PUT IT ALL TOGETHER

We have now explored transformations on many parent functions: polynomial, radical, exponential, and logarithmic functions. You have made observations about the general rules for transformations during these explorations. Now it is time to put them all together.

Function Notation

In general, a function is referred to as $f(x)$. We can use this notation to represent any function—in fact, it is called ***function notation***. If we are going to make generalizations about functions, we can do it using $f(x)$.

Observation I

We have looked at: $y=(x-3)^2$ $y=\sqrt{x+1}$ $y=e^{x-1}$

$y=(x-3)^3$ $y=\sqrt[3]{x+3}$ $y=\ln(x+4)$

These are all examples of altering the x portion of the function. We could write this generally as $f(x+a)$ where a is how we are changing x.

What effect did this change have on the parent function in each case?

Observation II

Also, we looked at: $y=x^2+3$ $y=\sqrt{x}-2$ $y=e^x-1$

$y=x^3+3$ $y=\sqrt[3]{x}-2$ $y=\ln(x)+4$

What was changing here?

How might you write that in ***function notation***?

What effect did this change have on the parent function in each case?

Observation III

We also examined: $y = 2x^2$ $y = 2x^3$ $y = 3e^x$

What was changing here?

How might you write that in ***function notation***?

What effect did this change have on the parent function in each case?

Observation IV

Also, we examined: $y = \sqrt{6x}$ $y = \sqrt[3]{8x}$ $y = \ln(3x)$

What was changing here? How did these differ from Observation III?

How might you write that in ***function notation***?

What effect did this change have on the parent function in each case?

Prediction

How would the graph of $y = 3\sin(x+4) - 2$ differ from the parent graph of $f(x) = \sin(x)$?