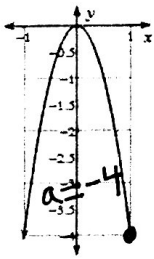
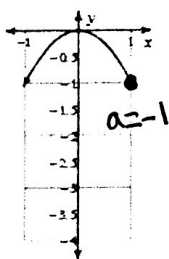
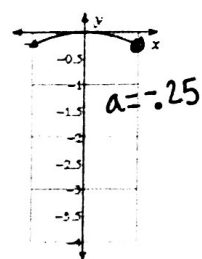
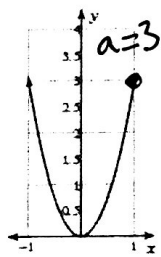
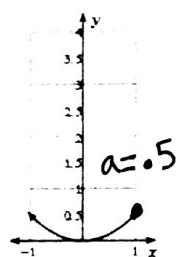
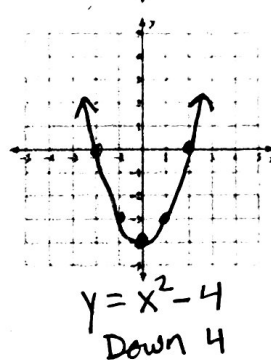
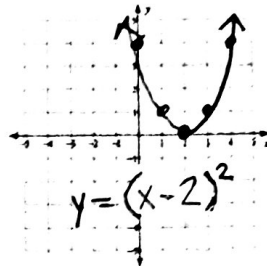
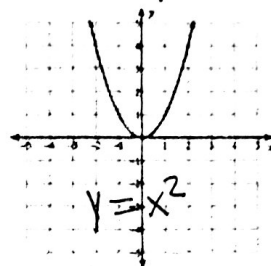
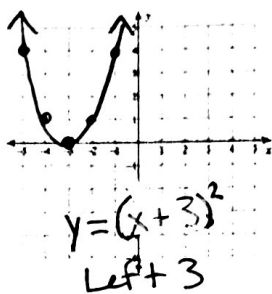
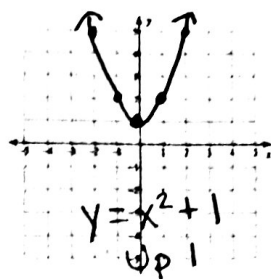


Unit 8 Notes

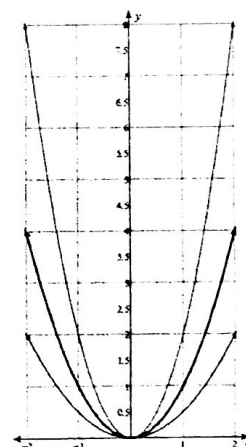
8.1 Intro to Transformations and Absolute Value

$y = a(x - h)^2 + k$, vertex @ (h, k)

- 1) Reflected across the x-axis
- 2) Vertical **stretch** by factor of a
Or
Vertical **compression** by a factor of a
- 3) Shift right h or Shift left h
- 4) Shift up k or Shift down k



To find the a -value, go over 1 from the vertex & however much you move up/down is the a -value
 Vertical stretch: $|a| > 1$
 Vertical compression: $|a| < 1$



Example 2: Describe the transformations of each parabola:

$y = .5(x - 2)^2 + 3$	$y = -(x + 5)^2$	$y = -2(x - 12)^2 - 9$
Vertical compression by factor of .5 Shift right 2, up 3	Reflection over x-axis Shift left 5	Reflection over x-axis Vertical stretch by factor of 2 Shift right 12, down 9

Example 3: Can a function be Stretched and Compressed at the same time?

No, a number can't be greater than & less than 1, at the same time

What about Stretched and Reflected?

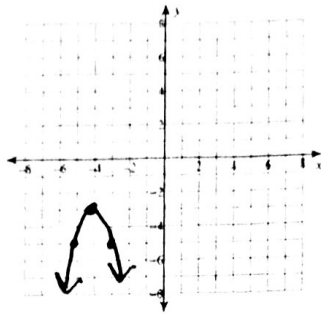
Yes ex: $a = -2$

Example 4: Graph each function. State the Domain and Range using interval AND inequality notation.

a) $y = -2(x + 4)^2 - 3$

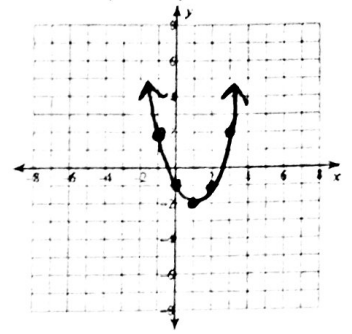
$1a = 1(-2) = -2$
 $3a = 3(-2) = -6$

Domain: $(-\infty, \infty)$
 Range: $(-\infty, -3)$



b) $y = (x - 1)^2 - 2$

Domain: $(-\infty, \infty)$
 Range: $[-2, \infty)$

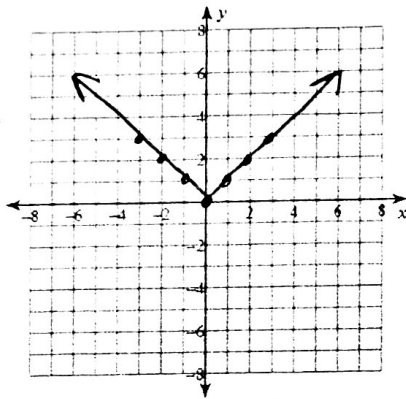


ABSOLUTE VALUE FUNCTIONS $y = a|x - h| + k$

Transformations work the same no matter what kind of equation you are working with

$y = |x|$

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3



The absolute value function uses the same transformation rules as a quadratic function

$y = -(x - 6)^2 - 2$ VS $y = -|x - 6| - 2$

Example 5: Without graphing, describe the transformations of the following functions:

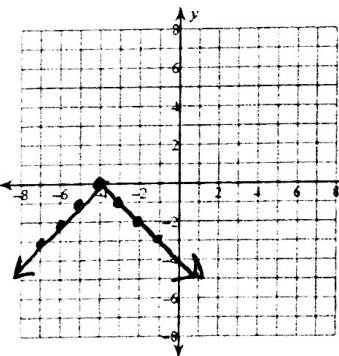
$y = -2 x + 3$	$y = .5 x + 5 + 2$	$y = - x - 6 - 2$
Reflection over the x-axis Vertical stretch by factor of 2 Shift up 3	Vertical compression by factor of .5 Shift left 5, up 2	Reflection over x-axis Shift right 6, down 2

Example 6: Graph each equation. State the Domain and Range.

a) $y = -|x + 4|$

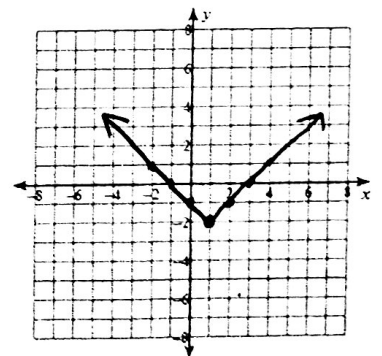
The a-value acts as the slope of both sides of the v-shape

Domain: $(-\infty, \infty)$
 Range: $(-\infty, 0]$



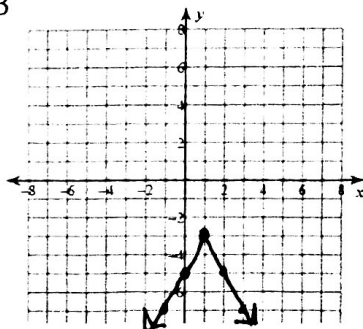
b) $y = |x - 1| - 2$

Domain: $(-\infty, \infty)$
 Range: $[-2, \infty)$



c) $y = -2|x - 1| - 3$

Domain: $(-\infty, \infty)$
 Range: $(-\infty, -3]$



d) $y = 3|x + 4| - 2$

Domain: $(-\infty, \infty)$
 Range: $[-2, \infty)$

