C12 - 10.0 - Function Operations Review

Operations $f(that)$: *Put* that *in for* x

$f(x) + g(x) = (f + g)(x)$ $\quad Add\ y-values$

$f(x) - g(x) = (f - g)(x)$ $\quad Subtract\ y-values$

$f(x) \cdot g(x) = (fg)(x)$ $\quad Multiply\ y-values$

$\frac{f(x)}{g(x)} = \left(\frac{f}{g}\right)(x)$ $\quad Divide\ y-values$

The Game

Pick an x-value to talk about. We aren't talking about another x-value until were done talking about that x-value. Add/Subtract/ Multiply/Divide /Substitute $y-values$. Draw new $y-value$.

Repeat

Composite Functions Domain: Inside & Final, Not Outside

$f\ o\ g(x) = f\big(g(x)\big)$ $\quad Put\ g(x)\ into\ f's\ x$

$g\ o\ f(x) = g\big(f(x)\big)$ $\quad Put\ f(x)\ into\ g's\ x$

$(f\ o\ g^{-1})(x) = f(g^{-1}(x))$ $\quad (f^{-1}\ o\ g^{-1})(x) = (g\ o\ f)^{-1}(x)$

Inverse

$y = 2x + 4$

$x = 2y + 4$ $\quad Switch\ x\ and\ y$

$x - 4 = 2y$

$\frac{x}{2} - 2 = y$ $\quad Algebra$

$y = \frac{1}{2}x - 2$ $\quad Solve\ for\ y =$

$f^{-1}(x) = \frac{1}{2}x - 2$ $\quad Call\ it\ f^{-1}(x)$

Check your answer

$f\big(f^{-1}(x)\big) = x$

$f^{-1}\big(f(x)\big) = x$

Remember: *If you put* $f^{-1}(x)$ *into* $f(x)$, *and if you put* $f(x)$ *into* $f^{-1}(x)$, *both must solve to x.*

$f(x) = \frac{x}{x+1}$

$y = \frac{x}{x+1}$

$x = \frac{y}{y+1}$

$x(y+1) = y$

$xy + x = y$

$x = y - xy$

$x = y(1-x)$ $\quad GCF = y$

$\frac{x}{1-x} = y$

$y = \frac{x}{1-x}$

$f^{-1}(x) = \frac{x}{1-x}$

Switch x and y
Multiply
Distribute
Combine like terms (y's on one side)
Factor
Divide