

- 10. CONSUMER ECONOMICS** A coupon for \$5 off any meal states that a 15% tip will be added to the total check before the \$5 is subtracted. Let x represent the total check amount. Write a function, R , for the price reduction and a function, T , for the tip. Find the composite functions $(R \circ T)(x)$ and $(T \circ R)(x)$, and explain which composite function represents the conditions of the coupon. (EXAMPLE 4)

Practice and Apply

Find $f + g$ and $f - g$.

11. $f(x) = 4x + 3$; $g(x) = 5$ 12. $f(x) = 20x + 7$; $g(x) = -3x$
 13. $f(x) = x^2 + 2x - 1$; $g(x) = 3x - 5$ 14. $f(x) = -x^2 - 3x$; $g(x) = 6x^2 - 3$
 15. $f(x) = x - 2$; $g(x) = 4 - 3x^2$ 16. $f(x) = 3x^2 - x$; $g(x) = 6 - x^2$

Find $f \cdot g$ and $\frac{f}{g}$. State any domain restrictions.

17. $f(x) = 3x^2$; $g(x) = x - 8$ 18. $f(x) = 2x^2$; $g(x) = 7 - x$
 19. $f(x) = -x^2$; $g(x) = 3x$ 20. $f(x) = 4x^2 - 2x + 1$; $g(x) = -5x$
 21. $f(x) = 2x^2$; $g(x) = 7 - x$ 22. $f(x) = 7x^2$; $g(x) = 2x - 6$
 23. $f(x) = -3x^2 - x$; $g(x) = 5 - x$ 24. $f(x) = 4x^2 + 3$; $g(x) = 3x - 9$

Let $f(x) = x^2 - 1$ and $g(x) = 2x - 3$. Find each new function and write it in simplest form. Justify each step in the simplification, and state any domain restrictions.

25. $f + g$ 26. $f - g$ 27. $g - f$ 28. $f \cdot g$ 29. $\frac{f}{g}$

Let $f(x) = x - 3$ and $g(x) = x^2 - 9$. Find each new function and write it in simplest form. Justify each step in the simplification, and state any domain restrictions.

30. $f + g$ 31. $f - g$ 32. $g - f$ 33. $f \cdot g$ 34. $\frac{g}{f}$

Find $f \circ g$ and $g \circ f$.

35. $f(x) = x + 1$; $g(x) = 2x$ 36. $f(x) = 3x$; $g(x) = 2x + 3$
 37. $f(x) = 3x - 2$; $g(x) = x + 2$ 38. $f(x) = 2x - 3$; $g(x) = x + 4$
 39. $f(x) = -3x^2 - 1$; $g(x) = -5x$ 40. $f(x) = -2x$; $g(x) = -2x^2 + 3$
 41. $f(x) = -4x^2 + 3x - 1$; $g(x) = 3$ 42. $f(x) = 2x^2 + 3x - 5$; $g(x) = 4$

Let $f(x) = 3x - 4$ and $g(x) = -x^2$. Evaluate each composite function.

43. $(f \circ g)(2)$ 44. $(f \circ g)(-2)$ 45. $(f \circ f)(2)$ 46. $(f \circ f)(-2)$
 47. $(g \circ g)(2)$ 48. $(g \circ g)(-2)$ 49. $(g \circ f)(0)$ 50. $(f \circ g)(0)$

Let $f(x) = 2x$, $g(x) = x^2 + 2$, and $h(x) = -4x + 3$. Find each composite function.

51. $f \circ g$ 52. $g \circ f$ 53. $f \circ h$ 54. $h \circ g$
 55. $f \circ f$ 56. $h \circ f$ 57. $h \circ (h \circ g)$ 58. $(h \circ f) \circ g$

CHALLENGE

59. Let $h(x) = x^2 - 9$. Find two functions f and g such that $f \circ g = h$.