

Ch 6 Quadratic Functions

6.1 Exploring Quadratic Relations

What makes a function a quadratic?

The highest degree term is x^2 , if there is no x^2 term it's not a quadratic

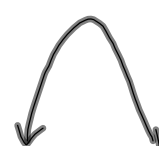
If there is a higher degree term, like x^3 , it's not a quadratic.

Quadratic functions are polynomial functions of degree 2, which are written in the form $y = ax^2 + bx + c$

This form, $y = ax^2 + bx + c$ is called Standard form.

The graph of a quadratic function is a curve called a Parabola

parabolas can open up 


or parabolas can open down 

All parabolas have a line of symmetry or axis of symmetry.


This is a vertical line which cuts the parabola exactly in half.

The point on the parabola where the axis of symmetry intersects it is called the vertex

If a parabola opens upward, the vertex is the lowest point on the graph and is called the minimum point. The y-coordinate is the minimum value.



If a parabola opens downward the vertex is the highest point on the graph and is called the maximum point. The y-coordinate is the maximum value.



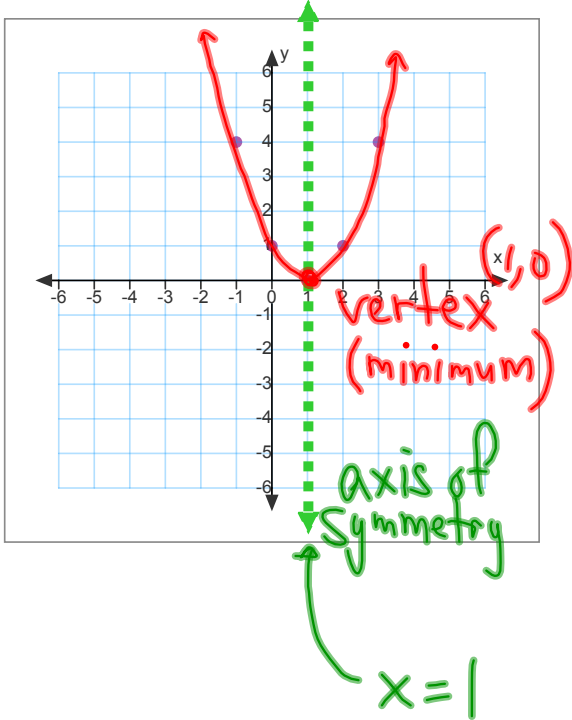
How do we tell if the parabola opens up or down? For quadratics of the form $y = ax^2 + bx + c$, if $a > 0$ parabola opens upward. If $a < 0$ parabola opens downward.

Ex: $y = (-3)x^2 + 2x - 5$ opens down and vertex is a MAX.

Summary of Characteristics of Quadratics

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

where $a > 0$

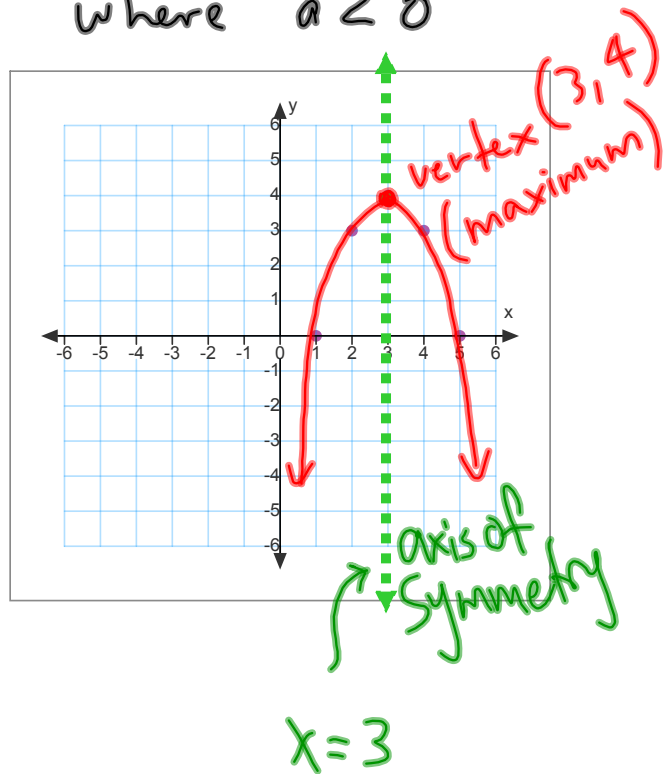


Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \geq 0, y \in \mathbb{R}\}$

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

where $a < 0$



Domain: $\{x | x \in \mathbb{R}\}$

Range: $\{y | y \leq 4, y \in \mathbb{R}\}$

y-coordinate of the vertex