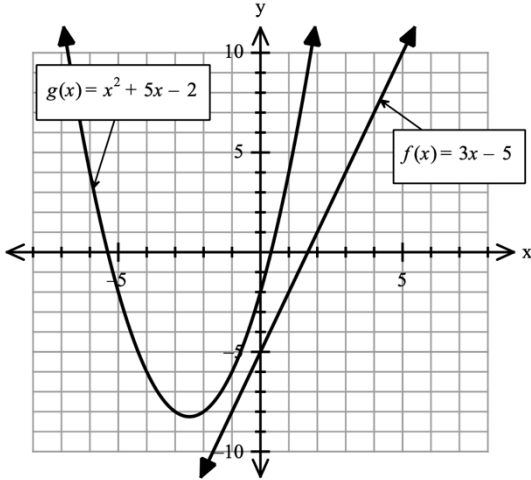# 1.3

Date:

Objective:

Function Notation: f(x) is another name for y. This notation is read "f of x". The parentheses do not imply multiplication.

$g(x) = x^2 + 5x - 2$

$f(x) = 3x - 5$

Evaluating Functions

Let $f(x) = 3x - 5$ and $g(x) = x^2 + 5x - 2$. If we want to evaluate the function at a specific x-value, we replace each x in the original function with the specific x-value.

Examples:

$f(2) = 3(2) - 5$	$g(-1) = (-1)^2 + 5(-1) - 2$
$6 - 5$	$1 - 5 - 2$
1	-6

Practice: Let $f(x) = 3x - 5$ and $g(x) = x^2 + 5x - 2$. Evaluate the following using the equations & the graph.

1. $f(0)$

3. $f(-5)$

2. $g(2)$

4. $g(-3)$

Combining Functions – We can add, subtract, multiply, or divide functions.

Examples: Let $f(x) = x - 5$ and $g(x) = x^2 + 5x - 2$. The combination of functions is set up for you. Simplify the expression by performing the requested operations. Give your answer in standard form.

$(f + g)(x)$	$(f - g)(x)$	$(fg)(x)$
or _____	or _____	or _____
$(f + g)(x) =$	$(f + g)(x) =$	$(fg)(x) =$
$(x - 5) + (x^2 + 5x - 2)$	$(x - 5) - (x^2 + 5x - 2)$	$(x - 5)(x^2 + 5x - 2)$

Practice: Let $f(x) = x + 3$ and $g(x) = x^2 - 1$. Perform or evaluate the indicated operations. Give your answer in standard form.

1. $(f + g)(x)$ 2. $f(0) + 2g(0)$ 3. $(g - f)(x)$

4. $-2(fg)(3)$ 5. $g(-1) - f(-1)$ 6. $(gf)(x)$

Composition of Functions

Composing functions means putting one inside the other.

We use the symbol ∘ to indicate function composition.

For example, $(f \circ g)(x)$ or $f(g(x))$ means "f of g of x." You plug $g(x)$ into $f(x)$.

Example: Let $f(x) = x + 3$ and $g(x) = x^2 - 1$. Find $(f \circ g)(x)$.	
1. Plug $g(x)$ into $f(x)$ by replacing each x with $(x^2 - 1)$	$(x^2 - 1) + 3$
2. Simplify	$x^2 + 2$

Practice: Find the indicated composition of functions. Let $f(x) = x + 5$ and $g(x) = x^2 + 3x - 7$. Give your answer in standard form.

1. $(f(g(x))$ or _____   2. $(g \circ f)(x)$ or _____   3. $(f \circ f)(x)$

Practice: Let $f(x) = x + 3$ and $g(x) = x^2 - 1$. Perform or evaluate the indicated operations. Give your answer in standard form.

4. $(f \circ g)(x)$ 5. $(g(f(x))$ 6. $(g(f(2))$

Functions in Real Life

You make a purchase at a local hardware store, but what you've bought is too big to take home in your car. For a small fee, you arrange to have the hardware store deliver your purchase for you. You pay for your purchase, plus the sales taxes of 7.5%, plus the delivery fee of $20.

1. Identify each part of the function given on the purchase amount x.

$(x) = 1.075x$ represents _____.

$f(x) = x + 20$ represents _____.

2. Calculate and interpret $(f \circ t)(x)$ *and* $(t \circ f)(x)$. Which results in a lower cost to you?

3. Suppose taxes, by law are not to be charged on delivery fees.

   a) Which composite function must then be used?

   b) Find out the total cost if your purchased amount x is $50.

A manufacturer of Android tablets has monthly fixed costs of $25,200 and a variable cost of $300 per unit for its entry level tablet. The company sells this tablet for $429 each.

1. Write a function for the monthly costs. $C(x) = $ _____

2. Write a function for the monthly total revenue. $R(x) = $ _____

3. Write a function for the monthly total profit. $P(x) = $ _____

4. Evaluate and explain what it means.

   a) $C(450)$

   b) $R(450)$

   c) $P(450)$