51

a. $(f \circ g)(x) = f(2x+1)$

$= 2x+1+4 = 2x+5$

b. $(g \circ f)(x) = g(x+4) = 2(x+4)+1$

$2x+8+1$

$= 2x+9$

c. $(f \circ g)(2) = 2x+5$

$2(2)+5 = 9$

(54) $f(x) = 7x + 1$

$g(x) = 2x^2 - 9$

$(f \circ g)(x) = f(2x^2 - 9)$

$= 7(2x^2 - 9) + 1$

$14x^2 - 63 + 1$

$14x^2 - 62$

b $(g \circ f)(x) = g(7x + 1)$

$2(7x+1)^2 - 9$

$2(49x^2 + 14x + 1) - 9$

$98x^2 + 28x + 2 - 9$

$98x^2 + 28x - 7$

c $(f \circ g)(2) = 14x^2 - 62$

$14(2)^2 - 62$

$56 - 62 = -6$

(57) $f(x) = 4 - x$

$g(x) = 2x^2 + x + 5$

a. $(f \circ g)(x) = f(2x^2 + x + 5)$

$= 4 - (2x^2 + x + 5)$

$= -2x^2 - x - 1$

b. $(g \circ f)(x) = g(4 - x)$

$2(4-x)^2 + (4-x) + 5$

$2(16 - 8x + x^2) + 4 - x + 5$

$32 - 16x + 2x^2 - x + 9$

$2x^2 - 17x + 41$

c $(f \circ g)(2) = -2x^2 - x - 1$

$-2(2)^2 - 2 - 1$

$-8 - 2 - 1 = -11$

(60) $f(x) = \sqrt{x}$

$g(x) = x+2$

a. $(f \circ g)(x) = f(x+2) = \sqrt{x+2}$

b $(g \circ f)(x) = g(\sqrt{x}) = \sqrt{x} + 2$

c. $(f \circ g)(2) = \sqrt{2+2} = 2$

(63) $f(x) = \frac{1}{x}$

$g(x) = \frac{1}{x}$

a $(f \circ g)(x) = f\left(\frac{1}{x}\right) = \dfrac{1}{\frac{1}{x}}$

$= x$

b $(g \circ f)(x) = g\left(\frac{1}{x}\right) = \dfrac{1}{\frac{1}{x}}$

$= x$

c $(f \circ g)(2) = 2$

(66) $f(x) = \frac{5}{x+4}$

$g(x) = \frac{1}{x}$

$x \neq 0$

a. $(f \circ g)(x) = \frac{5}{\left(\frac{1}{x} + 4\right)}(x) = \frac{5x}{1+4x}$

b. $D: (-\infty, -\frac{1}{4}) \cup (-\frac{1}{4}, 0) \cup (0, \infty)$

(69) $f(x) = \sqrt{x}$

$g(x) = x - 2$

a. $(f \circ g)(x) = f(x-2) = \sqrt{x-2}$

D: $[2, \infty)$

72

$f(x) = x^2 + 1$

$g(x) = \sqrt{2-x}$

$(f \circ g)(x) = f(\sqrt{2-x})$

$= (\sqrt{2-x})^2 + 1$

$2 - x + 1$

$= 3 - x$

D: $(-\infty, 2]$

(73) $h(x) = \sqrt[3]{x^2 - 9}$

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

$g(x) = x^2 - 9$

78 $h(x) = |3x-4|$

$f(x) = |x|$

$g(x) = 3x-4$

79.

$$f(x) = \frac{1}{x}$$

$$g(x) = 2x - 3$$

(90) $f \circ g(1)$

$g(1) = -5$

$f(-5) = 3$

92 $(g \circ f)(-1)$

$f(-1) = 1$

$g(1) = -5$

106 f is $5 off

g is 40% off

b. $(f \circ g)(x) = f(.6x)$

$= .6x - 5$

40% off then $5 off

c. $(g \circ f)(x) = g(x-5)$

$= .6(x-5)$

$= .6x - 3$

$5 off then 40% off

d $(f \circ g)(x)$ is better