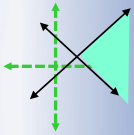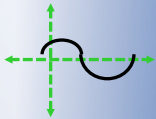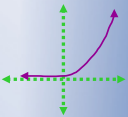$5x-2y \leq 75$

$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$
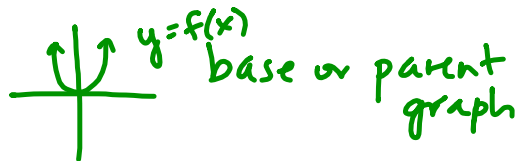
$S = Pe^{rt}$

$APY = (1 + \frac{r}{n})^{n} - 1$

Math 1090 ~ Business Algebra

Section 3.6 Transformations of Graphs

Objectives:
- Differentiate between outside and inside the function.
- Describe shifts, stretches and reflections of a parent function.
- Sketch a graph using shifts, stretches and reflections of the parent function.

Transformations to a graph of $f(x)$.

$y = f(x)$ base or parent graph

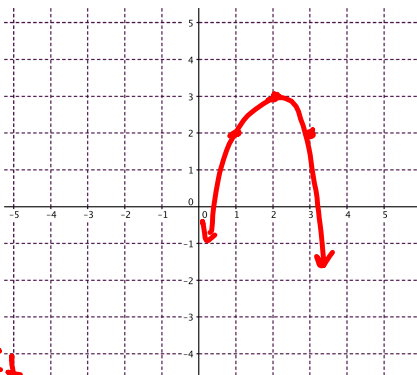|	shift	reflection	stretch/shrink $c > 0$ constant
V	$f(x) + h$ $h > 0$ up $h < 0$ down	$-f(x)$	$cf(x)$ $c > 1$, stretch $c < 1$, shrink
H	$f(x - h)$ $h > 0$ right $h < 0$ left	$f(-x)$	$f(cx)$ $c > 1$, shrink $c < 1$, stretch

vertical changes: outside the fn
horizontal changes: inside the fn

Ex 1: Describe the transformation of $f(x) = -(x-2)^2 + 3$ compared to the base graph of $y = x^2$. Sketch the graph of $f(x)$.
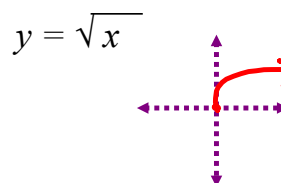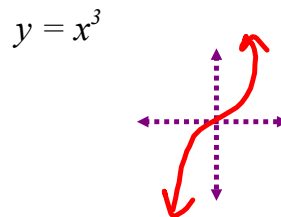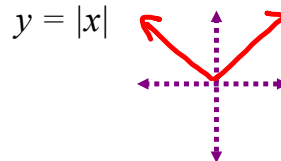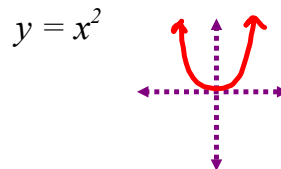
$y = x^2$

$f(x) = -(x-2)^2 + 3$

vert. ref.   shift R 2   shift up 3

vert. ref.

Base graphs

$y = x^2$

$y = |x|$

$y = x^3$

$y = \sqrt{x}$

Ex 2: Describe the transformations and sketch the graph.

a) $q(x) = -2|x-3| + 1$

base graph: $y = |x|$

$q(x) = -2|x-3| + 1$

vert. reflectn
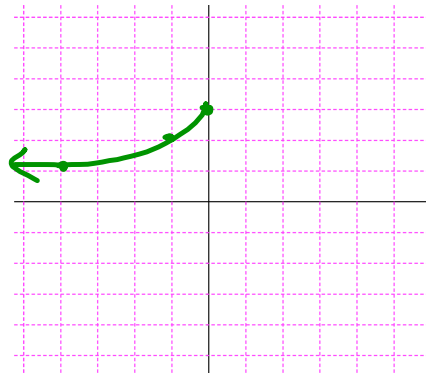
vert. Stretch factor of 2

shift R 3

shift up 1

① vert. ref

② vert. ref and stretch

b) $h(x) = -\sqrt{-x} + 3$

parent

$y =$ $\sqrt{x}$	vert ref. $-\sqrt{x}$	hor. ref. $-\sqrt{-x}$	$-\sqrt{-x} + 3$
(0,0)	(0,0)	(0,0)	(0,3)
(1,1)	(1,-1)	(-1,-1)	(-1,2)
(4,2)	(4,-2)	(-4,-2)	(-4,1)

+shift up 3

Ex 3: Given this graph of *f(x)*, sketch the indicated transformed graph.

f(x)

f(-x) + 1   ← horiz. ref.

vert. shift up 1

f(x+1) → horiz. shift left 1

-f(x) + 1 → vert. ref.

→ vert. shift up 1