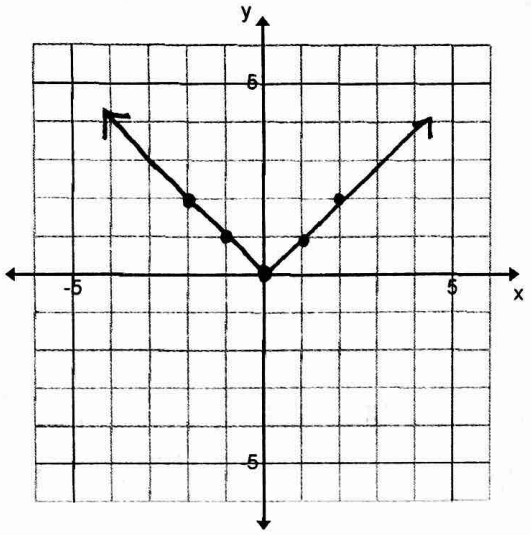
Transformations Notes & Examples Packet

Parent Functions:

$f(x) = |x|$

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

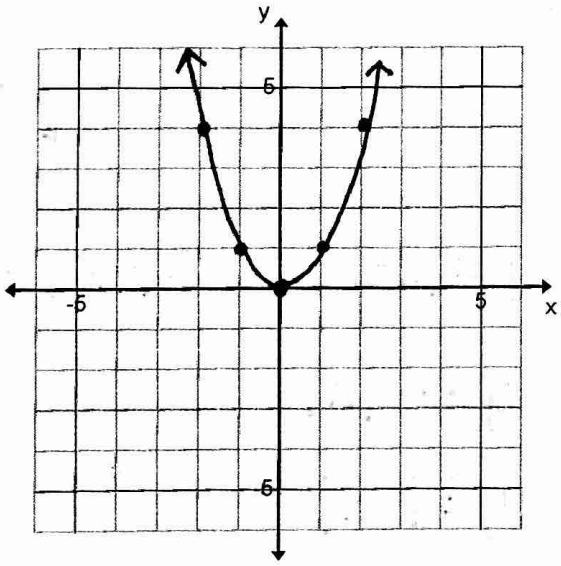
absolute value



$f(x) = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4

quadratic/ parabola



Definitions

Translation: movement L, R, U, D (sliding)

Reflection: reflect the graph over a line (x or y axis)

Transformation: changing original graph (dilation, translation, reflections)

All Transformations Note Sheet

$f(x)=a\cdot|b(x-h)|+k$ $\qquad$ $g(x)=a\cdot(b(x-h))^2+k$

a:

b:

★ **h:** movement of the graph left or right, opposite of what you see

$(x-3)^2 \rightarrow R3$ $\qquad$ $|x+2| \rightarrow L2$ $\qquad$ (inside)

k: movement of the graph up or down

$x^2+5 \rightarrow U5$, $|x|-7 \rightarrow D7$ $\qquad$ (outside)

reflections:

$-f(x)$ reflect over x-axis

$f(-x)$ reflect over y-axis

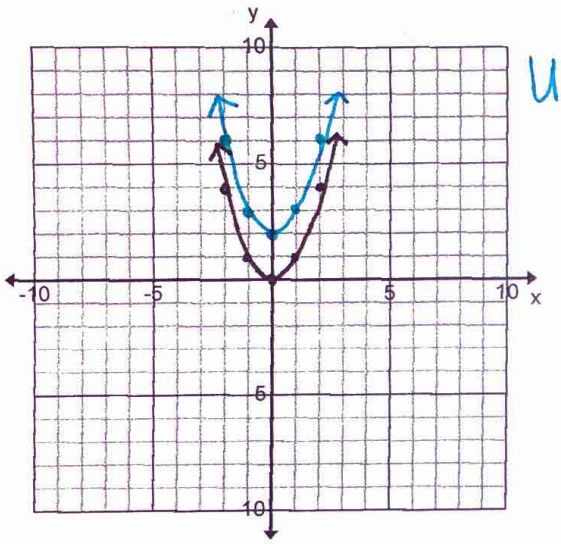
Writing Equations Given Transformations

Parent Function	$y=x^2$	$y=\|x\|$	$f(x)$ ← any function
Translations -Left 2 units -Down 3 units	$y=(x+2)^2-3$	$y=\|x+2\|-3$	$f(x+2)-3$
Reflection across the x-axis outside	$y=-x^2$	$y=-\|x\|$	
Reflection across the y-axis inside	$y=(-x)^2$	$y=\|-x\|$	
Vertical Dilation by a factor of 4			
Horizontal Dilation by a factor of 3			

Notes: vertex : (h, k)

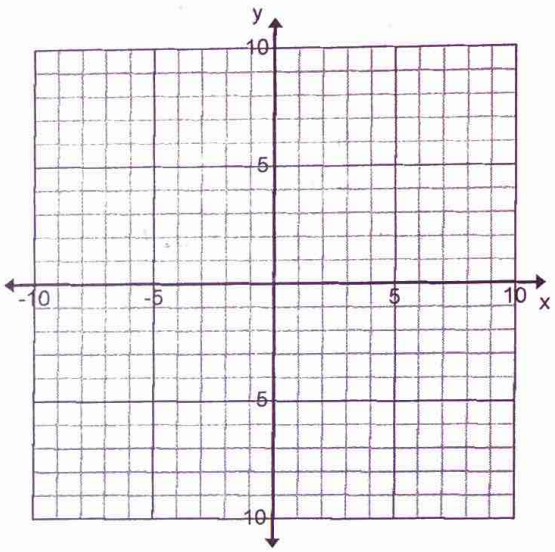
Examples:

1. $f(x) = x^2 + 2$



U2

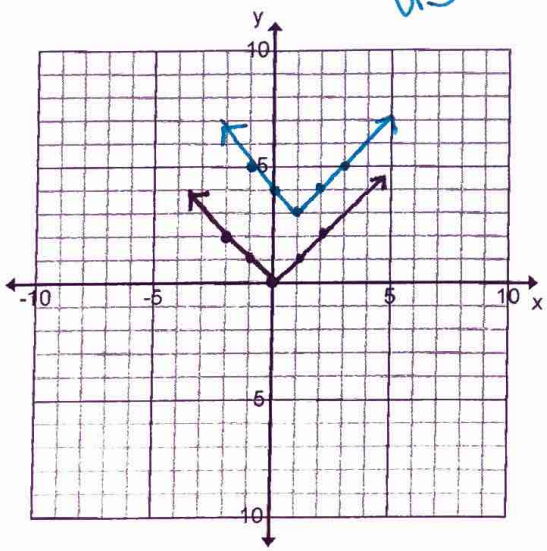
2. $f(x) = -|x-2|$



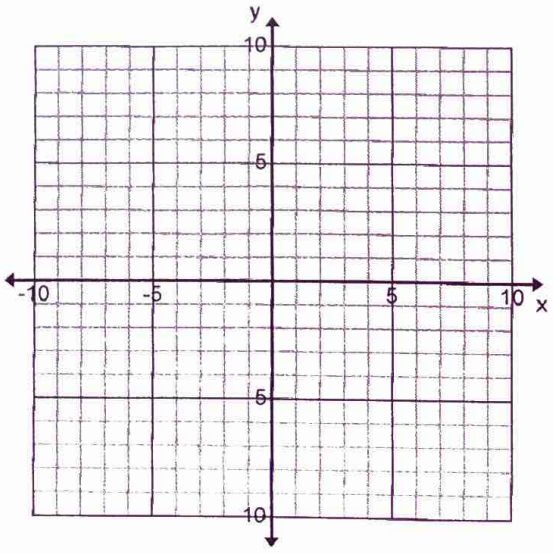
3. $f(x) = |x-1|+3$

R1

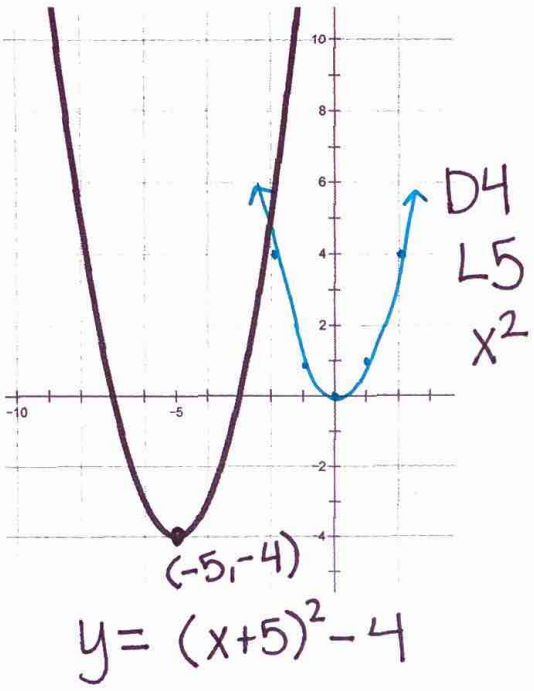
U3



4. $f(x) = (x+3)^2 - 4$



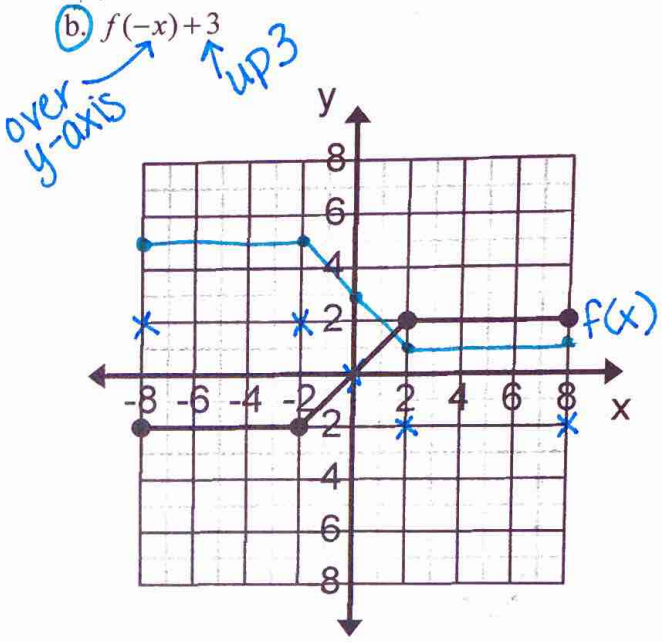
5. Write the equation of the graph



6. Given the graph, do the following transformations in different colors

a. $f(x+2)$

b. $f(-x)+3$



7. Write the equation for each transformation.

a. Translate the graph of $f(x)=x^2$ up 10 units and right 3 units

b. Translate the graph of $f(x)=|x|$ down 4 units and left 2 units

c. Translate $f(x)$ right 4 units, down 2 units and reflect it over the x-axis.