Sec 1.4 New Stuff: Composition of functions

$f(x)$

$f(g(x))$

Find (f o g)(x) and (g o f)(x)

read "f of g" of x

g of f of x

$f(x) = x^2 - 1$ $g(x) = 2x - 3$

$f \circ g = (2x-3)^2 - 1$

$(2x-3)(2x-3) - 1$

$4x^2 - 6x - 6x + 9 - 1 = 4x^2 - 12x + 8$

evaluate

$(f \circ g)(3) = (2 \cdot 3 - 3)^2 - 1$

8

$4 \cdot 3^2 - 12 \cdot 3 + 8$

$36 - 36 + 8$

8

$(g \circ f)(x) = 2(x^2 - 1) - 3$

$2x^2 - 2 - 3 = 2x^2 - 5$

$(g \circ f)(-2) = 2(-2^2 - 1) - 3 = 3$

Decomposing functions

Determine the two functions that make up the following: $(f \circ g)(x)$

f(x) = outside function, g(x) = inside

$h(x) = (3x-1)^2$ $f(x) = x^2$ $g(x) = 3x - 1$

$h(x) = \sqrt{2x+7}$ $f(x) = \sqrt{x}$ $g(x) = 2x + 7$

$h(x) = (2x-7)^3 + 5$ $f(x) = x^3 + 5$ $g(x) = 2x - 7$