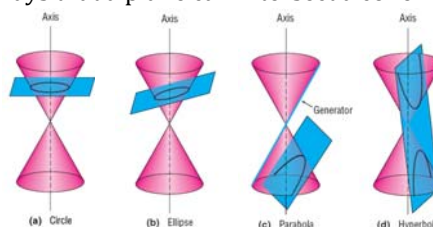


## Section 11.1 Section 11.2

### Conic Sections The Parabola

## THE CONIC SECTIONS

The four conic sections are formed by the four ways that a plane can intersect a cone.



## CIRCLES

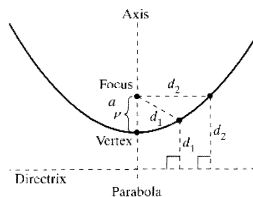
A circle is the set of points that are equidistant from a fixed point (the **center**). This distance is called the **radius**.

The standard form of an equation of a circle with center  $(h, k)$  and radius  $r$  is

$$(x - h)^2 + (y - k)^2 = r^2$$

## PARABOLAS

A **parabola** is the set of all points  $P$  in the plane that are same distance  $d$  from a fixed point  $F$  (the **focus**) and a fixed line  $D$  (the **directrix**).



## PARABOLAS WITH VERTEX AT THE ORIGIN

Using algebra, we can show that the standard form of the equation of a parabola whose vertex is at the origin is

$$x^2 = 4ay \text{ if the axis of symmetry is vertical.}$$

$$y^2 = 4ax \text{ if the axis of symmetry is horizontal.}$$

**NOTE:** In both cases the focus is  $|a|$  units "inside" the parabola; the directrix is  $|a|$  units "outside."

## PARABOLAS WITH VERTEX AT $(h, k)$

Using translations as discussed in Section 3.5, we can find the standard form of an equation for a parabola whose vertex is at  $(h, k)$ .

$$(x - h)^2 = 4a(y - k) \text{ if the axis of symmetry is vertical.}$$

$$(y - k)^2 = 4a(x - h) \text{ if the axis of symmetry is horizontal.}$$