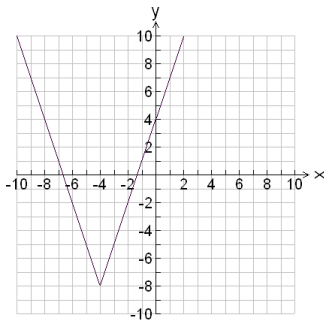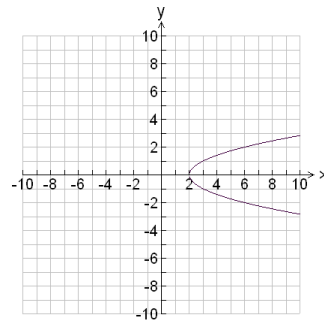# Chapter 11 Review

1. Does a function exist for which the input value is a mathematics instructor and the output value is the state that the instructor was born in?

2. Does a function exist for which the input value is the political party of a state's governor and the output value is the state?

Use the vertical line test to determine if the graph represents a function.

3.

4.

Evaluate the given function.

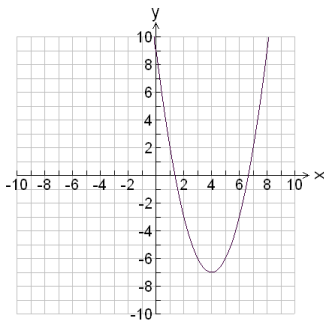5. $f(x) = 15x - 37$, $f\left(\dfrac{19}{3}\right)$

6. $f(x) = 7x - 11$, $f(3b - 8)$

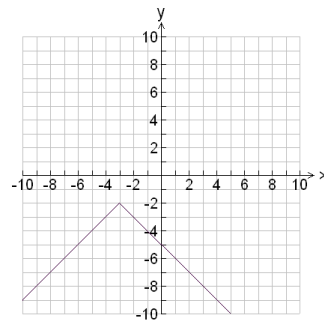7. $f(x) = x^2 - 9x - 36$, $f(-3)$

8. $f(x) = x^2 + 10x - 25$, $f(2n + 5)$

Determine the domain and range of the function $f(x)$ that has been graphed.
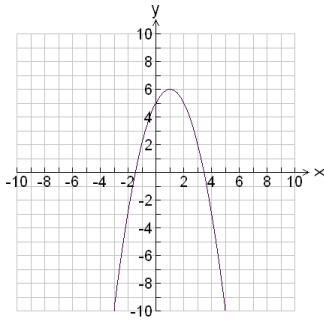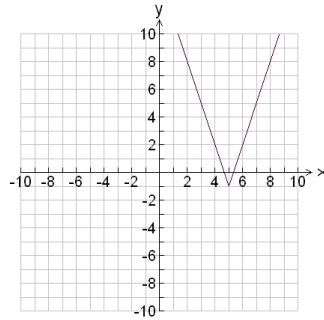
9.

10.

Use the graph of the function $f(x)$ to find the indicated function value.
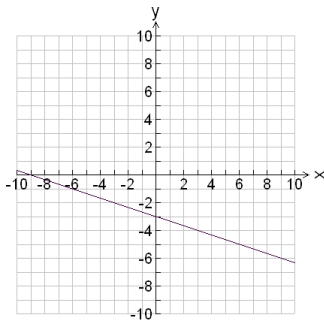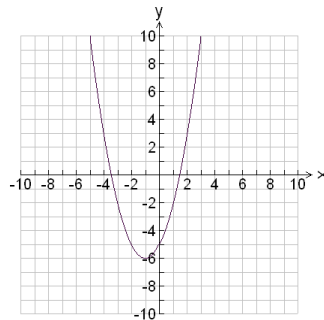
11. $f(4)$

12. $f(2)$

Use the graph of the function $f(x)$ to determine which values of x satisfy the given equation.

13. $f(x) = -6$

14. $f(x) = 3$

Graph each function. Label the x- and y-intercepts.

15. $f(x) = x - 7$

16. $f(x) = \dfrac{2}{5}x - 5$

17. A college club is selling snow cones to raise money for its scholarship fund. In addition to paying $40 to rent space for the day, the club also had to spend $60 on a snow cone machine. The supplies to make each snow cone costs $0.10, and the club is charging $1.50 for each snow cone.

(a) Find $C(x)$.   (b) Find $R(x)$.   (c) Find $P(x)$.

(d) How much profit will be generated if the club sells 400 snow cones?

Graph the function. Find the vertex, y-intercept, and any x-intercepts.

18. $f(x) = x^2 - 4x - 12$

19. $f(x) = x^2 + 6x + 1$

20. $f(x) = (x - 3)^2 - 7$

21. $f(x) = -(x + 2)^2 - 1$

Determine whether the given quadratic function has a maximum value or a minimum value. Then find that maximum or minimum value.

22. $f(x) = x^2 - 12x + 60$

23. $f(x) = -x^2 + 16x - 70$

24. A projectile is launched upward from the roof of a building with an initial velocity of 176 feet/second. The height of the projectile (in feet) after t seconds is given by the function $h(t) = -16t^2 + 176t + 42$. What is the maximum height that the projectile reaches?

25. A farmer has 144 feet of fencing to make a rectangular corral. What dimensions will make a corral with the maximum area? What is the maximum area possible?

For the given function $f(x)$, simplify the difference quotient $\dfrac{f(x+h) - f(x)}{h}$.
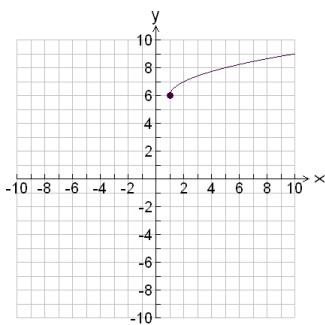
26. $f(x) = x^2 + 13$

27. $f(x) = x^2 - 14x$

Graph the given square root function, and state its domain and range.

28. $f(x) = \sqrt{x-2} + 7$

29. $f(x) = \sqrt{x+5} - 3$

Determine the function $f(x)$ that has been graphed.

30.

Let $f(x) = x^2 + 9x - 22$ and $g(x) = x + 11$. Find the following.

31. $(f + g)(-5)$

32. $(f - g)(15)$

33. $(f \cdot g)(8)$

34. $\left(\dfrac{f}{g}\right)(-1)$

35. For $f(x) = -x + 15$ and $g(x) = 2x - 9$, find $(f + g)(x)$.

36. For $f(x) = 3x + 10$ and $g(x) = -x + 6$, find $(f - g)(x)$.

37. For $f(x) = x - 9$ and $g(x) = x + 4$, find $(f \cdot g)(x)$.

38. For $f(x) = x^2 - x - 6$ and $g(x) = x^2 - 10x + 21$, find $\left(\dfrac{f}{g}\right)(x)$.

39. Let $f(x) = x - 5$ and $g(x) = 3x + 2$. Find $(f \circ g)(6)$.

40. Let $f(x) = x + 4$ and $g(x) = x^2 - 14x + 48$. Find $(g \circ f)(9)$.

For the given functions $f(x)$ and $g(x)$, find $(f \circ g)(x)$ and $(g \circ f)(x)$.

41. $f(x) = 6x - 17$, $g(x) = 3x + 20$ 42. $f(x) = x - 8$, $g(x) = x^2 + 7x - 56$

Determine whether the functions $f(x)$ and $g(x)$ are inverse functions by showing that $(f \circ g)(x) = x$ and $(g \circ f)(x) = x$.

43. $f(x) = 3x + 4$, $g(x) = 4x - 3$ 44. $f(x) = 2x - 10$, $g(x) = \dfrac{x + 10}{2}$

For the given function $f(x)$, find $f^{-1}(x)$.

45. $f(x) = 2x - 15$ 46. $f(x) = -8x + 27$ 47. $f(x) = \dfrac{9x + 2}{3x}$