49. Consider the spreadsheet shown in Example 6. What would this spreadsheet look like if you input .85 into cell A2? (Round your answers to the nearest cent.)

50. Show what you would put into the cells of a spreadsheet to evaluate $f[g(x)]$ for $f(x) = x^2$ and $g(x) = 5x^3$ for values $x = -5, 0, 5, 10$, and 15.

51. If $f(x) = x^2$, $g(x) = 2x - 1$, and $h(x) = 3x + 2$, find $f \circ g$ and $g \circ h$.

52. If $f(x) = x^2$, $g(x) = 2x - 1$, and $h(x) = 3x + 2$, find $(f \circ g) \circ h$.

53. If $f(x) = x^2$, $g(x) = 2x - 1$, and $h(x) = 3x + 2$, find $f \circ (g \circ h)$.

54. If $f(x) = x^2$, $g(x) = 3x - 2$, and $h(x) = x^2 + 1$, find $f \circ h$ and $g \circ h$.

55. If $f(x) = x^2$, $g(x) = 3x - 2$, and $h(x) = x^2 + 1$, find $(f \circ g) \circ h$.

56. If $f(x) = x^2$, $g(x) = 3x - 2$, and $h(x) = x^2 + 1$, find $f \circ (g \circ h)$.

57. If $f(x) = \sqrt{x}$, $g(x) = x^2 + 2$, and $h(x) = x + 2$, all with domain $(0, \infty)$, find $f \circ g$ and $g \circ h$.

58. If $f(x) = \sqrt{x}$, $g(x) = x^2 + 2$, and $h(x) = x + 2$, all with domain $(0, \infty)$, find $(f \circ g) \circ h$.

59. If $f(x) = \sqrt{x}$, $g(x) = x^2 + 2$, and $h(x) = x + 2$, all with domain $(0, \infty)$, find $f \circ (g \circ h)$.

60. If $f(x) = x$, $g(x) = x$, and $h(x) = x$, find $f \circ g$ and $g \circ h$.

61. If $f(x) = x$, $g(x) = x$, and $h(x) = x$, find $(f \circ g) \circ h$.

62. If $f(x) = x$, $g(x) = x$, and $h(x) = x$, find $f \circ (g \circ h)$.

C

63. Suppose that the volume of a certain cone is given by the function

$$V(h) = \frac{\pi h^3}{12}$$

where h is the height. Furthermore, suppose that the height is expressed as a function of time by $h(t) = 2t$.

a. Find the volume for $t = 2$.

b. Express the volume as a function of time by finding $V \circ h$.

c. If the domain of V is $\{h | 0 < h \leq 6\}$, find the domain of h; that is, what are the permissible values for t?

64. The surface area of a spherical balloon is given by

$$S(r) = 4\pi r^2$$

Suppose that the radius r is expressed as a function of time as $r(t) = 3t$.

a. Find the surface area for $t = 2$.

b. Express the surface area as a function of time by finding $S \circ r$.

c. If the domain of S is $\{r | 0 < r < 8\}$, find the domain of r; that is, what are the permissible values for t?

65. If $f(x) = x^2$, then $f(1/x) = (1/x)^2 = 1/x^2 = 1/f(x)$. Give an example of a function for which $f(1/x) \neq 1/f(x)$.

66. If $f(x) = x$, then $f(x^2) = x^2 = [f(x)]^2$. Give an example of a function for which $f(x^2) \neq [f(x)]^2$.

67. If $f(x) = x^2$, then $(f \circ f)(x) = x^4 = f(x) \cdot f(x)$. Give an example of a function for which $(f \circ f)(x) \neq f(x) \cdot f(x)$.

68. If $f(x) = 1 + 1/x$, find each value:

a. $(f \circ f)(x)$

b. $(f \circ f \circ f)(x)$

c. $(f \circ f \circ f \circ f)(x)$

d. Without doing any additional algebra, guess the value of $(f \circ f \circ f \circ f \circ f)(x)$ by noticing a pattern in parts **a–c.**

69. Let $f(x) = \sqrt{x}$. Choose any positive x. Find a numerical value for $(f \circ f)(x)$, $(f \circ f \circ f)(x)$, and $(f \circ f \circ f \circ f)(x)$. If this procedure is repeated a large number of times, $(f \circ f \circ f \circ \cdots \circ f)(x)$, can you predict the outcome for any x?

B *In Problems 27–36, find $f \circ g$ and $g \circ f$.*

27. $f = \{(0, 1), (1, 3), (2, 0), (3, 2)\}$; $g = \{(0, 3), (1, 2), (2, 1), (3, 0)\}$

28. $f = \{(0, 2), (1, 0), (2, 3), (3, 1)\}$; $g = \{(0, 1), (1, 3), (2, 0), (3, 2)\}$

29. $f(x) = 2x - 3$; $g(x) = \dfrac{x + 3}{2}$

30. $f(x) = 3x + 1$; $g(x) = \dfrac{x - 1}{3}$

31. $f(x) = \frac{1}{2}x + 1$; $g(x) = 2x - 2$

32. $f(x) = 2 - \frac{1}{3}x$; $g(x) = 6 - 3x$

33. $f(x) = 2x - 3$; $g(x) = x^2 + 1$

34. $f(x) = \dfrac{x - 2}{x + 1}$; $g(x) = x^2 - x - 2$

35. $f(x) = x^2$; $g(x) = x^2 - x - 2$

36. $f(x) = 4x + 1$; $g(x) = x^3 + 3$

inverse properties" are very
or an inverse property is to
think of a number. Call this