Essential Question: How do we evaluate composite functions?

Do Now:
Write in function notation.

a) $y = 2x + 5$

b) $C = 12n + 100$

Evaluate each function.

c) $g(n) = 4n - 5$; Find g(6)

d) $g(n) = n^2 + 4n$; Find g(2)

Evaluate each function.

1) $k(a) = 4a + 2$; Find k(a − 3)

2) $h(t) = -2t + 2$; Find h(−3t)

3) $h(n) = 3n + 5$; Find h(−4n)

4) $h(x) = x^2 + 1$; Find $h(\dfrac{x}{4})$
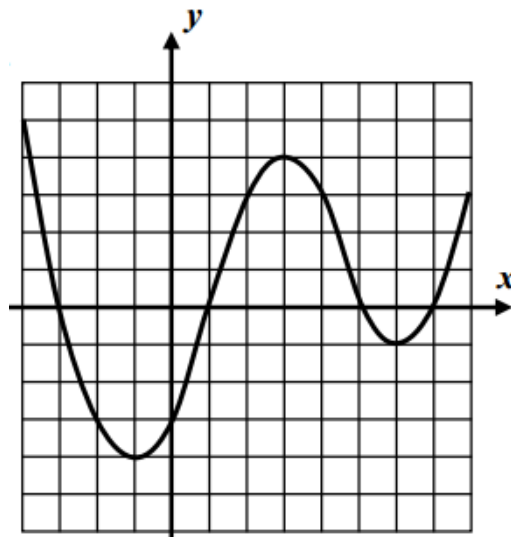
The function pictured to the right is represented by g(x).

g(2) =   g(-3) =

What is the value of x when g(x) = -4?

For what values of x is g(x) = 0?

Composition of Functions

The term "composition of functions" or "composite function" refers to the combining of functions in a manner where the output from one function becomes the input for the next function (apply one rule, get a result, and then apply the second rule to what you obtained from the first rule).

The notation used for composition is:
$$(f \circ g)(x) = f(g(x)) \text{ and is read } \textit{``f composed with g of x''} \textbf{ or } \textit{``f of g of x''}$$

(1) Given:
$$f(x) = 2x - 4$$
$$g(x) = x^2$$

Find:

a) $f(g(3))$

b) $f(g(-2))$

c) $g(f(-5))$

d) $(g \circ f)(7)$

(2) If $f(x) = -9x - 9$ and $g(x) = \sqrt{x - 9}$, find $(f \circ g)(10)$

(3) If $f(x) = -4x + 2$ and $g(x) = \sqrt{x - 8}$, find $(f \circ g)(12)$

(4) If $f(x) = -3x + 4$ and $g(x) = x^2$, find $(g \circ f)(-2)$

1. Given this graph of the function $f(x)$:
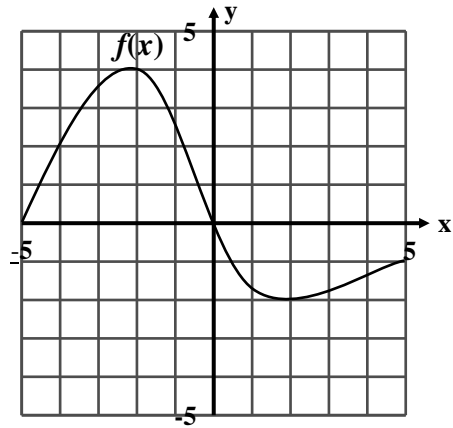
   Find:

   a. $f(2) =$ **b.** $f(0) =$

   c. $f(5) =$ **d.** $f(-5) =$

   e. $f(f(-4)) =$

   e. x when $f(x) = -2$

   f. x when $f(x) = 4$

2. Using $f(x) = 4x + 3$ and $g(x) = x - 2$, find:

   a. $f(g(5))$

   b. $g(f(-6))$

   c. $f(f(7))$

   d. $g(f(x))$

3. If $f(x) = -2x + 1$ and $g(x) = \sqrt{x^2 - 5}$, find $(g \circ f)(2)$