

## Lesson 1.2: Functions and Function Notation

### Standard Notation

$$y = x + 3$$

Solve for  $y$  when  $x = 1$ .

$$y = 1 + 3$$

$$y = 4$$

vs.

### Function Notation

$$f(x) = x + 3$$

Find  $f(1)$ .

$$f(1) = 1 + 3$$

$$f(1) = 4$$

Note:  $f$  is not a variable.

$f(x)$  does not mean  $f$  times  $x$ .

It means: What is the value of the function,  $f$ , when  $x$  equals a certain value?

Ex. For each function, determine the values indicated.

1. If  $f(x) = 3x^2 - 2x + 1$ , find  $f(-1)$ .

$$\begin{aligned} f(-1) &= 3(-1)^2 - 2(-1) + 1 \\ &= 3 + 2 + 1 \\ &= 6 \end{aligned}$$

$$\underline{f(10)}$$

$$\begin{aligned} f(10) &= 3(10)^2 - 2(10) + 1 \\ &= 300 - 20 + 1 \\ &= 281 \end{aligned}$$

2. If  $f(x) = -3x + 2$ , find  $x$  if  $f(x) = 0$ .

$$\begin{aligned} 0 &= -3x + 2 \\ \frac{-2}{-3} &= x \\ \frac{2}{3} &= x \end{aligned}$$

find  $x$  if  $y = 0$

3. If  $f(x) = x^2 - 6x$ , find  $x$  if  $f(x) = 16$ .

$$16 = x^2 - 6x$$

$$0 = x^2 - 6x - 16$$

$$= (x - 8)(x + 2)$$

$$x - 8 = 0 \quad x + 2 = 0$$

$$x = 8 \quad x = -2$$

$$\therefore x = 8 \neq x = -2$$

4. If  $f(x) = 2x^2 - 3x$  and  $g(x) = 3x - 4$ ,

a) find  ~~$3g(2)$~~   $5$  times  $g(x)$   
 $5g(1)$   $\cdot$  sub  $x = 1$

$$5g(1) = 5[3(1) - 4]$$

$$= -5$$

$$b) f(m+1) = 2(m+1)^2 - 3(m+1)$$

$$= 2(m^2 + 2m + 1) - 3m - 3$$

$$= 2m^2 + 4m + 2 - 3m - 3$$

$$= 2m^2 + m - 1$$

c)  $f(f(x))$

"sub in  $x = 2x^2 - 3x$ "

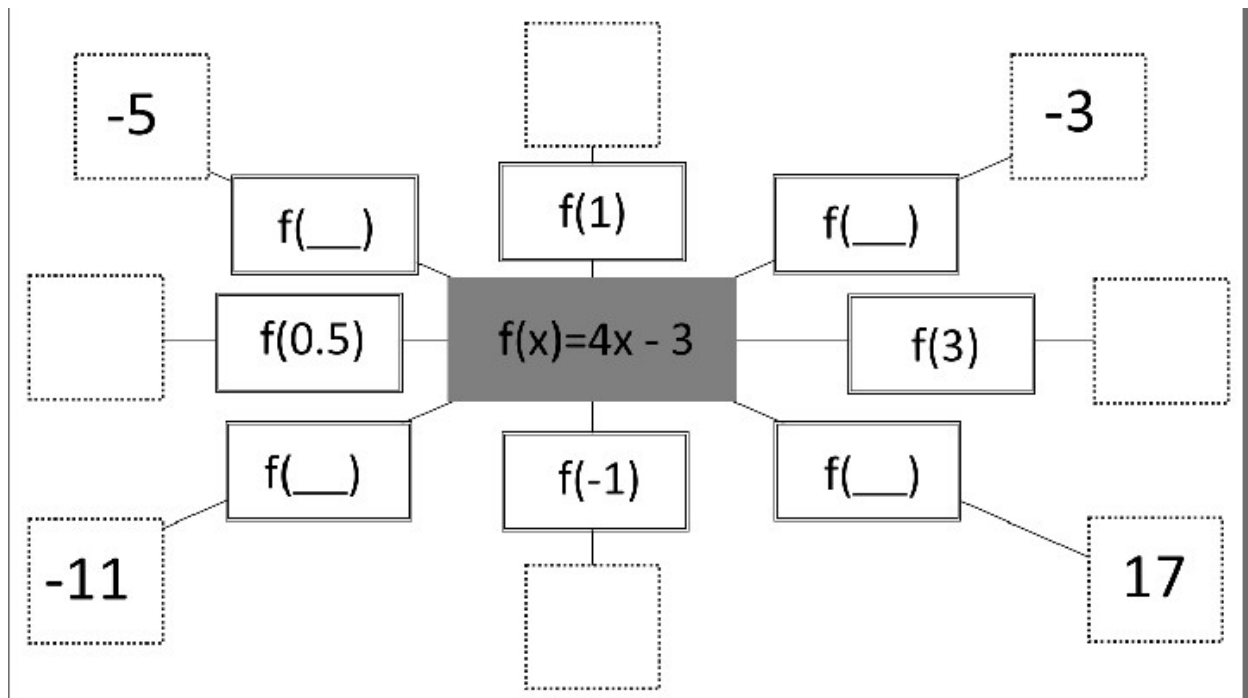
$$f(x) = 2x^2 - 3x$$

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

d)  $g(f(x))$

Sub the function into itself!

THINK: Would  $f(g(x))$  be the same as  $g(f(x))$ ?



# HOMework

p. 23 # 4, 8, 10 + Handout

The f is the generic name for the function.

The whole symbol is the output value.

The x is the generic name for the input value.

$f(x)$

This is read:  
"f of x equals x-squared"

$f(x) = x^2$

f is not a variable.  
This doesn't mean  
f times x