Entry #: _____

Lesson 2.6 & 2.7: Combining Functions & One-to-One Functions and Their Inverses

Combining Functions

Below are the rules for combining functions for each operation. Assume that A is the domain for $f(x)$ and B be the domain for $g(x)$.

Operation	Rule	Domain
Addition		
Subtraction		
Multiplication		
Division		

Example: Let $f(x) = x^2 + 3x - 1$ and $g(x) = -2x + 1$. Compute the following.

1. $(f + g)(3)$
2. $(fg)(2)$
3. $(f - g)(1)$
4. $\left(\frac{f}{g}\right)(4)$

Composition of Functions

Given two functions f and g, the _____ $f \circ g$ (also called the _____ of f and g) is defined by:

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

Example: Find $(f \circ g)(x)$ of the functions from the example above.

One-to-One Functions

A function with a domain A is called **one-to-one** if no two _____ of *A* have the same output. That is, $f(x_1) \neq f(x_2)$ whenever $x_1 \neq x_2$.

The _____ line test can be used to determine if a function is one-to-one. A function is one-to-one if and only if no horizontal line intersects its graph more than once.

The Inverse of a Function

Let f be a function with Domain *A* and Range *B*, then its _____ has Domain *B* and Range *A*.

How to Find an Inverse for a One-to-One Function

1. Write $y = f(x)$.
2. Solve this equation for x in terms of y (if possible).
3. Interchange x and y. The resulting equation is $y = f^{-1}(x)$

Example: Find the inverse of the following functions.

1. $f(x) = x^2 - 5$
2. $f(x) = \frac{2}{3}x^3 + 2$

How to Check if a Function is an Inverse of Another Function

A function f is the inverse of another function g if:

Conversely, any function f^{-1} satisfying these equations is the inverse of f.

Example: Check to see if the following equations are inverses of one another.

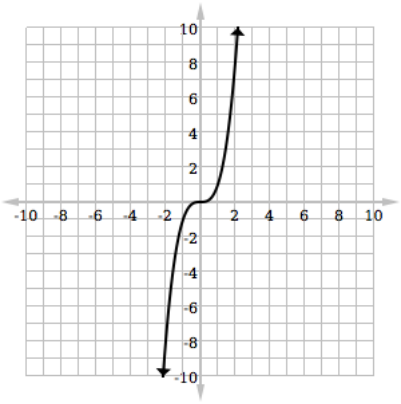
1. $f(x) = 2x^3 \quad g(x) = \frac{1}{2}x^{\frac{1}{3}}$

Graphing the Inverse of a Function

To graph the inverse of a function, you reflect the function over the line _____ .

Examples: Graph the Inverse.

1. $f(x) = x^3$



2. $f(x) = -\frac{1}{2}x + 5$