

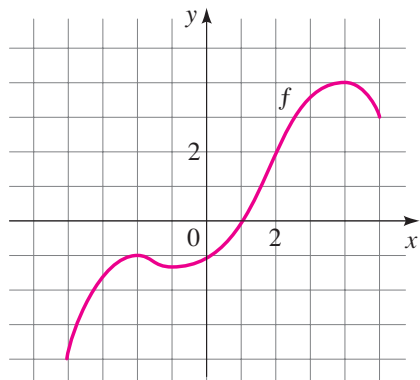
12. How is the composite function $f \circ g$ defined?
13. (a) What is a one-to-one function?
 (b) How can you tell from the graph of a function whether it is one-to-one?
 (c) Suppose f is a one-to-one function with domain A and

range B . How is the inverse function f^{-1} defined? What is the domain of f^{-1} ? What is the range of f^{-1} ?

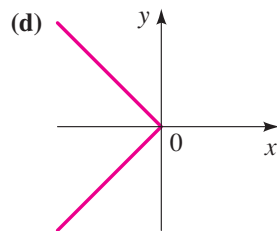
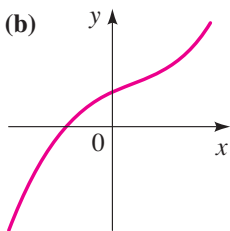
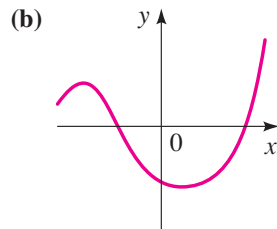
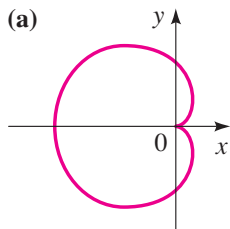
- (d) If you are given a formula for f , how do you find a formula for f^{-1} ?
 (e) If you are given the graph of f , how do you find the graph of f^{-1} ?

Exercises

1. If $f(x) = x^2 - 4x + 6$, find $f(0)$, $f(2)$, $f(-2)$, $f(a)$, $f(-a)$, $f(x + 1)$, $f(2x)$, and $2f(x) - 2$.
2. If $f(x) = 4 - \sqrt{3x - 6}$, find $f(5)$, $f(9)$, $f(a + 2)$, $f(-x)$, $f(x^2)$, and $[f(x)]^2$.
3. The graph of a function f is given.
 (a) Find $f(-2)$ and $f(2)$.
 (b) Find the domain of f .
 (c) Find the range of f .
 (d) On what intervals is f increasing? On what intervals is f decreasing?
 (e) Is f one-to-one?



4. Which of the following figures are graphs of functions? Which of the functions are one-to-one?



- 5–6 ■ Find the domain and range of the function.

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

6. $F(t) = t^2 + 2t + 5$

- 7–14 ■ Find the domain of the function.

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

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

9. $f(x) = \sqrt{x + 4}$

10. $f(x) = 3x - \frac{2}{\sqrt{x + 1}}$

11. $f(x) = \frac{1}{x} + \frac{1}{x + 1} + \frac{1}{x + 2}$

12. $g(x) = \frac{2x^2 + 5x + 3}{2x^2 - 5x - 3}$

13. $h(x) = \sqrt{4 - x} + \sqrt{x^2 - 1}$

14. $f(x) = \frac{\sqrt[3]{2x + 1}}{\sqrt[3]{2x + 2}}$

- 15–32 ■ Sketch the graph of the function.

15. $f(x) = 1 - 2x$

16. $f(x) = \frac{1}{3}(x - 5)$, $2 \leq x \leq 8$

17. $f(t) = 1 - \frac{1}{2}t^2$

18. $g(t) = t^2 - 2t$

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

20. $f(x) = 3 - 8x - 2x^2$

21. $g(x) = 1 - \sqrt{x}$

22. $g(x) = -|x|$

23. $h(x) = \frac{1}{2}x^3$

24. $h(x) = \sqrt{x + 3}$

25. $h(x) = \sqrt[3]{x}$

26. $H(x) = x^3 - 3x^2$

27. $g(x) = \frac{1}{x^2}$

28. $G(x) = \frac{1}{(x - 3)^2}$

29. $f(x) = \begin{cases} 1 - x & \text{if } x < 0 \\ 1 & \text{if } x \geq 0 \end{cases}$

30. $f(x) = \begin{cases} 1 - 2x & \text{if } x \leq 0 \\ 2x - 1 & \text{if } x > 0 \end{cases}$

31. $f(x) = \begin{cases} x + 6 & \text{if } x < -2 \\ x^2 & \text{if } x \geq -2 \end{cases}$

32. $f(x) = \begin{cases} -x & \text{if } x < 0 \\ x^2 & \text{if } 0 \leq x < 2 \\ 1 & \text{if } x \geq 2 \end{cases}$

33. Determine which viewing rectangle produces the most appropriate graph of the function $f(x) = 6x^3 - 15x^2 + 4x - 1$.
 (i) $[-2, 2]$ by $[-2, 2]$ (ii) $[-8, 8]$ by $[-8, 8]$
 (iii) $[-4, 4]$ by $[-12, 12]$ (iv) $[-100, 100]$ by $[-100, 100]$