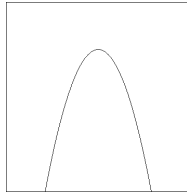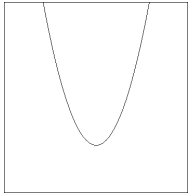# Conic Sections - Parabolas

<u>Standard Form of the Equation of a Parabola</u>
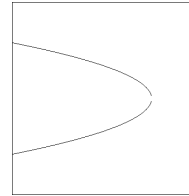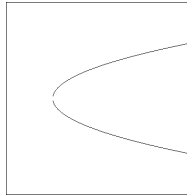
Vertical Parabola

$$(x-h)^2 = 4p(y-k)$$

Horizontal Parabola

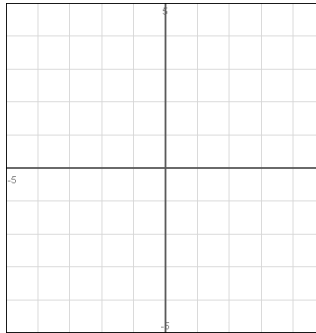$$(y-k)^2 = 4p(x-h)$$

Vertex $=(h,k)$

Focus $= p$ units from the vertex (inside the parabola)

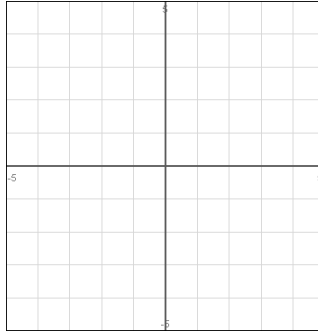Directrix $= p$ units from the vertex (outside the parabola)

Length of Focal Chord $= 4p$

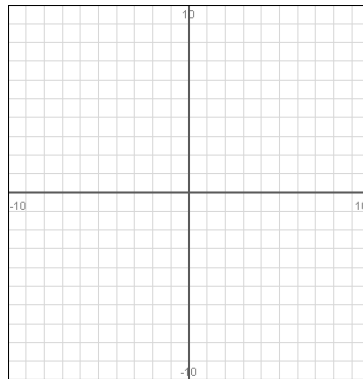1. Find the vertex, focus and directrix of the parabola and sketch its graph.
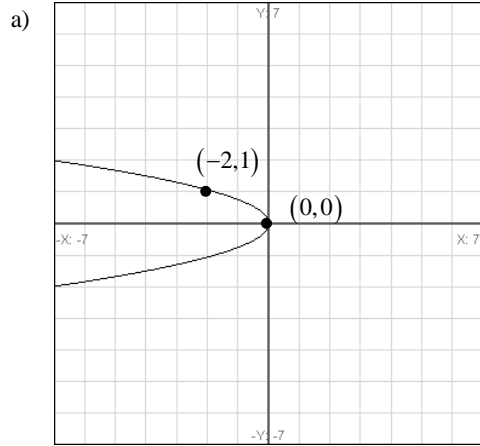
   a) $x^2 + 8y = 0$

b) $x^2 - 2x - 4y + 9 = 0$
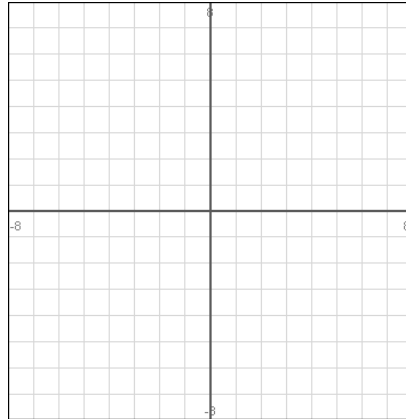
c) $y^2 + 6y + 2x + 25 = 0$

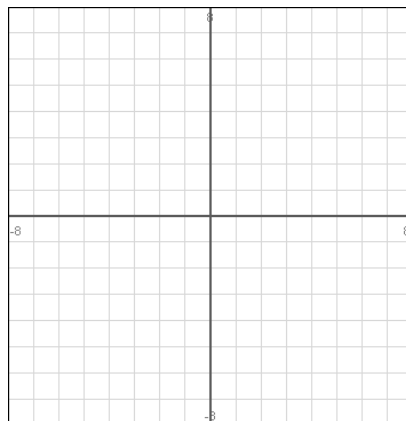2. Find the standard form of the equation of the parabola.

a)

b) Vertex is at the origin.
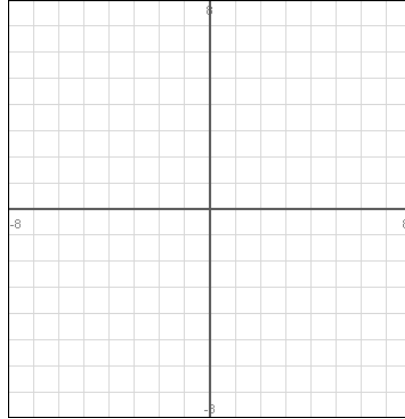
Directrix: $y = 3$

c) Focus: $(-3,1)$

Directrix: $x = 5$

3. The equation of a parabola and the tangent line are given. Find the coordinates of the point of tangency.

$$x^2 + 12y = 0$$
$$x + y = 3$$

4. Find the equation of the parabola that contains the points $(0,0)$, $(2,2)$ and $(4,8)$.