

Composite Functions Quiz

Sunday, November 10, 2013

12:41 PM

① $f(x) = x + 4$

a) $f(3) = 3 + 4 = 7$

b) $f(k) = k + 4$

c) $f(k+2) = (k+2) + 4 = k + 2 + 4 = k + 6$

② $f(x) = x^2 + 4x + 1$ and $g(x) = -2x$

a) $f(2) = 2^2 + 4(2) + 1 = 4 + 8 + 1 = 13$

b) $g(3) = -2 \times 3 = -6$

c) $f(g(3)) = f(-6) = (-6)^2 + 4(-6) + 1 = 36 - 24 + 1 = 13$

d) $f(g(x)) = f(-2x) = (-2x)^2 + 4(-2x) + 1 = 4x^2 - 8x + 1$

e) $g(f(x)) = g(x^2 + 4x + 1) = -2(x^2 + 4x + 1) = -2x^2 - 8x - 2$

f) $f \circ g = f(g(x)) = 4x^2 - 8x + 1$ (see Question d)

hint: $f \circ g$ is another way of writing $f(g(x))$

g) $f \circ f = f(f(x))$

$$= f(x^2 + 4x + 1)$$

$$= (x^2 + 4x + 1)^2 + 4(x^2 + 4x + 1) + 1$$

no need to expand.