Math 1060 ~ Trigonometry

$\sin^2 u + \cos^2 u = 1$

$\sin 2u = 2\sin u \cos u$

$\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

$c^2 = a^2 + b^2 - 2ab\cos C$

26 Conic Sections: Parabolas

### Learning Objectives

In this section you will:

- Learn the definition of a parabola in a plane.
- Know and use the standard equation of a parabola.
- Sketch the graph of a parabola.
- Determine the vertex, focus and directrix of a parabola.

Parabolas

A parabola is the set of points of equal distance from a given point and a given line.

The point is called the focus and the line is called the directrix.

Ex 1: Plot several points which are equidistant from F, the focus and d, the directrix.
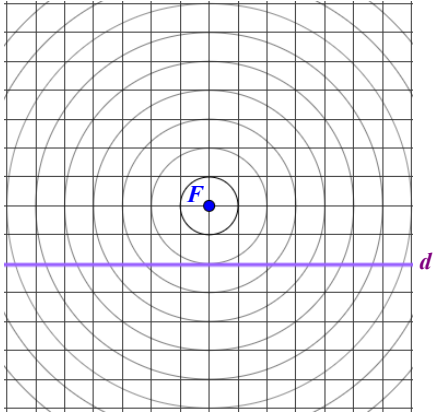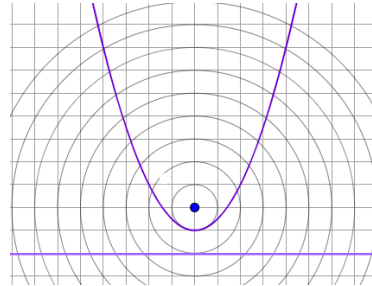
Vocabulary for Parabolas

Focus

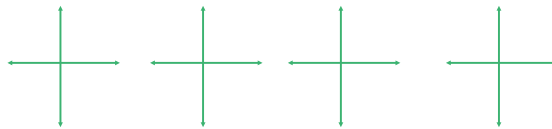Directrix

Axis of symmetry

Latus rectum (focal chord)

We can develop a formula for the parabola.

Let (x,y) be any point on the parabola.

Let F be at $(0,c)$ and the line L be at $y = -c$.
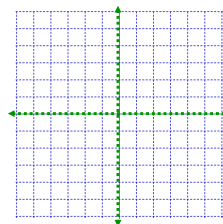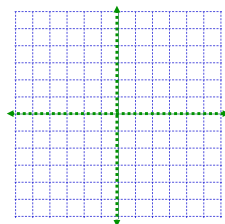
Standard Form of Parabolas with Vertex at (0,0)

Ex 2: Graph each of these.

a) $2x^2 = -4y$ b) $3y^2 - 12x = 0$
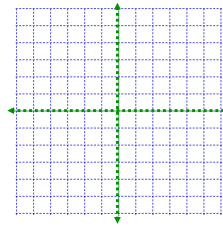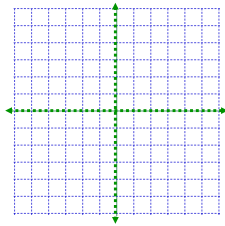
Transformations of a Parabola

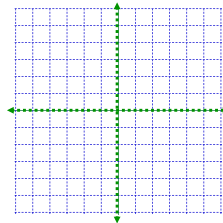Ex 3: Graph each of these. You may need to complete the square on one of them to put it in standard form.

a) $(x-2)^2 = 2(y-1)$

b) $y^2 - 6y = -4x -11$

Ex 4: Find the equation of a parabola with the given information.

a) directrix at $y = -4$, vertex at $(4,-1)$

b) vertex at $(4,2)$, passing through $(-3,-4)$ with axis parallel to the x-axis.