Function Transformations
Demonstration Activity

1) Open the Function Transformations II Demonstration located at
   http://demonstrations.wolfram.com/ALibraryOfFunctionsWithTransformations/

2) First get familiar with the various options. Choose a function. Adjust the sliders for stretches and shifts. You can animate the demonstration by clicking on the squares with a plus sign and pressing play.

3) Moving the slider for the vertical stretch does what to the graph?

a) If the vertical stretch number is greater than 1, what happens?

b) If the vertical stretch number is between 0 and 1, what happens?

c) If the vertical stretch number is negative between -1 and 0, what happens?

d) If the vertical stretch number is negative and less than -1, what happens?

4) What happens to the graph if the vertical shift number is positive?

   What happens to the graph if the vertical shift number is negative?

5) What happens to the graph if the horizontal shift number is positive?

   What happens to the graph if the horizontal shift number is negative?

6) Set the vertical stretch to 2, vertical shift to -3 and the horizontal shift to 1.

a) Write an equation for the absolute value graph with these transformations and sketch a graph below.

b) Write an equation for the quadratic graph with these transformations and sketch a graph below.

c) Write an equation for the cubic graph with these transformations and sketch a graph below.

d) Write an equation for the cube root graph with these transformations and sketch a graph below.

e) Write an equation for the square root graph with these transformations and sketch a graph below.

f) Write an equation for the exponential graph with these transformations and sketch a graph below. (Use base e)

g) Write an equation for the logarithmic graph with these transformations and sketch a graph below. (Use base e)

7) For the following graphs, list what transformations are being applied, sketch a graph by hand and verify your sketch on the demonstration.

a) $y = -2(x-4)^2 - 1$

b) $y = 3\ln(x+1) - 2$

c) $y = -4e^{x-3} + 1$

d) $y = -\sqrt{x+4} + 3$