Name _____

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.

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 width of the parabola at the focus is called the Latus Rectum or Focal Width.

Parabola

Focus

Vertex

Directrix
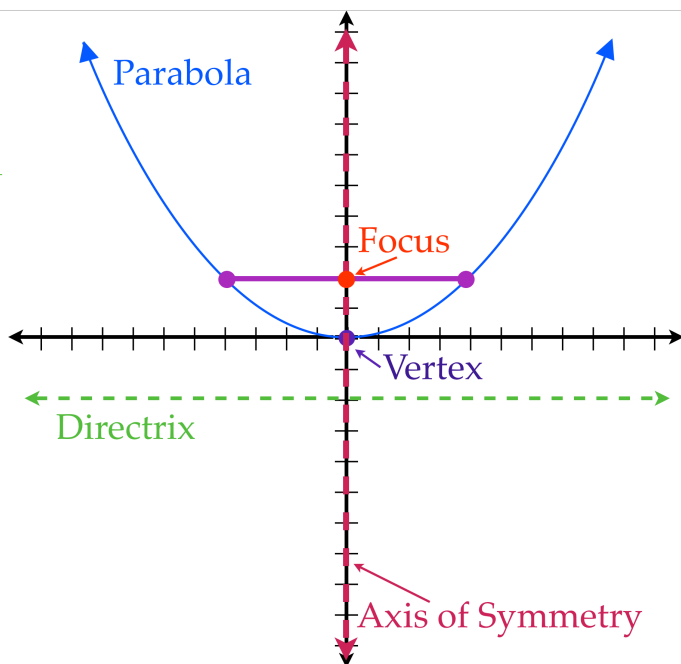
Axis of Symmetry

Equation of a Parabola
with vertex (0,0)

$$x^2 = 4ay$$

up / down

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

$$y^2 = 4ax$$

right / left

$a > 0$; opens right $a < 0$; opens left
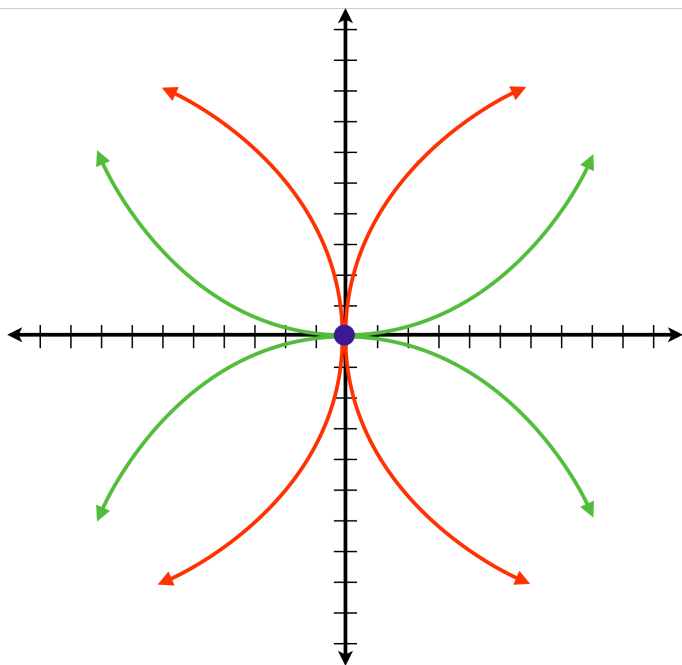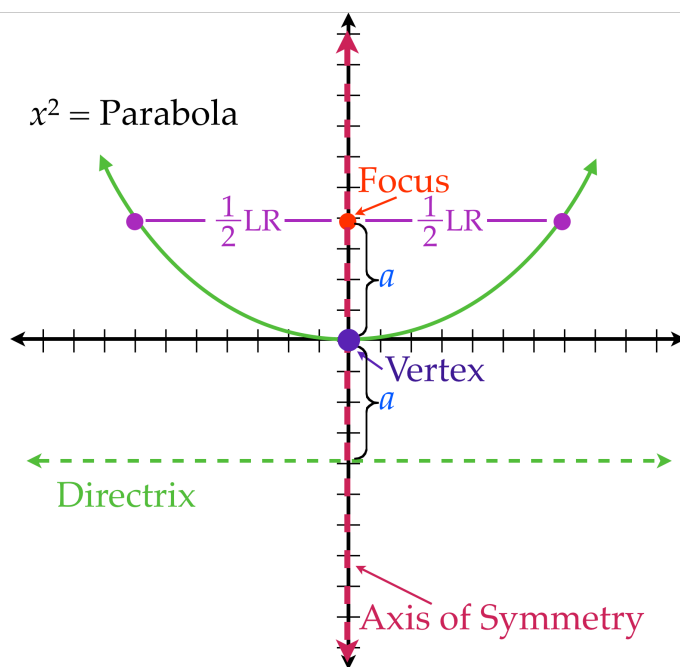
Pieces of a Parabola?

$$x^2 = 4ay$$

Vertex (0,0)

Focus   (0,a)

Directrix $y = -a$

Axis of Symmetry $x = 0$

Latus Rectum   LR = $|4a|$

x^2 = Parabola

Focus

$\frac{1}{2}$LR $\frac{1}{2}$LR

a

Vertex

a

Directrix

Axis of Symmetry

Pieces of a Parabola?

$$y^2 = 4ax$$

Vertex (0,0)

Focus   (a,0)

Directrix $x = -a$

Axis of Symmetry $y = 0$
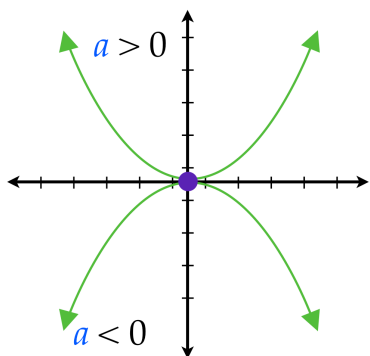
Latus Rectum   LR = $|4a|$

y^2 = Parabola

Directrix

$\frac{1}{2}$LR

a a Focus

Axis of Symmetry   Vertex

$\frac{1}{2}$LR
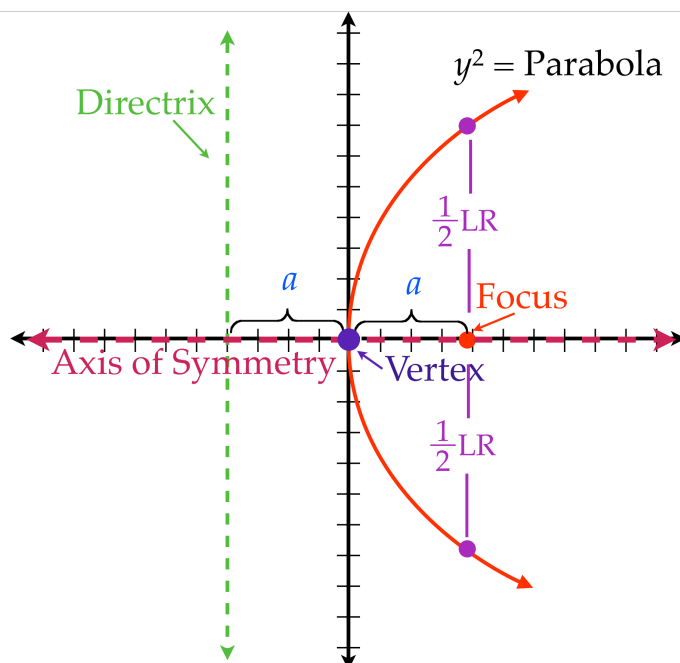
Parabolas

$x^2 = 4ay$

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

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

$a > 0$

$a < 0$

$y^2 = 4ax$

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

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

$a > 0$

$a < 0$

Latus Rectum

LR $= |4a|$