

Answers

Chapter Review (continued)

6. -1

7. 0

8. 3

9. undefined

10. 3

11. $-\frac{1}{2}$

12. $y = -2x; -14$

13. $y = \frac{5}{2}x; \frac{35}{2}$

14. $y = \frac{1}{3}x; \frac{7}{3}$

15. $y = -x; -7$

16. no

17. yes; $y = -2.5x$

5-1 Rate of Change and

Quick Review

Rate of change shows the relationship between changing quantities. The slope of a line is the vertical change (the rise) to the horizontal change (the run).

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

The slope of a horizontal line is 0, and the slope of a vertical line is undefined.

Example

What is the slope of the line that passes through the points $(1, 12)$ and $(6, 22)$?

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{22 - 12}{6 - 1} = \frac{10}{5} = 2$$

5-2 Direct Variation

Quick Review

A function represents a direct variation $y = kx$, where $k \neq 0$. The coefficient k is the constant of variation.

Example

Suppose y varies directly with x , and $y = 15$ when $x = 5$. Write a direct variation equation that relates y and x . What is the value of y when $x = 9$?

$y = kx$ Start with the general form of a direct variation equation.

$15 = k(5)$ Substitute 5 for x and 15 for y .

$3 = k$ Divide each side by 5 to solve for k .

$y = 3x$ Write an equation. Substitute $k = 3$.

The equation $y = 3x$ relates x and y . When $x = 9$, $y = 27$.

The graph of a linear equation is a line. You can write a linear equation in different forms.

The **slope-intercept form** of a linear equation is $y = mx + b$, where m is the slope and b is the y -intercept.

The **point-slope form** of a linear equation is $y - y_1 = m(x - x_1)$, where m is the slope and (x_1, y_1) is a point on the 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.

Example

What is an equation of the line that has slope -4 and passes through the point $(-1, 7)$?

$y - y_1 = m(x - x_1)$ Use point-slope form.
 $y - 7 = -4(x - (-1))$ Substitute $(-1, 7)$ for (x_1, y_1) and -4 for m .
 $y - 7 = -4(x + 1)$ Simplify inside grouping symbols.
 An equation of the line is $y - 7 = -4(x + 1)$.

5-6 Parallel and Perpendicular Lines

Quick Review

Parallel lines are lines in the same plane that never intersect. Two lines are **perpendicular** if they intersect to form right angles.

Example

Are the graphs of $y = \frac{4}{3}x + 5$ and $y = -\frac{3}{4}x + 2$ parallel, perpendicular, or neither? Explain.

The slope of the graph of $y = \frac{4}{3}x + 5$ is $\frac{4}{3}$.
 The slope of the graph of $y = -\frac{3}{4}x + 2$ is $-\frac{3}{4}$.

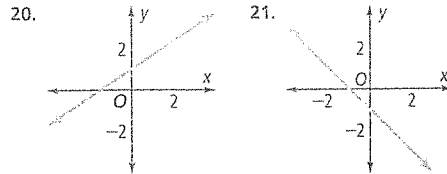
$$\frac{4}{3} \left(-\frac{3}{4} \right) = -1$$

The slopes are opposite reciprocals, so the graphs are perpendicular.

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

18. $(-3, 4), (1, 4)$ 19. $(3, -2), (6, 1)$

Write an equation of each line.



Graph each equation.

22. $y = 4x - 3$ 23. $y = 2$
 24. $y + 3 = 2(x - 1)$ 25. $x + 4y = 10$

Exercises

Write an equation of the line that passes through the given point and is parallel to the graph of the given equation.

26. $(2, -1); y = 5x - 2$ 27. $(0, -5); y = 9x$

Determine whether the graphs of the two equations are parallel, perpendicular, or neither. Explain.

28. $y = 6x + 2$ 29. $2x - 5y = 0$
 $18x - 3y = 15$ $y + 3 = \frac{5}{2}x$

Write an equation of the line that passes through the given point and is perpendicular to the graph of the given equation.

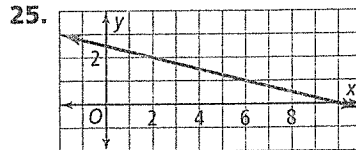
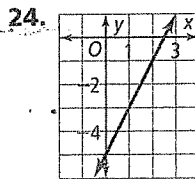
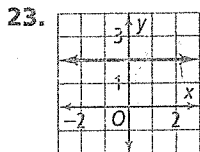
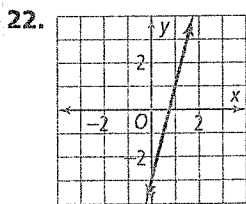
30. $(3, 5); y = -3x + 7$ 31. $(4, 10); y = 8x - 1$

18. $y = 4$

19. $y = x - 5$

20. $y = \frac{2}{3}x + 1$

21. $y = -x - 1$



26. $y = 5x - 11$

27. $y = 9x - 5$

28. Parallel; the slopes are equal.

29. Neither; the slopes are not equal or opposite reciprocals.

30. $y = \frac{1}{3}x + 4$

31. $y = -\frac{1}{8}x + \frac{21}{2}$