

5.6 Extra Practice

In Exercises 1–6, let $f(x) = 3x + 1$, $g(x) = \sqrt{x + 2}$, and $h(x) = x^2 - 7$. Find the indicated value.

1. $f(g(7))$

2. $g(f(2))$

3. $h(f(-1))$

4. $g(h(-3))$

5. $f(f(1.4))$

6. $h\left(h\left(\frac{1}{2}\right)\right)$

In Exercises 7–12, find (a) $f(g(x))$, (b) $g(f(x))$, and (c) $f(f(x))$. State the domain of each composition.

7. $f(x) = 2x + 3, g(x) = |x - 1|$

8. $f(x) = 3x^2, g(x) = 3 - 4x$

9. $f(x) = 6x^{-1}, g(x) = 6x + 1$

10. $f(x) = 9x^{-1}, g(x) = x^2 - 4$

11. $f(x) = -2x + 5, g(x) = \sqrt{x - 9}$

12. $f(x) = 6x + 3, g(x) = \sqrt[3]{x + 7}$

13. The function $r(t) = 3t$ represents the radius (in feet) of an oil spill after t seconds. The area (in square feet) of the oil spill is represented by $A(r) = \pi r^2$.

a. Find $A(r(t))$.

b. Evaluate $A(r(6))$ and explain what it represents.

14. Show that the function $f(x) = 4\sqrt[3]{x - 3} + 4$ is a composition, in some order, of the functions g, h, p , and q .

$g(x) = 4x$

$h(x) = x + 1$

$p(x) = x - 3$

$q(x) = \sqrt[3]{x}$

5.7

Extra Practice

In Exercises 1–3, find the inverse of the function. Then graph the function and its inverse.

1. $f(x) = 10x$

2. $f(x) = -\frac{1}{5}x - 7$

3. $f(x) = \frac{3}{4}x + \frac{5}{8}$

4. Determine whether the functions f and g are inverses. Explain your reasoning.

x	-4	-3	-2	-1	0	1
f(x)	17	13	9	5	1	-3

x	17	13	9	5	1	-3
g(x)	-4	-3	-2	-1	0	1

In Exercises 5 and 6, find the inverse of the function. Then graph the function and its inverse.

5. $f(x) = (x + 2)^3$

6. $f(x) = \frac{1}{3}x^4, x \geq 0$

In Exercises 7 and 8, determine whether the functions are inverse functions.

7. $f(x) = \frac{4x}{5} - 1, g(x) = \frac{5x + 1}{4}$

8. $f(x) = -(x - 2)^5 + 6, g(x) = 2 + (6 - x)^{1/5}$

9. The height h (in meters) of a dropped object after t seconds is represented by $h(t) = -4.9t^2 + 10$.

- a. Find the inverse function. Describe what it represents.
- b. After how many seconds will the object be 2 meters above the ground?