slope and the coordinates of one of the points into the point-slope form of a linear equation $y – y_1 = m(x – x_1)$. Then solve for y.
2. Since the number of chirps increase by 4 for each increase in degree, the slope is 4. The y-intercept is the initial number of chirps, or 5. The slope-intercept form of the linear equation is $y = 4x + 5$ with $y =$ the number of chirps and $x =$ the temperature in degrees Celsius.
3. First, write two ordered pairs from the information given: (212, 100) and (32, 0). Next, use these points and the slope formula to find the slope of the line, $\frac{5}{9}$. Then, choose a point, say (32, 0). Substitute that point and the slope into the point-slope form of a linear equation $y – y_1 = m(x – x_1)$. Solve for y. $y – 0 = \frac{5}{9}(x – 32)$ or $y = \frac{5}{9}x – \frac{160}{9}$.
4. First, determine the slope of the line perpendicular to ℓ. Then, find the negative reciprocal of that slope. This is the slope of line ℓ. Substitute the slope of line ℓ and the given point on line ℓ into the point-slope form of a linear equation. Solve for y.
5. The slope of a horizontal line is 0. Substitute the x-coordinate and y-coordinate of the point (1, 4) and the slope, 0, into the point-slope form of a linear equation to get $y – 4 = 0(x – 1)$. The equation simplifies to $y = 4$.

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