

Quadratic Relations 6.1: Exploring Quadratic Relations

In Math 1201 you explored Linear Relations.

In Math 2201 our focus shifts to **Quadratic Relations**.

In real life, not all situations are represented by linear functions.

Suppose we looked at the path of a baseball as it leaves home plate and heads for the outfield? Or the path of a skier in flight? If we graphed the height of the ball over time, what would the graph look like



A moving object that is influenced by the force of gravity can often be modelled by a quadratic relation (assuming there is no friction).

1

A quadratic relation creates a graph that is called a **parabola**. It looks like a "U" or an upside down "U".

Quadratic functions are the result of multiplying two linear functions:

Recall that the degree of a polynomial is the highest exponent.

What is the degree of the polynomial above?

2

Which of the following functions are quadratic?

(1) $y = 5(x+3)$ NO

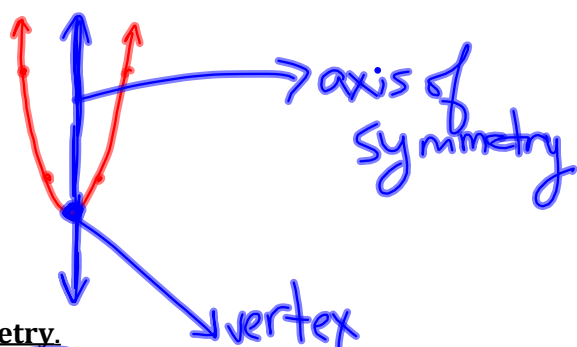
(2) $y = 5x(x+3)$ yes

(3) $y = 5(x^2+3)$ yes

(4) $y = (5x+1)(x+3)$ yes

(5) NO

(6) $y = 5(x+3)^2 + 1$ yes



axis of symmetry.

$$x=0$$

vertex.

$$(0,0)$$

Maximum

highest pt

Minimum

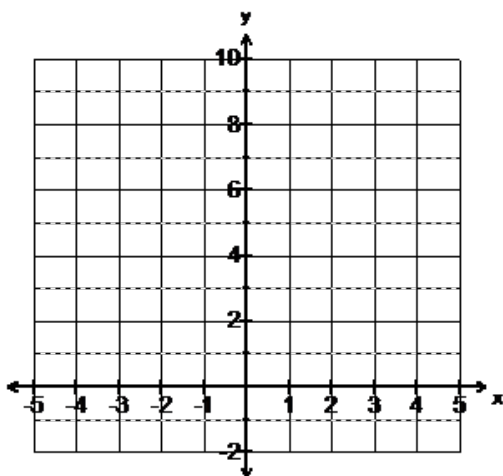
lowest point

Exploring Quadratic Functions- What is the effect of 'a' 'b' and 'c'

Standard form

Using the simplest form of the quadratic function, $y = ax^2$, what is the effect of 'a'?

1.



.

0

()

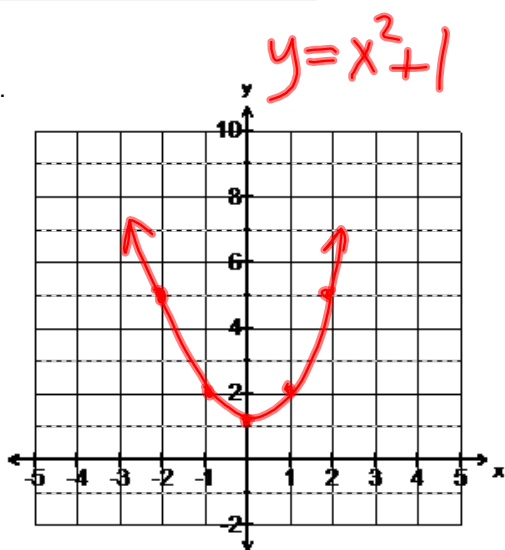
What is the effect of 'b'?

<http://www.mathopenref.com/quadraticexplorer.html>



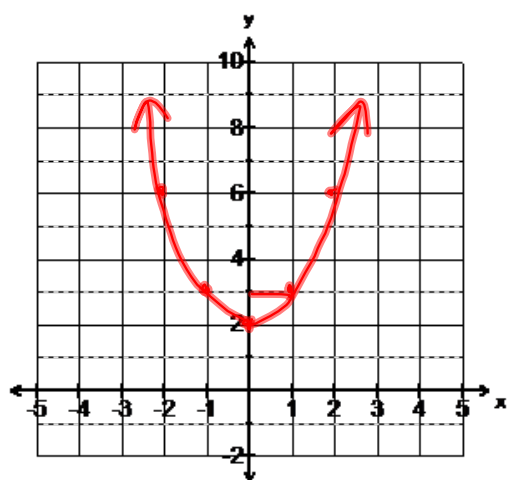
What is the effect of 'c'?

1.



x	y
-2	5
-1	2
0	1
1	2
2	5

2. $y = x^2 + 2$



x	y
-2	6
-1	3
0	2
1	3
2	6

What effect does 'c' have on the graph?

How can you identify the y-intercept by looking at the standard form of the equation

$$y = ax^2 + bx + c ?$$

- ❖ The value of c influences the y-intercept of the graph.
- ❖ In the standard form of the equation $y = ax^2 + bx + c$, c is the y-intercept.
 - If c is positive then the y-intercept is positive
 - If c is negative then the y-intercept is negative.

Complete Practice examples on handout and pg 324 #1, 2, 3, 5

