

**Functions : Part Four - Function Composition**

You can add, subtract, multiply, and divide functions just as you would with numbers. Not only that, but you can use function arithmetic when defining functions or when using functions in equations.

Not only that, you can also put functions inside of other functions in equations or definitions.



Here are two functions:

$hand(x) = 2x + 1$

$foot(x) = 3x + 5$



What formula do we get if we use the function $foot(x)$ as the input into the function $hand(x)$?

$hand(foot(x))$

LiveMath is just like you when you do math...one step at a time. First enter in the expression:

$hand(foot[x])$



There are two things to do now.

Substitute in the expression for $foot(x)$:

$hand(foot[x])$

$\triangle hand(foot[x]) = hand(3x + 5)$ Substitute

Or, substitute in the expression for $hand(x)$:

$hand(foot[x])$

$\triangle hand(foot[x]) = 2foot(x) + 1$ Substitute

Then substitute in the other expression:

$hand(foot[x])$

$hand(foot[x]) = hand(3x + 5)$

$\triangle hand(foot[x]) = 2(3x + 5) + 1$ Substitute

$hand(foot[x])$

$hand(foot[x]) = 2foot(x) + 1$

$\triangle hand(foot[x]) = 2(3x + 5) + 1$ Substitute



Now It's Your Turn... Follow the directions below to get hands on experience.



1.

Declare the functions

$$\text{stone}(x) = 3x - 1$$

$$\text{rock}(x) = \sqrt{x + 5}$$

What are the formulas for $\text{stone}(\text{rock}(x))$ and $\text{rock}(\text{stone}(x))$?

Graph $\text{stone}(\text{rock}(x))$ and $\text{rock}(\text{stone}(x))$.