Name: NOTES Date: _____ Period: ____

Algebra II Transformations on Quadratic and Absolute Value Functions

STUDENT NOTES

Essential Questions:

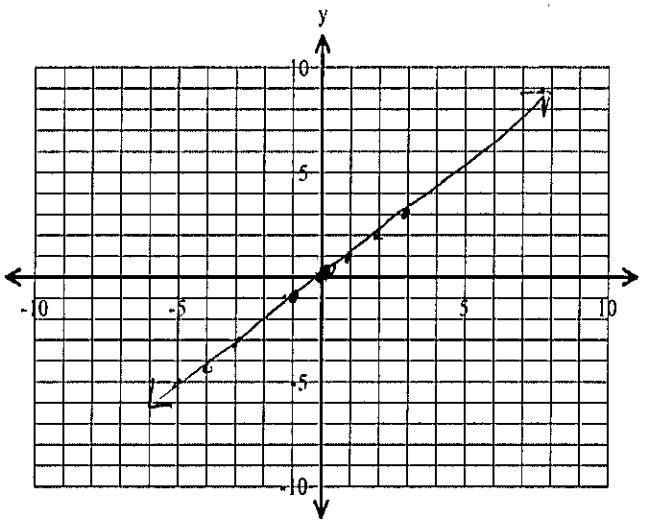
- How do I recognize/perform transformations on quadratic functions and absolute value functions?

Slope of a line Parent Function

$f(x) = x$

$y = x + 0$

x	$f(x) = x$
-3	-3
-2	-2
-1	-1
0	0
1	1
2	2
3	3

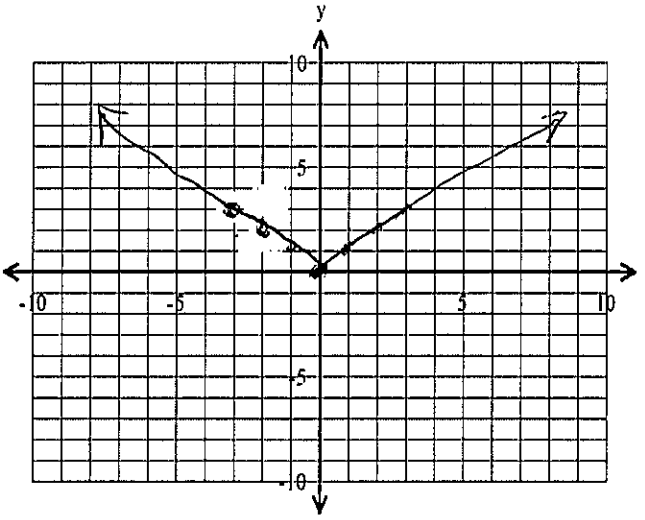


Absolute Value Parent Function

$f(x) = |x|$

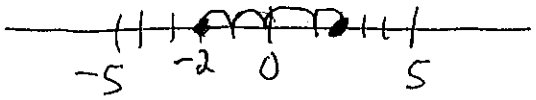
$y = |x|$

x	$f(x) = \|x\|$
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3



| | | = Absolute Value - The distance from 0.

ALWAYS POSITIVE



$|-2| = 2$

$|2| = 2$

Quadradic Equation Parent Function

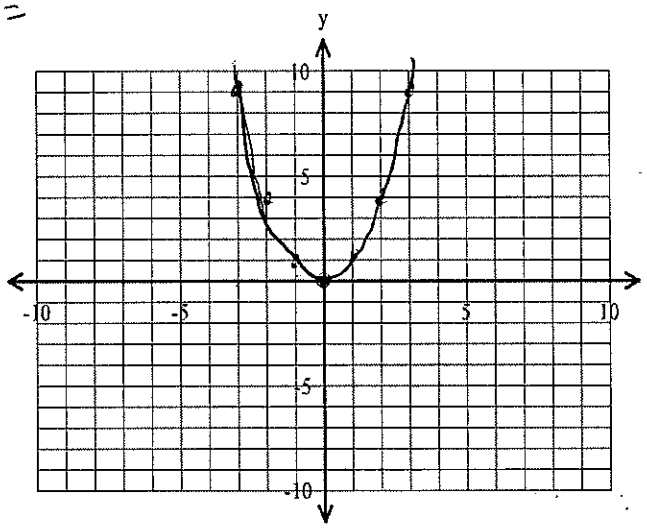
x	$f(x) = x^2$
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

$f(x) = x^2$

$3^2 =$

$Y = X^2$ $3 \cdot 3 = 9$

$-3 \cdot -3 = 9$



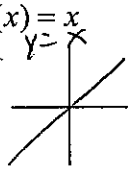
Quadratic equation has X^2

make a U graph

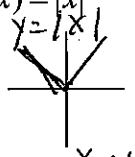
called a parabola

Graph each function. *You **must** memorize these "Parent" graphs*

a) $f(x) = x$

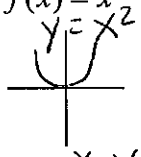


b) $f(x) = |x|$



vertex (0, 0)

c) $f(x) = x^2$



vertex (0, 0)

vertex = highest or lowest point

Part I - Vertical Translation or Shift (Outside):

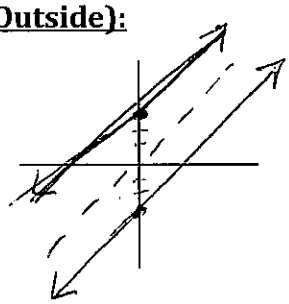
A. $f(x) = x$

Graph $y_1 = x$ *(dashed)*

Graph $y_2 = x + 3$

Graph $y_2 = x - 3$

$Y = X$



x	$f(x) = x + 3$	$F(x) = x - 3$
-3		
-2		
-1		
0		
1		
2		
3		

label each graph

$Y = X + 3$

goes up 3

$Y = X - 3$

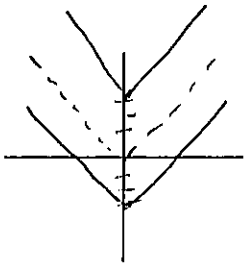
goes down 3

B. $f(x) = |x|$

Graph $y_1 = |x|$ *(dashed)*

Graph $y_2 = |x| + 3$

Graph $y_2 = |x| - 3$



label each graph

$y = |x| + 3$

goes up 3

$y = |x| - 3$

goes down 3

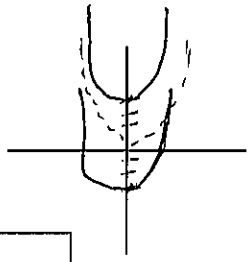
x	$f(x) = \|x\| + 3$	$f(x) = \|x\| - 3$
-3		
-2		
-1		
0		
1		
2		
3		

C. $f(x) = x^2$

Graph $y_1 = x^2$ *(dashed)*

Graph $y_2 = x^2 + 3$

Graph $y_2 = x^2 - 3$



label each graph

$y = x^2 + 3$

goes up 3

$y = x^2 - 3$

goes down 3

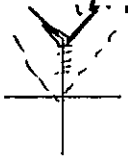
x	$f(x) = x^2 + 3$	$f(x) = x^2 - 3$
-3		
-2		
-1		
0		
1		
2		
3		

Explain how a parent graph moves when adding on the "outside" and subtracting on the "outside."
Graph the functions *without* a calculator *(first draw the parent graph using dashed lines)*

1) $f(x) = x^2 + 5$ parent: $y = x^2$

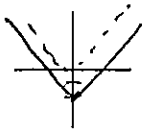
Parent vertex (0, 0)
New vertex (0, 5)

2) $f(x) = |x| + 5$ parent: $y = |x|$



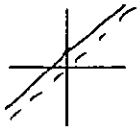
Parent vertex (0, 0)
New vertex (0, 5)

3) $f(x) = |x| - 2$ parent: $y = |x|$

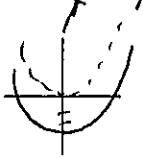


Parent vertex (0, 0)
New vertex (0, -2)

4) $f(x) = x + 1$ parent: $y = x$



5) $f(x) = x^2 - 3$ parent: $y = x^2$



Parent vertex (0, 0)
New vertex (0, -3)

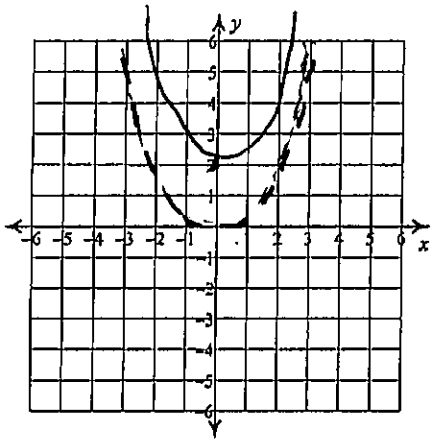
Algebra 2 Name_____ ID: 1

Assignment

Date_____ Period____

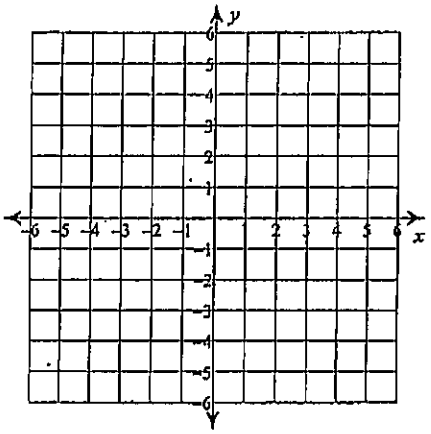
Graph each equation. Draw the parent graph with dotted lines. Label the vertex in the form (,).

1) $y = x^2 + 2$



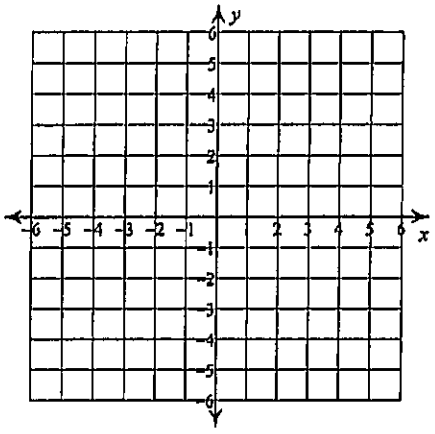
Vertex (0, 2)

2) $y = x^2 + 1$



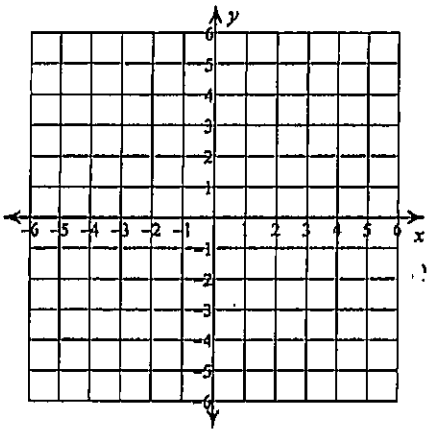
vertex (,)

3) $y = x^2 + 3$



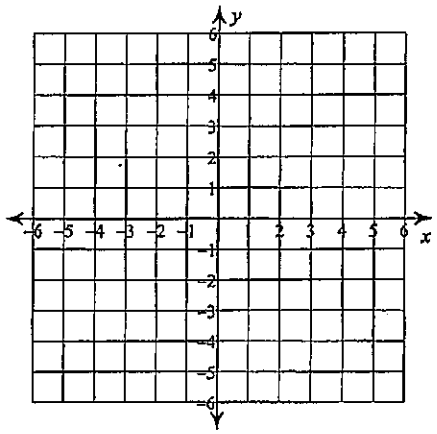
vertex (,)

4) $y = x^2 - 1$



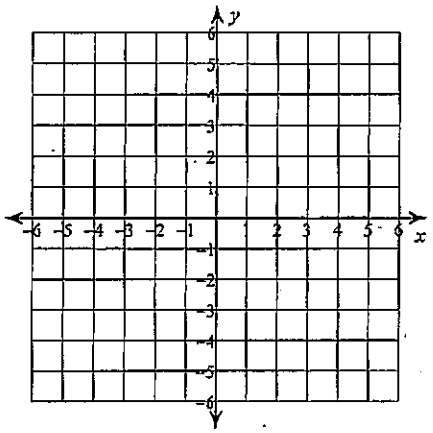
vertex (,)

5) $y = x^2 + 4$



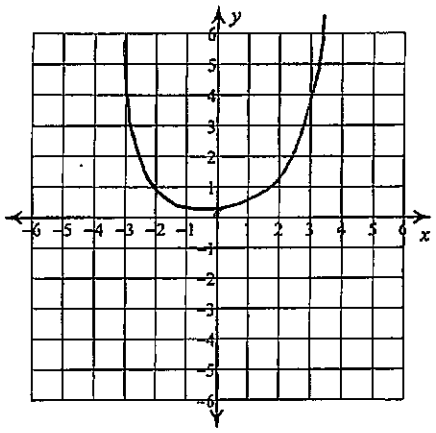
vertex (,)

6) $y = x^2 - 3$



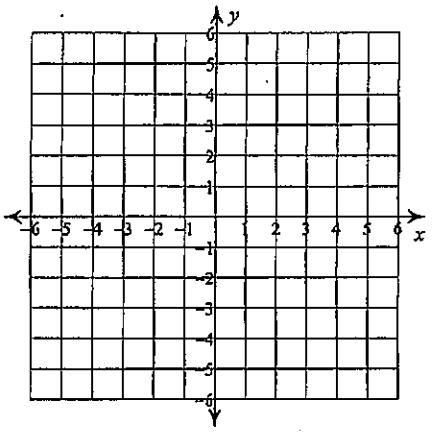
vertex (,)

7) $y = x^2$



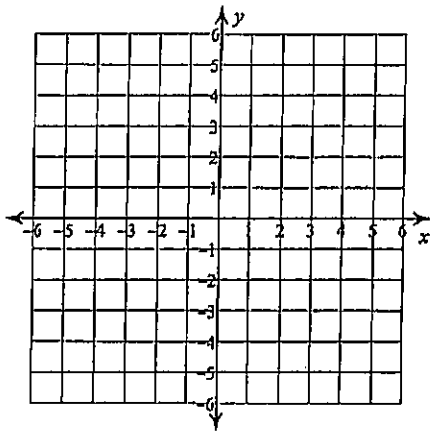
vertex (0, 0)

8) $y = x^2 - 5$



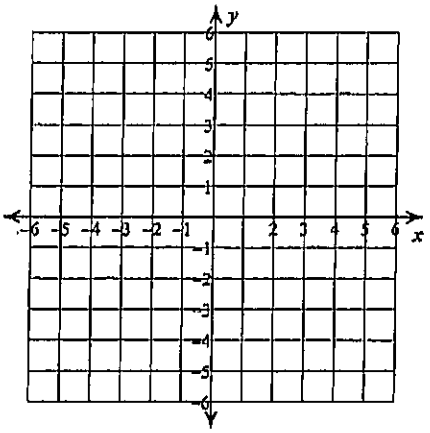
vertex (,)

9) $y = |x| + 4$



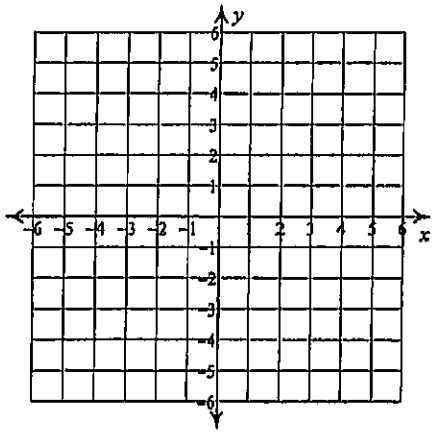
vertex (,)

10) $y = |x| - 2$



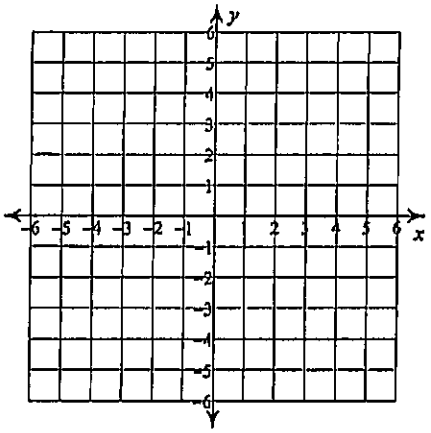
vertex (,)

11) $y = |x| - 3$



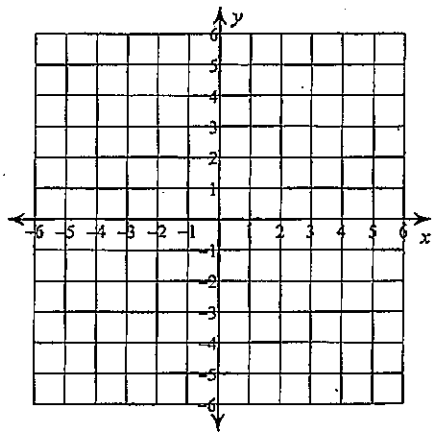
vertex (,)

12) $y = |x| - 1$



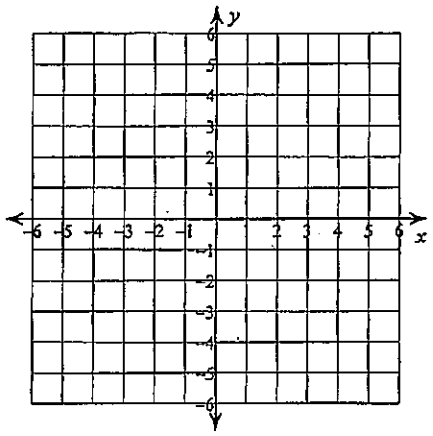
vertex (,)

13) $y = |x| + 3$



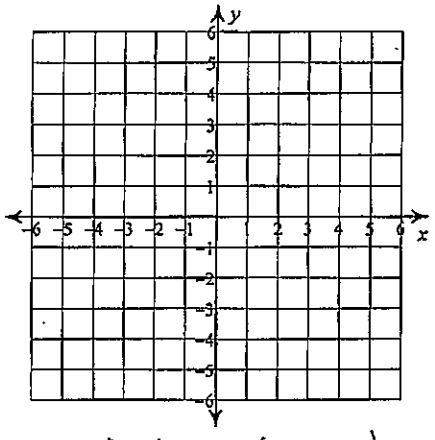
vertex (,)

14) $y = |x| - 4$



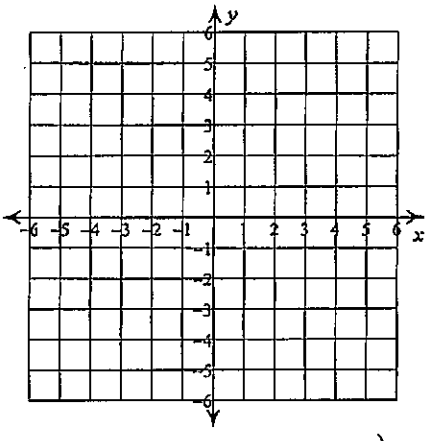
vertex (,)

15) $y = |x| - 5$



vertex (,)

16) $y = |x| + 3$



vertex (,)