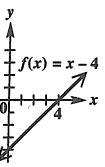
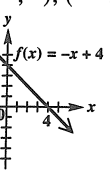
3 Exercises

2. H 3. C 4. G 5. A

ercises 7–24, we give the
in first and then the range.
∞, ∞); (−∞, ∞)

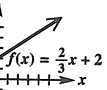


∞, ∞); (−∞, ∞)



∞, ∞); (−∞, ∞)

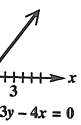
∞, ∞); (−∞, ∞)



∞, ∞); (−∞, ∞)

∞, ∞); (−∞, ∞)

∞, ∞); (−∞, ∞)



Concept Check *Match the description in Column I with the correct response in Column II. Some choices may not be used.*

I	II
1. a linear function whose graph has y-intercept 6	**A.** $f(x) = 2x$
2. a vertical line	**B.** $f(x) = 2x + 6$
3. a constant function	**C.** $f(x) = 7$
4. a linear function whose graph has x-intercept -2 and y-intercept 4	**D.** $f(x) = x^2$
5. a linear function whose graph passes through the origin	**E.** $x + y = 4$
6. a function that is not linear	**F.** $f(x) = 3x + 7$
	G. $2x - y = -4$
	H. $x = 3$

Graph each linear function. Identify any constant functions. Give the domain and range. See Examples 1, 2, and 4.

7. $f(x) = x - 4$ **8.** $f(x) = -x + 4$ **9.** $f(x) = \frac{1}{2}x - 6$

10. $f(x) = \frac{2}{3}x + 2$ **11.** $-4x + 3y = 9$ **12.** $2x + 5y = 10$

13. $3y - 4x = 0$ **14.** $3x + 2y = 0$ **15.** $f(x) = 3x$

16. $f(x) = -2x$ **17.** $f(x) = -4$ **18.** $f(x) = 3$

Graph each vertical line. Give the domain and range of the relation. See Example 3.

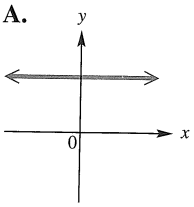
19. $x = 3$ **20.** $x = -4$ **21.** $2x + 4 = 0$

22. $-3x + 6 = 0$ **23.** $-x + 5 = 0$ **24.** $3 + x = 0$

Match each equation with the sketch that most closely resembles its graph. See Examples 2 and 3.

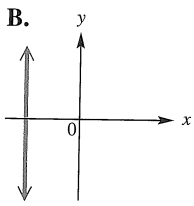
25. $y = 2$

A.



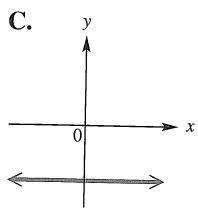
26. $y = -2$

B.



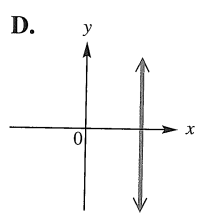
27. $x = 2$

C.



28. $x = -2$

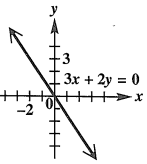
D.



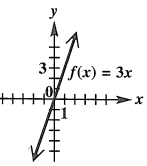
Use a graphing calculator to graph each equation in the standard viewing window. See Examples 1–4.

29. $y = 3x + 4$ **30.** $y = -2x + 3$ **31.** $3x + 4y = 6$ **32.** $-2x + 5y = 10$

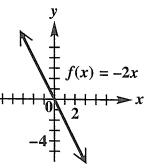
14. $(-\infty, \infty)$; $(-\infty, \infty)$



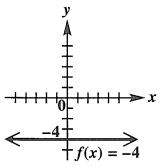
15. $(-\infty, \infty)$; $(-\infty, \infty)$



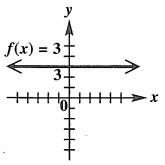
16. $(-\infty, \infty)$; $(-\infty, \infty)$



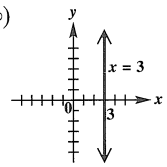
17. $(-\infty, \infty)$; $\{-4\}$; constant function



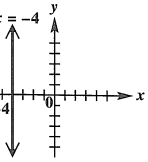
18. $(-\infty, \infty)$; $\{3\}$; constant function



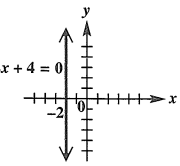
19. $\{3\}$; $(-\infty, \infty)$



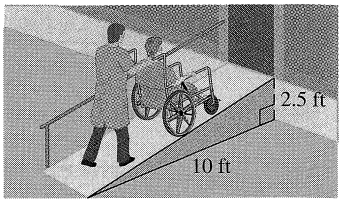
20. $\{-4\}$; $(-\infty, \infty)$



21. $\{-2\}$; $(-\infty, \infty)$



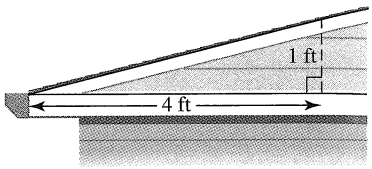
33. *Concept Check* If a walkway rises 2.5 ft for every 10 ft on the horizontal, which of the following express its slope (or grade)? (There are several correct choices.)



A. .25 **B.** 4 **C.** $\frac{2.5}{10}$ **D.** 25%

E. $\frac{1}{4}$ **F.** $\frac{10}{2.5}$ **G.** 400% **H.** 2.5%

34. *Concept Check* If the pitch of a roof is $\frac{1}{4}$, how many feet in the horizontal direction correspond to a rise of 4 ft?



Find the slope of the line satisfying the given conditions. See Example 5.

35. through $(2, -1)$ and $(-3, -3)$

36. through $(5, -3)$ and $(1, -7)$

37. through $(5, 9)$ and $(-2, 9)$

38. through $(-2, 4)$ and $(6, 4)$

39. horizontal, through $(3, -7)$

40. horizontal, through $(-6, 5)$

41. vertical, through $(3, -7)$

42. vertical, through $(-6, 5)$

43. Which of the following forms of the slope formula are correct? Explain.

A. $m = \frac{y_1 - y_2}{x_2 - x_1}$ **B.** $m = \frac{y_1 - y_2}{x_1 - x_2}$ **C.** $m = \frac{y_2 - y_1}{x_2 - x_1}$ **D.** $m = \frac{x_2 - x_1}{y_2 - y_1}$

44. Can the graph of a linear function have undefined slope? Explain.

Find the slope of each line and sketch the graph. See Example 6.

45. $y = 3x + 5$

46. $y = 2x - 4$

47. $2y = -3x$

48. $-4y = 5x$

49. $5x - 2y = 10$

50. $4x + 3y = 12$

51. Explain in your own words what is meant by the slope of a line.

52. Explain how to graph a line using a point on the line and the slope of the line.

Graph the line passing through the given point and having the indicated slope. Plot two points on the line. See Example 6.

53. through $(-1, 3), m = \frac{3}{2}$

54. through $(-2, 8)$, $m = -1$

55. through $(3, -4), m = -\frac{1}{3}$

56. through $(-2, -3)$, $m = -\frac{3}{4}$

57. through $\left(-\frac{1}{2}, 4\right), m = 0$

58. through $\left(\frac{9}{4}, 2\right)$, undefined slope

Concept Check For each given slope in Exercises 59–64, identify the line in A–F at the top of the next page having that slope.

59. $\frac{1}{2}$

60. -2

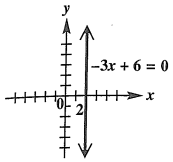
61. 0

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

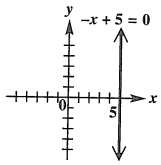
63. 2

64. undefined

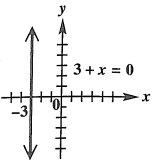
22. {2}; $(-\infty, \infty)$



23. {5}; $(-\infty, \infty)$

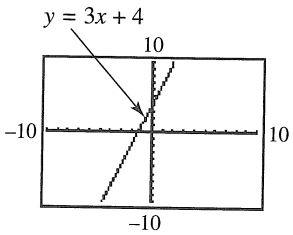


24. {−3}; $(-\infty, \infty)$

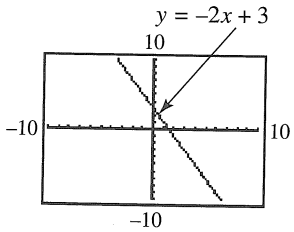


25. A 26. C 27. D 28. B

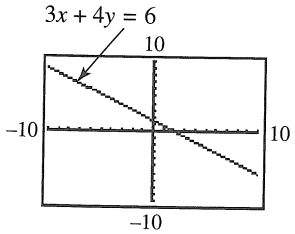
29.



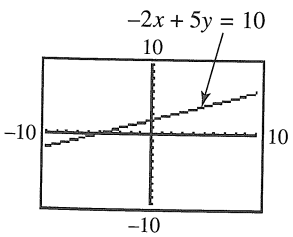
30.



31.



32.



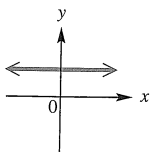
33. A, C, D, E 34. 16 ft

35. $\frac{2}{5}$ 36. 1 37. 0 38. 0

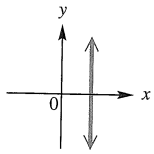
39. 0 40. 0 41. undefined

42. undefined

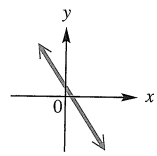
A.



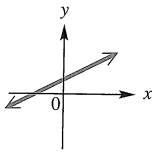
B.



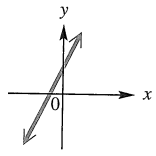
C.



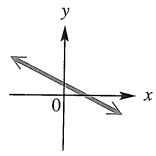
D.



E.

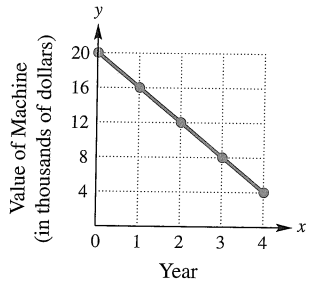


F.

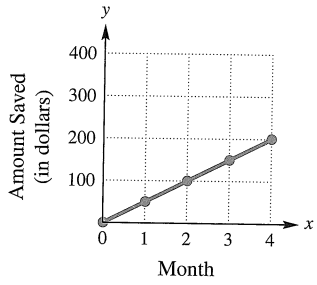


Concept Check *Find and interpret the average rate of change illustrated in each graph.*

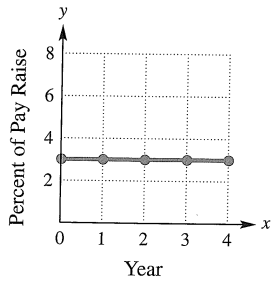
65.



66.

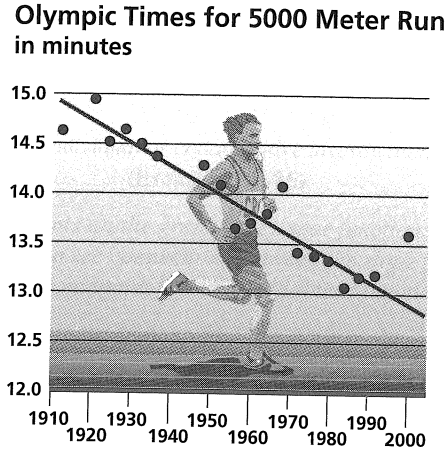


67.



Solve each problem. See Example 8.

68. *(Modeling) Olympic Times for 5000 Meter Run* The graph shows the winning times (in minutes) at the Olympic Games for the men's 5000 m run together with a linear approximation of the data.



Source: United States Olympic Committee.

(continued)