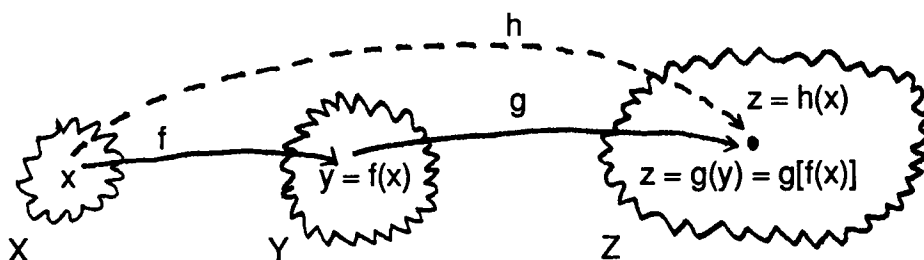


Composite Functions Worksheet to Accompany Videotape #16

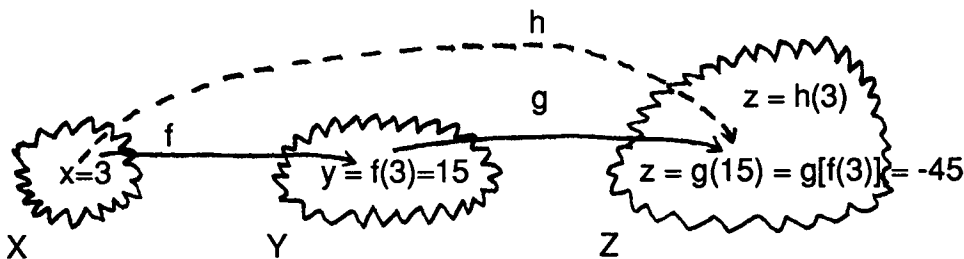
Let f and g be functions. The composite function, or composition, of g and f is

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

for all x in the domain of f such that $f(x)$ is in the domain of g .



Example: Let $f(x) = x^2 + 2x$ and $g(x) = -3x$. Find $(g \circ f)(3)$.



Find $(g \circ f)(x)$ and $(f \circ g)(x)$:

$$(g \circ f)(x) = g[f(x)] = g[x^2 + 2x] = -3(x^2 + 2x) = -3x^2 - 6x$$

$$(f \circ g)(x) = f[g(x)] = f(-3x) = (-3x)^2 + 2(-3x) = 9x^2 - 6x$$

1. Given $f(x) = 4x^2 - 2x$ and $g(x) = 8x+1$, find:

a. $(g \circ f)(2)$

b. $(f \circ g)(-1)$

2. Find $f \circ g$ and $g \circ f$ for each of the following pairs of functions:

a. $f(x) = 8x + 12, g(x) = 3x-1$

d. $f(x) = \sqrt{x+2}, g(x) = 8x^2 - 6$

b. $f(x) = 5x + 3, g(x) = -x^2 + 4x + 3$

e. $f(x) = \frac{1}{x-5}, g(x) = \frac{2}{x}$

c. $f(x) = -x^3 + 2, g(x) = 4x$

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ANSWERS: (1) a. 97 b. 210 (2) a. $24x+4, 24x+35$ b. $-5x^2+20x+18, -25x^2-10x+6$ c. $-64x^3+2, -4x^3+8$ d. $\sqrt{8x^2-4}, 8x+10$ e. $\frac{2-5x}{x}, 2x-10$