Lesson 1.11-Objective- SWBAT find the compositions of functions.

Kickoff- Simplify each of the following

1) $\frac{5x^2-10x^4}{10x^3}$

2) $\frac{6a^2bc^3-4a^3bc+2abc}{2a^2b^2c^2}$

Composition of Functions- The application of one function follows that of another.
(Applying one function to another)

Notation: Compositions are shown as $f(g(x))$ when you have two functions, $f(x)$ and $g(x)$

However, the most important thing is that you complete the INSIDE function first and then continue to the OUTSIDE function.

Examples: Given $f(x) = 2x - 1$ and $g(x) = 2x^2 - 3x$ find each of the following:

1) $g(f(1))$

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

3) $g(f(-5))$

4) $f(g(4))$

However, we can also complete compositions of functions without evaluating. To do this, you substitute the INSIDE function for every time you see x in the OUTSIDE function.

Examples: Given $f(x) = 2x - 1$ and $g(x) = 2x^2 - 3x$ find each of the following:

5) $f(g(x))$

6) $g(f(x))$

Practice:

7) If $f(x) = 3x$ and $g(x) = x - 4$, find $g(f(-2))$

8) If $h(x) = x^2$ and $r(x) = x + 3$, find $h(r(-5))$

9) If $j(x) = x^2 + 3$ and $a(x) = 2x - 10$ find $j(a(3))$

10) If $f(x) = 2x - 6$ and $g(x) = x + 4$ find $f(g(x))$

11) If $b(x) = x^2$ and $c(x) = x + 1$, find $c(b(x))$

$1(x^2) + 1$

$x^2 + 1$

12) If $f(x) = x^2 - 1$ and $g(x) = 2x + 5$, find $g(f(x))$

$2(x^2 - 1) + 5$

$2x^2 - 2 + 5$

$2x^2 + 3$