

Handout: Functions and Transformations

I. Functions You Must Know - these are the "Parent Graphs" you must be able to visualize quickly!

$$f(x) = c$$
$$x = c$$

$$f(x) = x^2$$
$$f(x) = x^3$$
$$f(x) = x^4$$

$$f(x) = \sin x$$
$$f(x) = \cos x$$
$$f(x) = \tan x$$

$$f(x) = e^x$$
$$f(x) = e^{-x}$$
$$f(x) = b^x \quad (b > 0)$$
$$f(x) = b^x \quad (b < 0)$$
$$f(x) = b^{-x} \quad (b > 0)$$
$$f(x) = b^{-x} \quad (b < 0)$$

$$f(x) = \log_b x$$
$$f(x) = \ln x$$

$$f(x) = 1/x$$
$$f(x) = 1/x^2$$

$$f(x) = x^{1/2} \text{ or } \sqrt{x}$$
$$f(x) = x^{1/3}$$
$$f(x) = x^{2/3}$$

$$f(x) = |x|$$

II. Transformations of the "Parent Graphs" that you must be able to visualize quickly!

Change to the "parent function" $y = f(x)$, with $c \geq 0$. Be able to describe these transformations in a sentence.

$$y = f(x) + c$$
$$y = f(x) - c$$

$$y = f(x + c)$$
$$y = f(x - c)$$

$$y = |f(x)|$$
$$y = f(|x|)$$

$$y = -f(x)$$
$$y = f(-x)$$

$$y = c \cdot f(x), c > 1$$
$$y = c \cdot f(x), 0 < c < 1$$
$$y = c \cdot f(x), c < -1$$
$$y = c \cdot f(x), -1 < c < 0$$

$$y = f(cx), c > 1$$
$$y = f(cx), 0 < c < 1$$