

# Practice 17

For use with Section 2-8

For Exercises 1–12, use the functions  $f(x) = 3x - 1$ ,  $g(x) = 5x^2$ , and  $h(x) = \frac{12}{x + 1}$ . Find each function rule or value.

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|----------------------|----------------------|-----------------------|----------------------|
| 1. $(f \circ g)(x)$  | 2. $(f \circ h)(x)$  | 3. $(g \circ h)(x)$   | 4. $(h \circ g)(x)$  |
| 5. $(g \circ f)(x)$  | 6. $(h \circ f)(x)$  | 7. $(g \circ h)(3)$   | 8. $(f \circ g)(-2)$ |
| 9. $(f \circ h)(-3)$ | 10. $(h \circ g)(1)$ | 11. $(g \circ f)(-1)$ | 12. $(h \circ f)(4)$ |

For Exercises 13–20, add, subtract, multiply, or divide the functions, as indicated. Use  $f(x) = x^2 + 2x$ ,  $g(x) = x^2 - 2x - 8$ , and  $h(x) = 3x - 12$ .

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|-------------------------|-----------------------|-----------------------|-------------------------|
| 13. $f(x) + h(x)$       | 14. $f(x) - g(x)$     | 15. $g(x) \cdot h(x)$ | 16. $\frac{g(x)}{f(x)}$ |
| 17. $\frac{g(x)}{h(x)}$ | 18. $f(x) \cdot g(x)$ | 19. $h(x) - f(x)$     | 20. $g(x) + h(x)$       |

For each function in Exercises 21–26, write two functions  $f(x)$  and  $g(x)$  such that the given function  $k(x)$  is equal to  $(f \circ g)(x)$ .

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| 21. $k(x) = \sqrt{x^2 + 1}$                | 22. $k(x) = 2(3x - 5)^2$                   |
| 23. $k(x) = 4\left(\frac{1}{x}\right) - 5$ | 24. $k(x) = (2x + 1)^2 + 3(2x + 1)$        |
| 25. $k(x) = \frac{x^2}{x^2 - 1}$           | 26. $k(x) = \sqrt{x} + \frac{1}{\sqrt{x}}$ |

27. The speed  $g(t)$  (in ft/s) of a bicycle coasting down a hill as a function of elapsed time (in seconds) is given by the function  $g(t) = 3t$ . The elapsed time  $f(d)$  (in seconds) is given as a function of the distance traveled (in feet) by the function  $f(d) = \sqrt{1.5d}$ .

- Express the speed of the bike as a function of its distance traveled.
- What is the speed of the bike after it has gone 150 ft?

28. **Writing** Suppose you are given two functions, and a co-worker will need to know a value of either the composite of the two functions or their product. Write instructions for arriving at the value of the composite and instructions for arriving at the value of the product.