

6.1

Exploring Quadratic Relations

GOAL

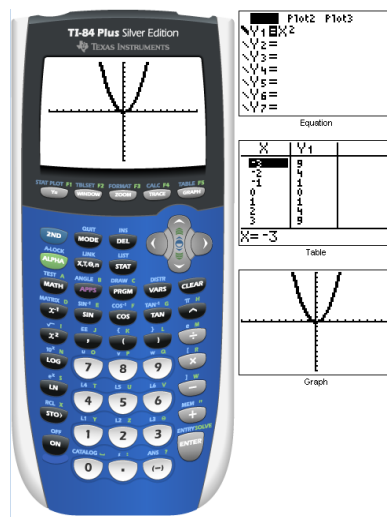
Determine the characteristics of quadratic relations.

quadratic relation

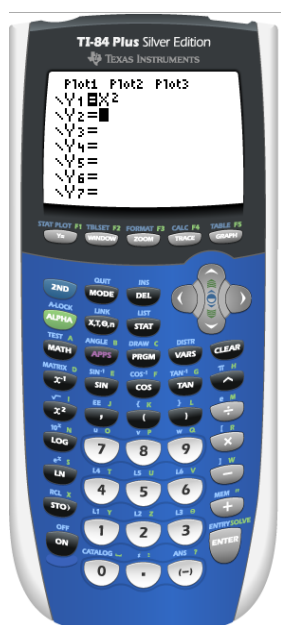
A relation that can be written in the standard form $y = ax^2 + bx + c$, where $a \neq 0$; for example, $y = 4x^2 + 2x + 1$

Notes...

- parabolic in shape
- non linear
- highest power is 2 (degree 2)
- is a **function**, where each x value has only one y value [vertical line test]



Properties in Vertex Form...



Grab a 'Graphing Calculator'

Vertex Form..

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

Handwritten notes:
 - a : Open up/down
 - $(x - h)$: move up/down
 - h : Shape (narrow/wide)
 - k : move up/down

Direction of Opening: ("Look at the sign of the stretch factor!")

positive

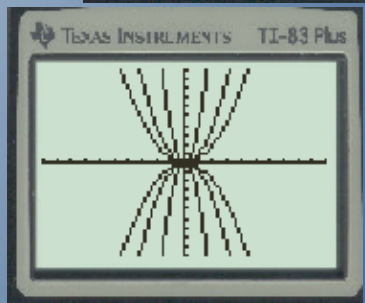
- If $a > 0$, then the graph opens upward.
- If $a < 0$, then the graph opens downward.



Vertical Stretch: ("Look at the magnitude of the stretch factor")

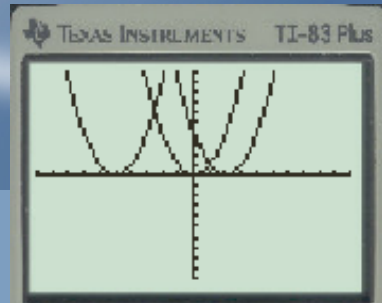
|a| → always positive

- If $|a| > 1$, then the graph becomes narrower.
- If $|a| = 1$, then the graph stays the same. *e same.*
- If $0 < |a| < 1$, then the graph becomes wider.



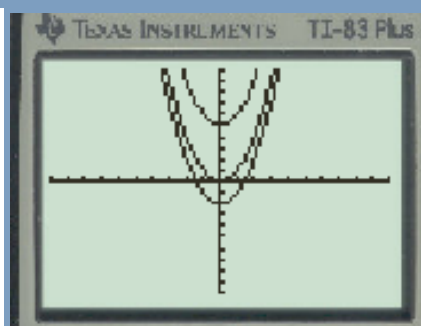
Horizontal Translation: ("Think opposite")

- If $h > 0$, then the graph moves to the right h units.
- If $h = 0$, then the graph does not move horizontally.
- If $h < 0$, then the graph moves to the left h units.



Vertical Translation: ("Exactly the same")

- If $k > 0$, then the graph moves upward k units.
- If $k = 0$, then the graph does not move vertically.
- If $k < 0$, then the graph moves downward k units.



HOMEWORK EXERCISE:

	OPEN UP? OPEN DOWN?	NARROW? WIDER?	LEFT? RIGHT?	UP? DOWN?
Plot1				
Plot2				
Plot3				
$Y_1 = X^2$				
$Y_2 = -2X^2 + 5$				
$Y_3 = 0.5(X-3)^2 - 4$				
$Y_4 = 5X^2$				
$Y_5 = -1/2(X+7)^2 + 2$				
$Y_6 = 7(X-1)^2 - 22$				