Check Understanding **5** Is the relationship shown by the data in the table linear? If it is, model the data with an equation.

Working Outdoors

Temperature	Calories Burned per Day
68°F	3030
62°F	3130
56°F	3230
50°F	3330

In Example 5 you could rewrite $y - 206.6 = -1.8(x - 3)$ as $y = -1.8x + 212$. This form gives you useful information about the y-intercept. For instance, 212°F is the boiling point of water at sea level.

Here are the three forms of linear equations you have studied..

Key Concepts

Reading Math

For more help with the three forms of a linear equation, see page 310.

Summary **Linear Equations**

Slope-Intercept Form	Standard Form	Point-Slope Form
$y = mx + b$	$Ax + By = C$	$(y - y_1) = m(x - x_1)$
m is the slope and b is the y-intercept.	A and B are not both 0.	(x_1, y_1) lies on the graph of the equation, and m is the slope.
Examples		
$y = -\frac{2}{3}x + \frac{5}{3}$	$2x + 3y = 5$	$y - 1 = -\frac{2}{3}(x - 1)$

EXERCISES

For more practice, see *Extra Practice.*

Practice and Problem Solving

A Practice by Example

Example 1 (page 305) **Graph each equation.**

1. $y - 2 = (x - 3)$
2. $y - 2 = 2(x - 3)$
3. $y - 2 = -\frac{3}{2}(x - 3)$
4. $y + 5 = -(x - 2)$
5. $y + 1 = \frac{2}{3}(x + 4)$
6. $y - 1 = -3(x + 2)$
7. $y + 3 = -2(x - 1)$
8. $y - 4 = (x - 5)$
9. $y - 2 = 3(x + 2)$

Example 2 (page 305) **Write an equation in point-slope form for the line through the given point with the given slope.**

10. $(3, -4); m = 6$
11. $(4, 2); m = -\frac{5}{3}$
12. $(0, 2); m = \frac{4}{5}$
13. $(-2, -7); m = -\frac{3}{2}$
14. $(4, 0); m = 1$
15. $(5, -8); m = -3$
16. $(-5, 2); m = 0$
17. $(1, -8); m = -\frac{1}{5}$
18. $(-6, 1); m = \frac{2}{3}$

Example 3 (page 305) **A line passes through the given points. Write an equation for the line in point-slope form. Then rewrite the equation in slope-intercept form.**

19. $(-1, 0), (1, 2)$
20. $(3, 5), (0, 0)$
21. $(4, -2), (9, -8)$
22. $(6, -4), (-3, 5)$
23. $(-1, -5), (-7, -6)$
24. $(-3, -4), (3, -2)$
25. $(2, 7), (1, -4)$
26. $(-2, 6), (5, 1)$
27. $(3, -8), (-2, 5)$
28. $\left(1, \frac{1}{2}\right), (3, 2)$
29. $\left(\frac{1}{2}, 2\right), \left(-\frac{3}{2}, 4\right)$
30. $(0.2, 1.1), (7, 3)$

Example 4 (page 306)

Is the relationship shown by the data linear? If so, model the data with an equation.

31.

x	y
−4	9
2	−3
5	−9
9	−17

32.

x	y
−10	−5
−2	19
5	40
11	58

33.

x	y
3	1
6	4
9	13
15	49

Example 5 (page 306)

34.

Speed Over Posted Speed (mi/h)	Fine ($)
10	75
12	95
15	125
19	165

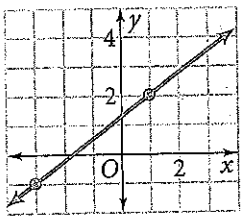
35.

Volume (gal)	Weight (lb)
0	0
2	16
4	33
6	50

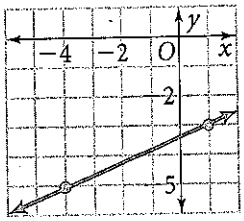
(B) Apply Your Skills

Write an equation of each line in point-slope form.

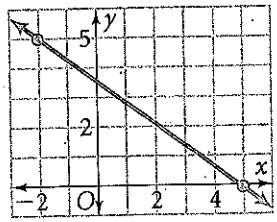
36.



37.



38.



Write one equation of the line through the given points in point-slope form and one in standard form using integers.

39. (1, 4), (−1, 1)

40. (6, −3), (−2, −3)

41. (0, 0), (−1, −2)

42. (0, 2), (−4, 2)

43. (−6, 6), (3, 3)

44. (2, 3), (−1, 5)

45. (5, −3), (3, 4)

46. (2, 2), (−1, 7)

47. (−7, 1), (5, −1)

48. (−8, 4), (−4, −2)

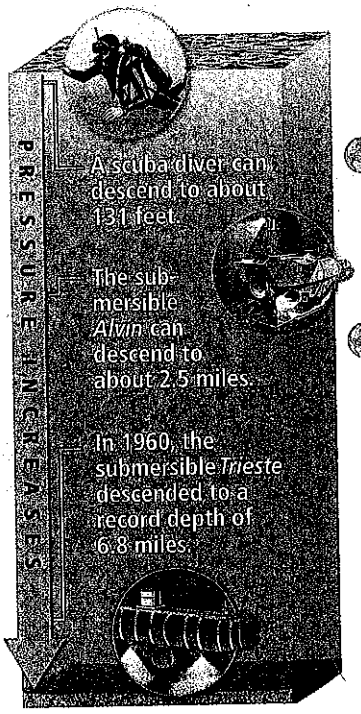
49. (2, 4), (−3, −6)

50. (5, 3), (4, 5)

51. (0, 1), (−3, 0)

52. (−2, 4), (0, −5)

53. (6, 2), (1, −1)



54. Science At the surface of the ocean, pressure is 1 atmosphere. At 66 ft below sea level, the pressure is 3 atmospheres. The relationship of pressure and depth is linear.

a. Write an equation for the data.

b. Predict the pressure at 100 ft below sea level.

55. Environment Worldwide carbon monoxide emissions are decreasing about 2.6 million metric tons each year. In 1991, carbon monoxide emissions were 79 million metric tons. Use a linear equation to model the relationship between carbon monoxide emissions and time. Let $x = 91$ correspond to 1991.

56. a. Open-Ended Write an equation in point-slope form that contains the point (−4, −6). Explain your steps.

b. How many equations could you write in part(a)? Explain.

57. Critical Thinking How would the graph of $y - 12 = 8(x - 2)$ change if all of the subtraction signs were changed to addition signs?

58. Reasoning Is $y - 5 = 2(x - 1)$ an equation of a line through (4, 11)? Explain.