

## 5.6 Extra Practice

In Exercises 1–8, let  $f(x) = \sqrt{x+3}$ ,  $g(x) = 4x - 3$ , and  $h(x) = 3x^2 + 3$ . Find the indicated value.

1.  $f(g(9))$
2.  $g(f(6))$
3.  $g(h(1))$
4.  $h(g(0))$
5.  $h(f(-2))$
6.  $f(h(5))$
7.  $g(g(1.5))$
8.  $f(f(-2))$

In Exercises 9–16, let  $f(x) = \sqrt{x-6}$ ,  $g(x) = 2x - 5$ , and  $h(x) = x^2 - 3$ . Find the indicated value.

9.  $f(g(10))$
10.  $g(f(31))$
11.  $g(h(1))$
12.  $h(g(2))$
13.  $f(h(5))$
14.  $h(f(42))$
15.  $g\left(g\left(\frac{3}{2}\right)\right)$
16.  $h(h(1))$

In Exercises 17–26, find (a)  $f(g(x))$ , (b)  $g(f(x))$ , and (c)  $f(f(x))$ . State the domain of each composition.

17.  $f(x) = 6x$ ,  $g(x) = x - 2$
18.  $f(x) = x + 7$ ,  $g(x) = |x - 9|$
19.  $f(x) = 4x^2$ ,  $g(x) = x - 2$
20.  $f(x) = x^2 + 2$ ,  $g(x) = 2x - 3$
21.  $f(x) = 2x^{-1}$ ,  $g(x) = 3x - 9$
22.  $f(x) = -3x^{-1}$ ,  $g(x) = x^2 - 4$
23.  $f(x) = 2x + 5$ ,  $g(x) = \sqrt{x-3}$
24.  $f(x) = 3x - 2$ ,  $g(x) = \sqrt{2x-2}$
25.  $f(x) = x + 2$ ,  $g(x) = x^2 + 3x - 7$
26.  $f(x) = 2x - 1$ ,  $g(x) = x^2 - 3x + 2$

In Exercises 27 and 28, let  $f(x) = x^2 + 2$  and  $g(x) = 5x$ . Describe and correct the error in performing the composition.

27. 
$$\begin{aligned} \times \quad f(g(x)) &= 5(x^2 + 2) \\ &= 5x^2 + 10 \end{aligned}$$

28. 
$$\begin{aligned} \times \quad g(f(x)) &= g(x^2 + 2) \\ &= 5x^2 + 2 \end{aligned}$$

29. The function  $C(x) = 10x + 85$  represents the cost (in dollars) of producing  $x$  handbags. The number of handbags produced in  $t$  hours is represented by  $x(t) = 5t$ .

- a. Find  $C(x(t))$ .
- b. Evaluate  $C(x(40))$  and explain what it represents.