Handout for MATH 1300 (Barsamian) Lecture L11 Fri Sep 11
Part 1: Library of Basic Functions

For each function

- Fill in the table of y values. (No calculators! Work in fractions, not decimals.)
- Make a graph.
  - Make your graph large and neat.
  - Label the graph with the formula of the function
  - Use the data from your table to label points on the graph with their (x, y) coordinates.

x	$y = x^2$
-2	
-1	
0	
1	
2	

x	$y = \sqrt{x}$
0	
1	
4	
9	

x	$y = \lvert x \rvert$
-2	
-1	
0	
1	
2	

Part 2: Transformations of Graphs

	constant on the outside	constant on the inside
additive constant	$g(x) = f(x) + c$ Make graph of g by *adding* c to the y-values on the graph of f.	$g(x) = f(x + c)$ Make graph of g by *subtracting* c from the x-values on the graph of f.
multiplicative constant	$g(x) = cf(x)$ Make graph of g by *multiplying* the y-values on the graph of f by c.	$g(x) = f(cx)$ Make graph of g by *dividing* the x-values on the graph of f by c.

The goal is to make graphs of functions by transforming the basic graphs that you made in Part 1.

You will start by drawing a basic graph, and then draw a new graph for the result of each transformation, until you finally arrive at the desired graph.

For the first two functions, the sequence of intermediate graphs is specified.
For the third function, you have to figure out the sequence of intermediate graphs

For every graph (even the intermediate ones), label important points with their (x, y) coordinates.

[Example 1] Goal: Make a graph of $y = \frac{1}{2}(x-3)^2 - 1$

First graph (basic graph): $y = x^2$
Second graph: $y = (x-3)^2$
Third graph: $y = \frac{1}{2}(x-3)^2$
Fourth graph (the goal): $y = \frac{1}{2}(x-3)^2 - 1$

[Example 2] Goal: Make a graph of $y = -5\sqrt{2x}$

First graph (basic graph): $y = \sqrt{x}$
Second graph: $y = \sqrt{2x}$
Third graph (the goal): $y = -5\sqrt{2x}$

[Example 3] Goal: Make a graph of $y = -2|x+3| + 4$

You figure out the sequence of graphs, starting with a basic graph.