Warm Up 9/26

Lesson 2-7: Combining Functions

Objective
Students will…
- Be able to add, subtract, multiply, and divide functions.
- Be able to compute the composition of functions.

Adding, Subtracting, Multiplying, and Dividing
There exist sums, differences, products, and quotients within functions. Here are the rules:
Let f and g be functions. Then the functions $f + g, f - g, fg, f/g$ are defined as follows.

$(f + g)(x) =$　　　　　　　$(f - g)(x) =$　　　　　　　$(fg)(x) =$　　　　　　　$\left(\frac{f}{g}\right)(x) =$

Example

Let $f(x) = \frac{1}{x-2}$ and $g(x) = \sqrt{x}$
a. Find the functions $f + g, f - g, fg$.

b. Find $(f + g)(4), (f - g)(4), (fg)(4)$, and $(\frac{f}{g})(4)$

Composition of Functions
With functions, there s a very special way of combining them to get a new function. Consider the following,
Let $f(x) = \sqrt{x}$ and $g(x) = x^2 + 1$. We may define a function h as, $h(x) =$　　　　　$= f(x^2 + 1) = \sqrt{x^2 + 1}$
This is called a composition of functions. The _____ function $f \circ g$ (also called a <u>composition</u> of f and g) is defined by
$($　　　$)(x) = f(g(x))$

Example

Let $f(x) = x^2$ and $g(x) = x - 3$
a. Find the functions $f \circ g$ and $g \circ f$　　　　　　　　b. Find $(f \circ g)(5)$ and $(g \circ f)(7)$

Let $f(x) = x^2$ and $g(x) = x - 3$
Find the functions $f \circ f$ and $g \circ g$

Homework 9/26
Worksheet problems Odd Only