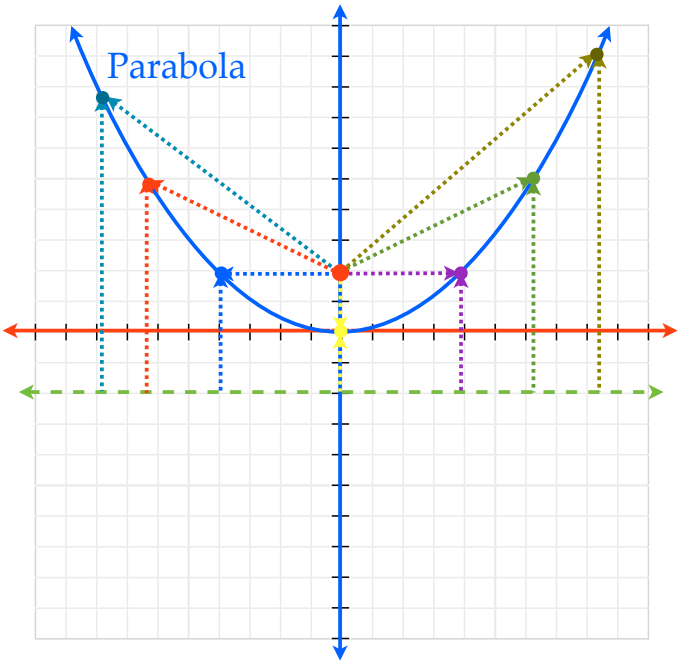
Name _____

Introduction to Parabolas

Date _____ Period _____

What is a Parabola?

Parabola - the set of all points that are the same distance from a given point and a given line in a plane.



What is a Parabola?

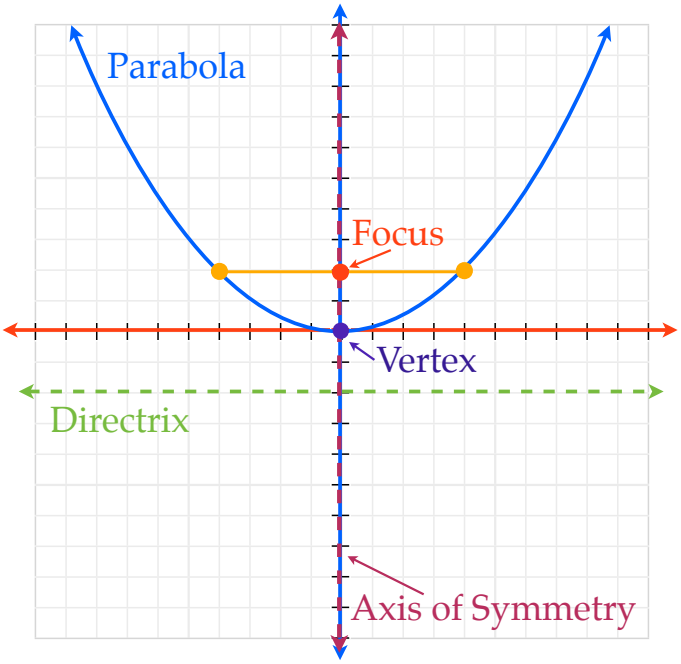
Parabola - the set of all points that are the same distance from a given point and a given line in a plane.

The given point is called the Focus and the given line is called the Directrix.

The midpoint of the perpendicular segment from the focus to the directrix is called the Vertex.

The line that passes through the Vertex and the Focus is called the Axis of Symmetry.

The Focal Width is the length of the segment through the Focus parallel to the Directrix.



Equation of a Parabola
with vertex (0,0)

$y = ax^2$

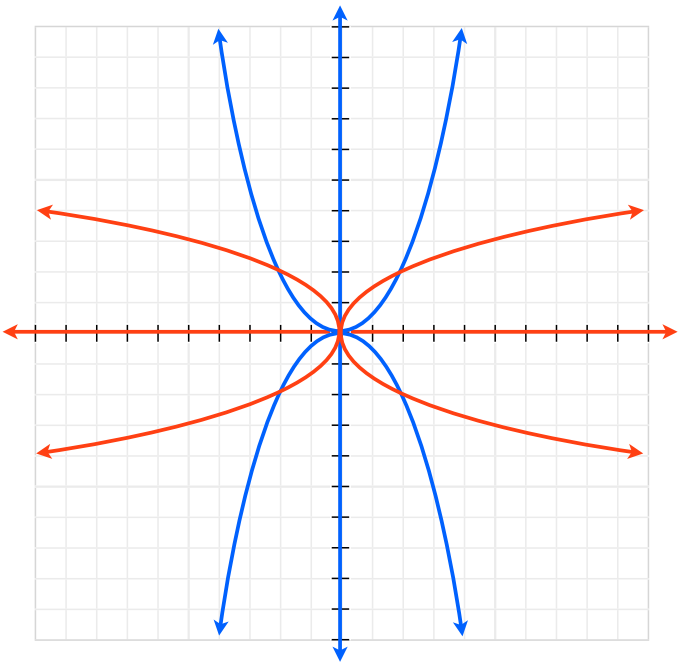
up / down

$a > 0$; opens up $a < 0$; opens down

$x = ay^2$

right / left

$a > 0$; opens right $a < 0$; opens left



Pieces of a Parabola?

$y = ax^2$

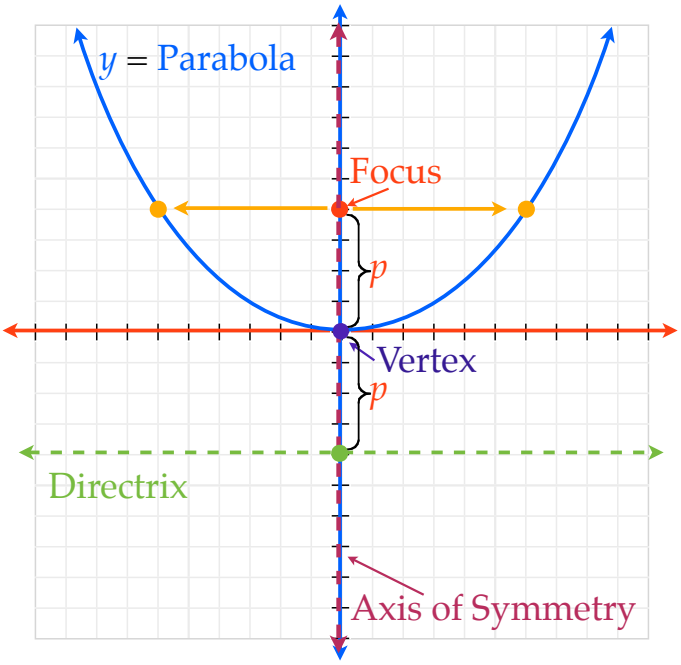
Vertex (0,0)

Focus (0,p) $|a| = \frac{1}{4p}$ Solve for p

Directrix $y = -p$

Axis of Symmetry $x = 0$

Focal Width $= |4p|$



Pieces of a Parabola?

$$x = ay^2$$

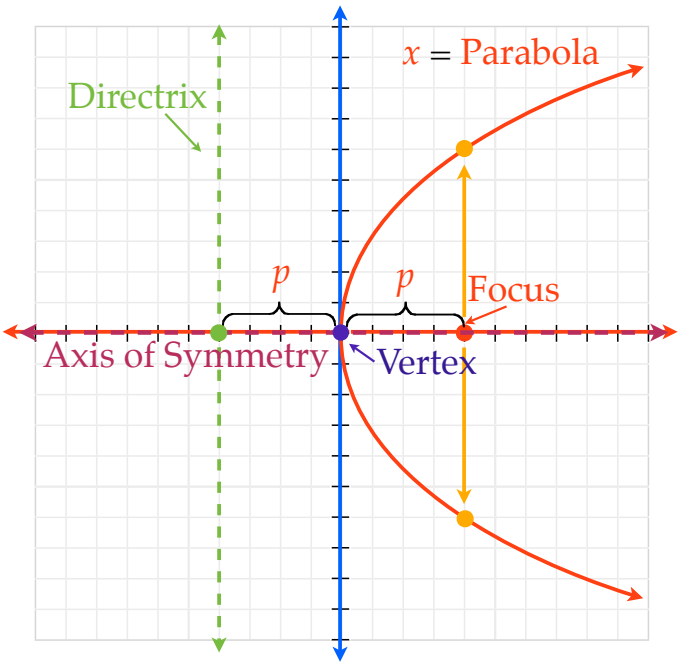
Vertex $(0,0)$

Focus $(p,0)$ $|a| = \frac{1}{4p}$ Solve for p

Directrix $x = -p$

Axis of Symmetry $y = 0$

Focal Width $= |4p|$

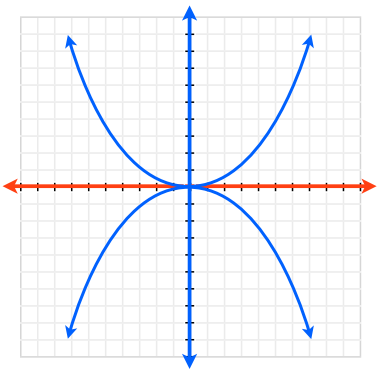


Parabolas

$$y = ax^2$$

Vertex $(0,0)$ Directrix $y = -p$

Focus $(0,p)$ Axis of Symmetry $x = 0$



$$|a| = \frac{1}{4p}$$

Focal Width $= |4p|$

$$x = ay^2$$

Vertex $(0,0)$ Directrix $x = -p$

Focus $(p,0)$ Axis of Symmetry $y = 0$