LIVEMATH JumpStart Lesson 3 : Functions

Functions : Part 3 - Function Arithmetic

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.

Here are two functions:

$\text{hand}(x) = 2x + 1$

$\text{foot}(x) = 3x + 5$

Here is an equation using these definitions:

$3\,\text{hand}(x) = \text{foot}(x) - 1$

Here is the same equation with the two definitions substituted in.

$3\,\text{hand}(x) = \text{foot}(x) - 1$

$3(2x + 1) = 3x + 4$ Substitute

How about a third function defined using hand(x) and foot(x):

$$\text{elbow}(x) = \frac{\text{hand}(x)}{x} + \sqrt{x\ \text{foot}(x)}$$

You can evaluate this new function:

$\text{elbow}(3)$

$\text{elbow}(3) = 8.8141$ Calculate

Or, you can substitute 3 into this function...or rather, substitute this function into an expression:

$\text{elbow}(3)$

$\text{elbow}(3) = \frac{1}{3}\text{hand}(3) + \sqrt{3\,\text{foot}(3)}$ Substitute

And then substitue hand and foot in:

$\text{elbow}(3)$

$\text{elbow}(3) = \frac{1}{3}\text{hand}(3) + \sqrt{3\,\text{foot}(3)}$

$\text{elbow}(3) = \sqrt{42} + \frac{7}{3}$ Substitute

And then calculate the resulting expression:

$\text{elbow}(3)$

$\text{elbow}(3) = \frac{1}{3}\text{hand}(3) + \sqrt{3\,\text{foot}(3)}$

$\text{elbow}(3) = \sqrt{42} + \frac{7}{3}$

$\text{elbow}(3) = 8.8141$ Calculate

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

1.

Declare several functions as follows:

ohio(x) = 3 x - 1

utah(x) = x + 2

iowa(x) = - x + 3

$$\text{states}(x) = \frac{\text{ohio}(x)\ \text{utah}(x)}{\text{iowa}(x)}$$

asymptote(x) = -3 x - 5

Graph states(x) and asymptote(x) on the same graph.
Viewing window dimensions: [-20, 20] by [-100, 100].