Name: _____ **Panther ID:** _____

Worksheet 1 Calculus I Spring 2013

1. Use transformations to obtain the graph of $y = 1 - 2|x - 3|$ out of the graph of $y = |x|$.
Confirm your graph by writing $y = 1 - 2|x - 3|$ as a piecewise defined function and graphing it this way.

2. (like Pb. 29, p. 14, textbook) An open box is to be constructed from a rectangular sheet of cardboard, 8 inches by 12 inches, by cutting out squares with sides of length x from each corner and bending up the sides.

(a) Express the volume V as a function of x.
(b) Find the domain of $V(x)$.
(c) Plot the graph of the function $V(x)$ and estimate the range of this function.
(d) In words, describe how the volume V varies with x, and how should one construct the box with maximum volume.

3. Consider the function $f(x) = 3x^2 - 2x$.

(a) Compute and simplify as much as possible the expression $\dfrac{f(x+h) - f(x)}{h}$.

(b) Sketch the graph of $y = f(x)$ and also sketch the graph of $y = |f(x)|$.

(c) Is $f(x)$ a one-to-one function? Restrict the domain of $f(x)$ to make it a one-to-one function and find a formula for the inverse function f^{-1}.