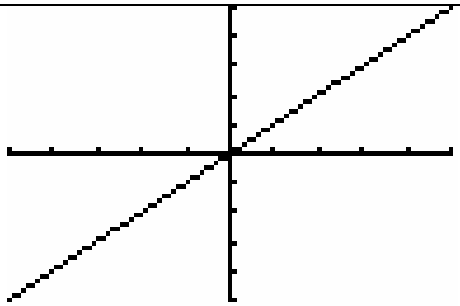
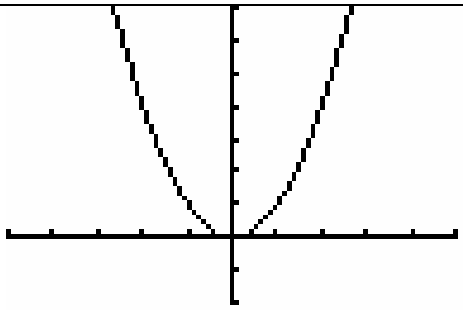
Déjà Vu, It's Algebra 2!

Lesson 11

Quadratic Functions: Graphs & Properties

Degree	Parent Function	Name	Graph
1	$f(x) = x$	Linear	 Slanted Line
2	$f(x) = x^2$	Quadratic	 Parabola

Forms of Quadratic Equations

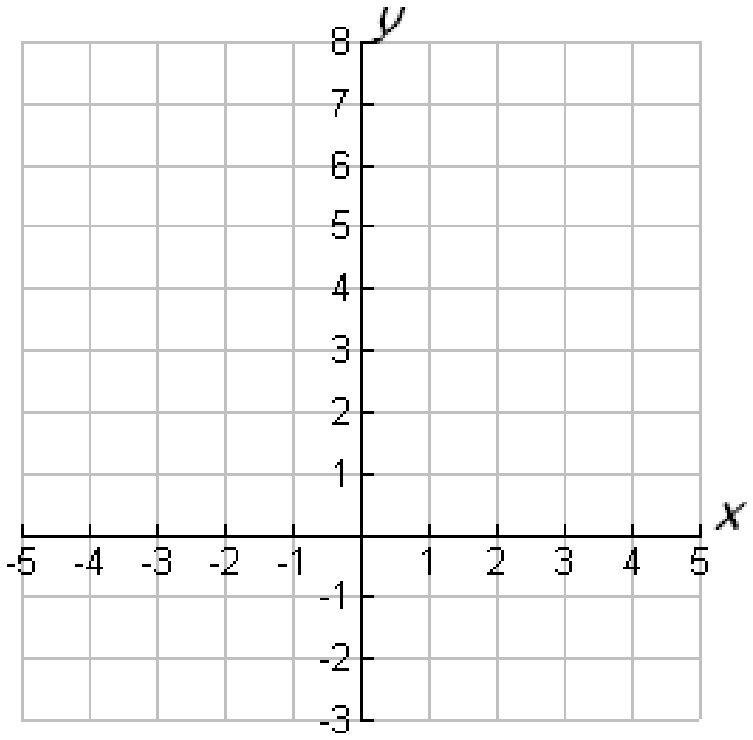
Standard Form: $f(x) = ax^2 + bx + c \qquad a \neq 0$

Example:

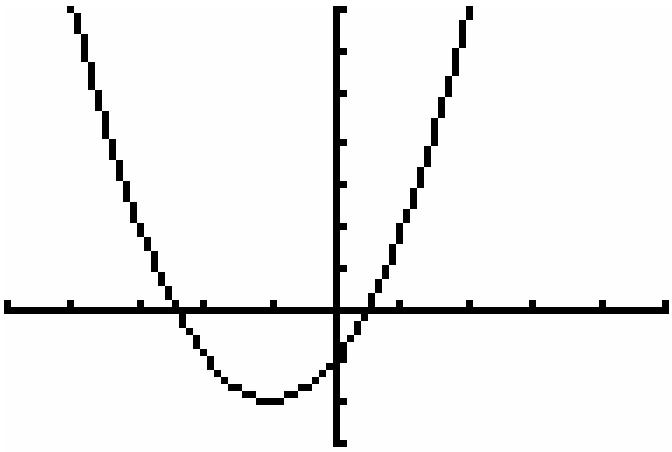
Graph the following function using a table:

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

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



Vertex Form: $f(x) = a(x-h)^2 + k$



Example:

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

Completing the Square

Transformations of the parent function

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

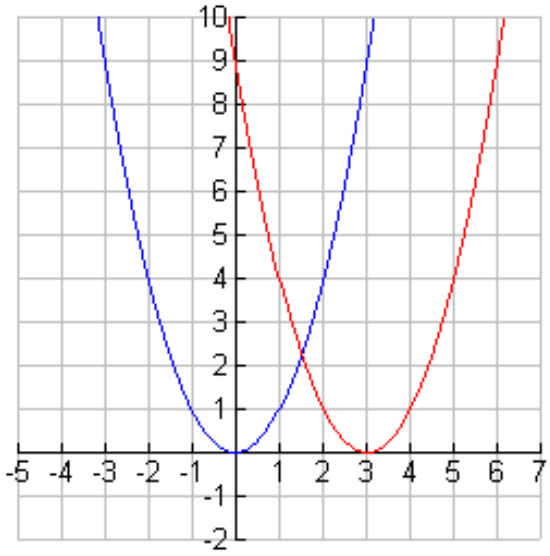
TRANSLATIONS or SHIFTS

Horizontal shift for $h > 0$

$f(x-h) = (x-h)^2$

moves RIGHT h units

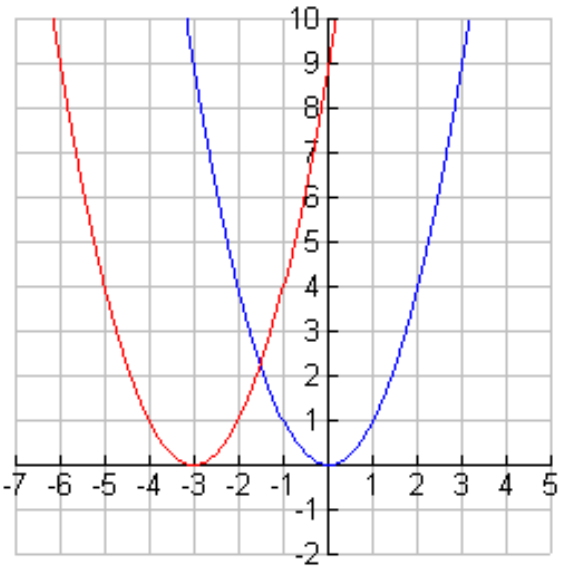
Ex) $g(x) = (x-3)^2$



$f(x+h) = (x+h)^2$

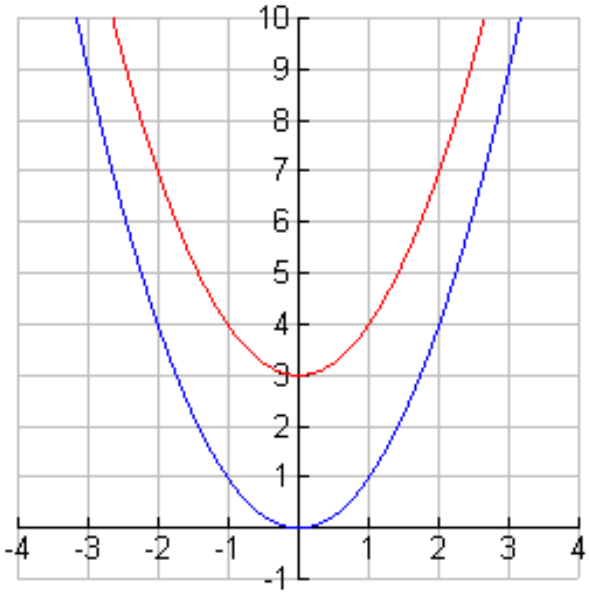
moves LEFT h units

Ex) $g(x) = (x+3)^2$

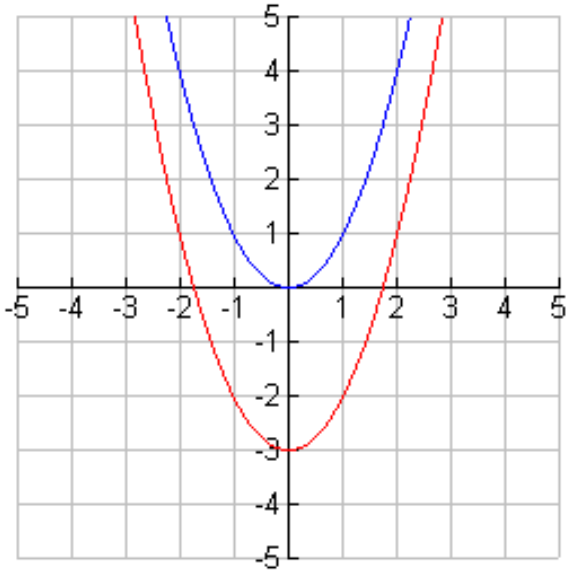


Vertical Shift for $k > 0$

$f(x) + k = x^2 + k$
moves UP k units
Ex) $g(x) = x^2 + 3$



$f(x) - k = x^2 - k$
moves DOWN k units
Ex) $f(x) = x^2 - 3$



Example:

Put the following equation into vertex form, then sketch the graph using transformations.

$f(x) = x^2 - 6x + 4$

Déjà RE-Vu

Putting it all together

Put the following equation in vertex form, and then sketch the parabola.

$$h(x) = -2x^2 + 16x - 29$$

References:
All images created with TI-Interactive software or TI-83+ calculator

For more information on applications of parabolas, check out the following website:
http://www.pen.k12.va.us/Div/Winchester/jhhs/math/lessons/calc2004/apppara b.html