

Lesson-by-Lesson Review



4-1 Graphing Equations in Slope-Intercept Form

Write an equation of a line in slope-intercept form with the given slope and y -intercept. Then graph the equation.

- 10. slope: 3, y -intercept: 5 $y = 3x + 5$
- 11. slope: -2, y -intercept: -9 $y = -2x - 9$
- 12. slope: $\frac{2}{3}$, y -intercept: 3 $y = \frac{2}{3}x + 3$
- 13. slope: $-\frac{5}{8}$, y -intercept: -2 $y = -\frac{5}{8}x - 2$

10-13. See margin for graphs.

Graph each equation. **14-17. See margin.**

- 14. $y = 4x - 2$
- 15. $y = -3x + 5$
- 16. $y = \frac{1}{2}x + 1$
- 17. $3x + 4y = 8$

- 18. **SKI RENTAL** Write an equation in slope-intercept form for the total cost of skiing for h hours with one lift ticket.
 $y = 5h + 15$

Slippery Slope
Ski Lodge

Lift Ticket \$15/day
Ski Rental \$5/hour

Example 1

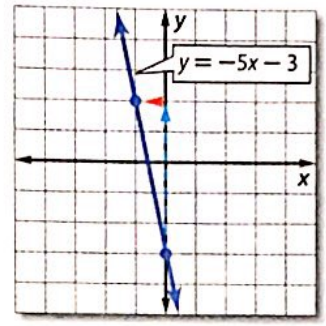
Write an equation of a line in slope-intercept form with slope -5 and y -intercept -3 . Then graph the equation.

$$y = mx + b \quad \text{Slope-intercept form}$$

$$y = -5x + (-3) \quad m = -5 \text{ and } b = -3$$

$$y = -5x - 3 \quad \text{Simplify.}$$

To graph the equation, plot the y -intercept $(0, -3)$. Then move up 5 units and left 1 unit. Plot the point. Draw a line through the two points.



- 19. $y = 3x - 1$
- 20. $y = -4x + 2$

4-2 Writing Equations in Slope-Intercept Form

Write an equation of the line that passes through the given point and has the given slope.

- 19. $(1, 2)$, slope 3
- 20. $(2, -6)$, slope -4
- 21. $(-3, -1)$, slope $\frac{2}{5}$
 $y = \frac{2}{5}x + \frac{1}{5}$
- 22. $(5, -2)$, slope $-\frac{1}{3}$
 $y = -\frac{1}{3}x - \frac{1}{3}$

Write an equation of the line that passes through the given points. **23-26. See margin.**

- 23. $(2, -1)$, $(5, 2)$
- 24. $(-4, 3)$, $(1, 13)$
- 25. $(3, 5)$, $(5, 6)$
- 26. $(2, 4)$, $(7, 2)$

- 27. **CAMP** In 2005, a camp had 450 campers. Five years later, the number of campers rose to 750. Write a linear equation that represents the number of campers that attend camp. $y = 60x + 450$

Example 2

Write an equation of the line that passes through $(3, 2)$ with a slope of 5.

Step 1 Find the y -intercept.

$$y = mx + b \quad \text{Slope-intercept form}$$

$$2 = 5(3) + b \quad m = 5, y = 2, \text{ and } x = 3$$

$$2 = 15 + b \quad \text{Simplify.}$$

$$-13 = b \quad \text{Subtract 15 from each side.}$$

Step 2 Write the equation in slope-intercept form.

$$y = mx + b \quad \text{Slope-intercept form}$$

$$y = 5x - 13 \quad m = 5 \text{ and } b = -13$$

4-3 Writing Equations in Point-Slope Form

Write an equation in point-slope form for the line that passes through the given point with the slope provided.

28. (6, 3), slope 5 $y - 3 = 5(x - 6)$
 29. (-2, 1), slope -3 $y - 1 = -3(x + 2)$
 30. (-4, 2), slope 0 $y - 2 = 0$

Write each equation in standard form.

31. $y - 3 = 5(x - 2)$ $5x - y = 7$
 32. $y - 7 = -3(x + 1)$ $3x + y = 4$
 33. $y + 4 = \frac{1}{2}(x - 3)$ $x - 2y = 11$
 34. $y - 9 = -\frac{4}{5}(x + 2)$ $4x + 5y = 37$

Write each equation in slope-intercept form.

35. $y - 2 = 3(x - 5)$ $y = 3x - 13$
 36. $y - 12 = -2(x - 3)$ $y = -2x + 18$
 37. $y + 3 = 5(x + 1)$ $y = 5x + 2$
 38. $y - 4 = \frac{1}{2}(x + 2)$ $y = \frac{1}{2}x + 5$

Example 3

Write an equation in point-slope form for the line that passes through (3, 4) with a slope of -2.

$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

$$y - 4 = -2(x - 3) \quad \text{Replace } m \text{ with } -2 \text{ and } (x_1, y_1) \text{ with } (3, 4).$$

Example 4

Write $y + 6 = -4(x - 3)$ in standard form.

$$y + 6 = -4(x - 3) \quad \text{Original equation}$$

$$y + 6 = -4x + 12 \quad \text{Distributive Property}$$

$$4x + y + 6 = 12 \quad \text{Add } 4x \text{ to each side.}$$

$$4x + y = 6 \quad \text{Subtract } 6 \text{ from each side.}$$

4-4 Parallel and Perpendicular Lines

Write an equation in slope-intercept form for the line that passes through the given point and is parallel to the graph of each equation.

39. (2, 5), $y = x - 3$ $y = x + 3$
 40. (0, 3), $y = 3x + 5$ $y = 3x + 3$
 41. (-4, 1), $y = -2x - 6$ $y = -2x - 7$
 42. (-5, -2), $y = -\frac{1}{2}x + 4$ $y = -\frac{1}{2}x - \frac{9}{2}$

Write an equation in slope-intercept form for the line that passes through the given point and is perpendicular to the graph of the given equation.

43. (2, 4), $y = 3x + 1$ $y = -\frac{1}{3}x + \frac{14}{3}$
 44. (1, 3), $y = -2x - 4$ $y = \frac{1}{2}x + \frac{5}{2}$
 45. (-5, 2), $y = \frac{1}{3}x + 4$ $y = -3x - 13$
 46. (3, 0), $y = -\frac{1}{2}x$ $y = 2x - 6$

Example 5

Write an equation in slope-intercept form for the line that passes through (-2, 4) and is parallel to the graph of $y = 6x - 3$.

The slope of the line with equation $y = 6x - 3$ is 6. The line parallel to $y = 6x - 3$ has the same slope, 6.

$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

$$y - 4 = 6[x - (-2)] \quad \text{Substitute.}$$

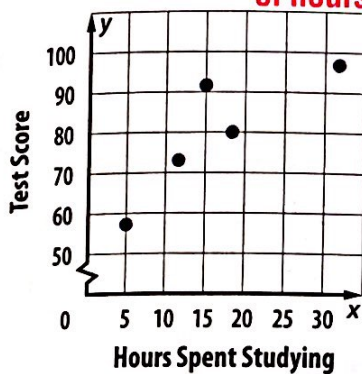
$$y - 4 = 6(x + 2) \quad \text{Simplify.}$$

$$y - 4 = 6x + 12 \quad \text{Distributive Property}$$

$$y = 6x + 16 \quad \text{Add } 4 \text{ to each side.}$$

4-5 Scatter Plots and Lines of Fit

47. Determine whether the graph shows a *positive*, *negative*, or *no* correlation. If there is a positive or negative correlation, describe its meaning. **Positive; as the number of hours spent studying increases, the test scores increase.**

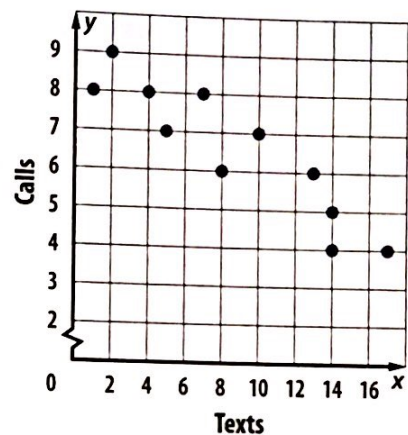


48. **ATTENDANCE** A scatter plot of data compares the number of years since a business has opened and its annual number of sales. It contains the ordered pairs (2, 650) and (5, 1280). Write an equation in slope-intercept form for the line of fit for this situation.

$$y = 210x + 230$$

Example 6

The scatter plot displays the number of texts and the number of calls made daily. Write an equation for the line of fit.



First, find the slope using (2, 9) and (17, 4).

$$m = \frac{4 - 9}{17 - 2} = \frac{-5}{15} \text{ or } -\frac{1}{3} \quad \text{Substitute and simplify.}$$

Then find the y -intercept.

$$9 = -\frac{1}{3}(2) + b \quad \text{Substitute.}$$

$$9\frac{2}{3} = b \quad \text{Add } \frac{2}{3} \text{ to each side.}$$

Write the equation.
$$y = -\frac{1}{3}x + 9\frac{2}{3}$$

4-6 Regression and Median-Fit Lines

49. **SALE** The table shows the number of purchases made at an outerwear store during a sale. Write an equation of the regression line. Then estimate the daily purchases on day 10 of the sale. **$y = 5.36x + 11; 65$**

Example 7

ATTENDANCE The table shows the annual attendance at an amusement park. Write an equation of the regression line for the data.

Study Guide and Review *Continued*

4-7 Inverse Linear Functions

Find the inverse of each relation.

51. $\{(7, 3.5), (6.2, 8), (-4, 2.7), (-12, 1.4)\}$

52. $\{(1, 9), (13, 26), (-3, 4), (-11, -2)\}$

53.

X	Y
-4	2.7
-1	3.8
0	4.1
3	7.2

54.

X	Y
-12	4
-8	0
-4	-4
0	-8

$$\{(2.7, -4), (3.8, -1), (4.1, 0), (7.2, 3)\}$$

$$\{(4, -12), (0, -8), (-4, -4), (-8, 0)\}$$

Find the inverse of each function.

55. $f(x) = \frac{5}{11}x + 10$ $f^{-1}(x) = \frac{11}{5}x - 22$

56. $f(x) = 3x + 8$ $f^{-1}(x) = \frac{1}{3}x - \frac{8}{3}$

57. $f(x) = -4x - 12$ $f^{-1}(x) = -\frac{1}{4}x - 3$

58. $f(x) = \frac{1}{4}x - 7$ $f^{-1}(x) = 4x + 28$

59. $f(x) = -\frac{2}{3}x + \frac{1}{4}$ $f^{-1}(x) = -\frac{3}{2}x + \frac{3}{8}$

60. $f(x) = -3x + 3$ $f^{-1}(x) = -\frac{1}{3}x + 1$

Example 8

Find the inverse of the relation.

$$\{(5, -3), (11, 2), (-6, 12), (4, -2)\}$$

To find the inverse, exchange the coordinates of the ordered pairs.

$$(5, -3) \rightarrow (-3, 5)$$

$$(-6, 12) \rightarrow (12, -6)$$

$$(11, 2) \rightarrow (2, 11)$$

$$(4, -2) \rightarrow (-2, 4)$$

The inverse is $\{(-3, 5), (2, 11), (12, -6), (-2, 4)\}$.

Example 9

Find the inverse of $f(x) = \frac{1}{4}x + 9$.

$$f(x) = \frac{1}{4}x + 9 \quad \text{Original equation}$$

$$y = \frac{1}{4}x + 9 \quad \text{Replace } f(x) \text{ with } y.$$

$$x = \frac{1}{4}y + 9 \quad \text{Interchange } y \text{ and } x.$$

$$x - 9 = \frac{1}{4}y \quad \text{Subtract 9 from each side.}$$

$$4(x - 9) = y \quad \text{Multiply each side by 4.}$$

$$4x - 36 = y \quad \text{Distributive Property}$$

$$4x - 36 = f^{-1}(x) \quad \text{Replace } y \text{ with } f^{-1}(x).$$

Chapter 4 Review

Complete the following book work:

Page 273 #10-27

Page 274 #28-46

Page 275 #47-48

Page 276 #51-60

Complete the following questions below:

- 1) Write the equation in STANDARD FORM for a line that passes through $(-2, 5)$ and has a y-intercept of 3.

$(-2, 5)$

$(0, 3)$

$$\frac{3-5}{0-(-2)} = \frac{-2}{2} = \boxed{\begin{matrix} m \\ -1 \end{matrix}}$$

$$y = -1x + 3$$

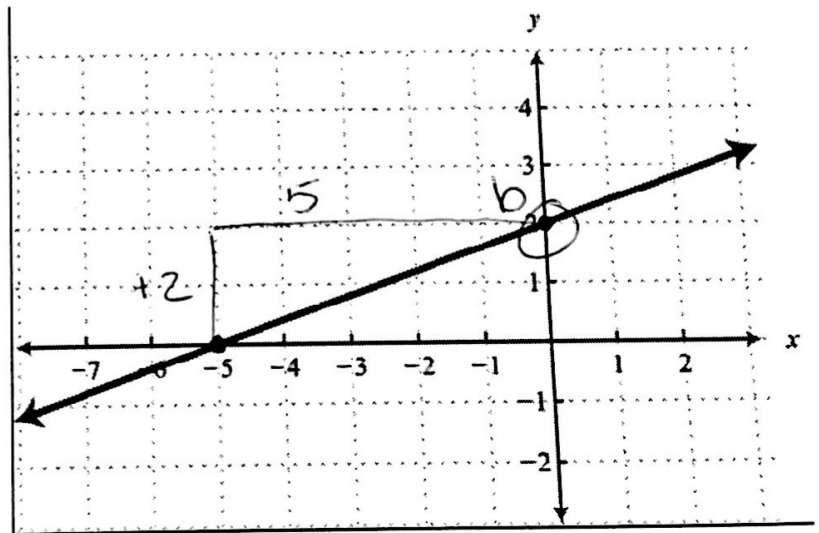
$$\boxed{x + y = 3}$$

- 2) Given that a line has an undefined slope and passes through $(21, 35)$, write an equation in STANDARD FORM.

Vertical line

$$\boxed{x = 21}$$

- 3) Write the equation in SLOPE-INTERCEPT form for the line graphed below.



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

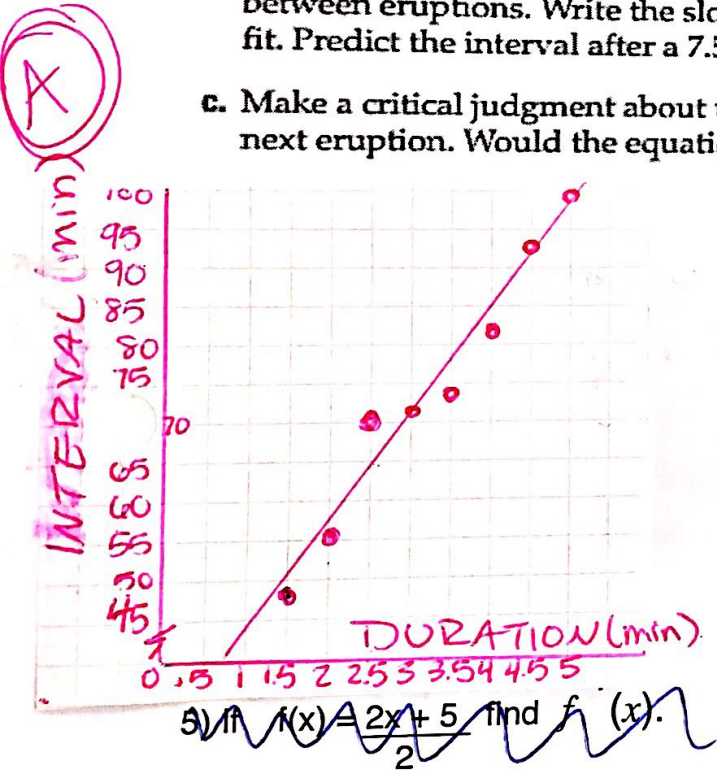
4)

There is a positive correlation between the two variables.

GEYSERS The time to the next eruption of Old Faithful can be predicted by using the duration of the current eruption.

Duration (min)	1.5	2	2.5	3	3.5	4	4.5	5
Interval (min)	48	55	70	72	74	82	93	100

- Identify the independent and the dependent variables. Make a scatter plot and determine what relationship, if any, exists in the data. Draw a line of fit for the scatter plot. Independent: Duration (min) Dependent: Interval (min)
- Let x represent the duration of the previous interval. Let y represent the time between eruptions. Write the slope-intercept form of the equation for the line of fit. Predict the interval after a 7.5-minute eruption.
- Make a critical judgment about using the equation to predict the duration of the next eruption. Would the equation be a useful model?



$(2.5, 65)$
 $(3, 72)$
 $\frac{72-65}{3-2.5} = \frac{7}{.5} \quad m=14$

(B)
 $y - 72 = 14(x - 3)$
 $y - 72 = 14x - 42$
 $y = 14x + 30$
*Should be close

$y = 14(7.5) + 30$

$y = 105 + 30$
 $y = 135 \text{ min}$

(C) The duration of an eruption is not dependent on the previous interval. Only the interval can be predicted by the length of the eruption.

#5

$$f(x) = \frac{2x+5}{2}$$

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

$$\left(x = \frac{2y+5}{2} \right) \cdot 2$$

$$2x = 2y + 5$$

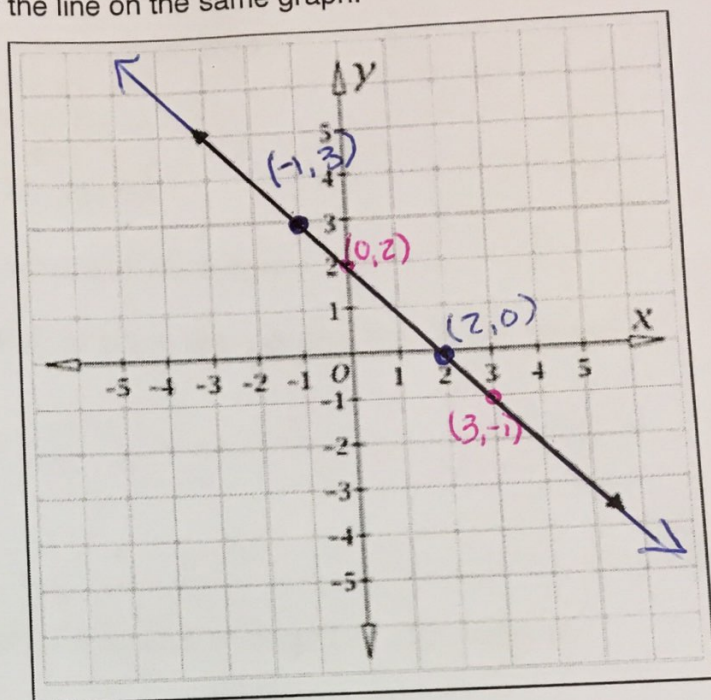
$$\frac{2x - 5}{2} = 2y$$

$$x - \frac{5}{2} = y$$

$$\boxed{f^{-1}(x) = x - 2.5}$$

6) Given a graph below, graph the inverse of the line on the same graph.

Same line



7) Write the inverse of $3x + 7y = 15$ in $f^{-1}(x)$ notation.

~~3x + 7y = 15~~

$$3x + 7y = 15$$

$$3y = \frac{-7x + 15}{3}$$

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

$$f^{-1}(x) = -\frac{7}{3}x + 5$$