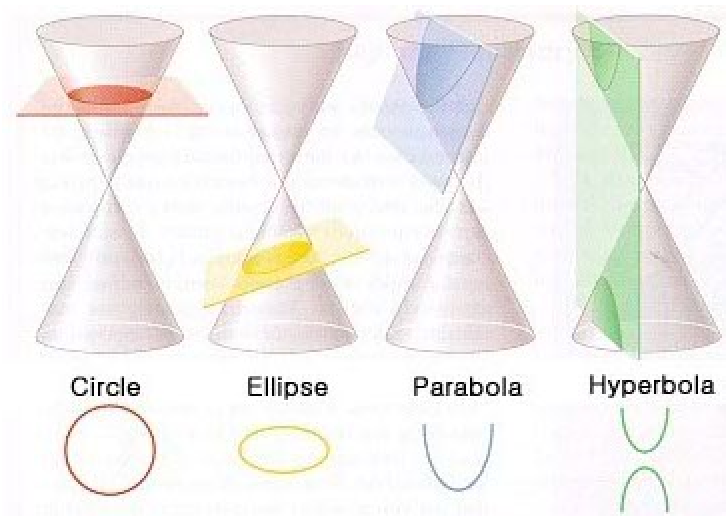
Section 8.2a
Circles

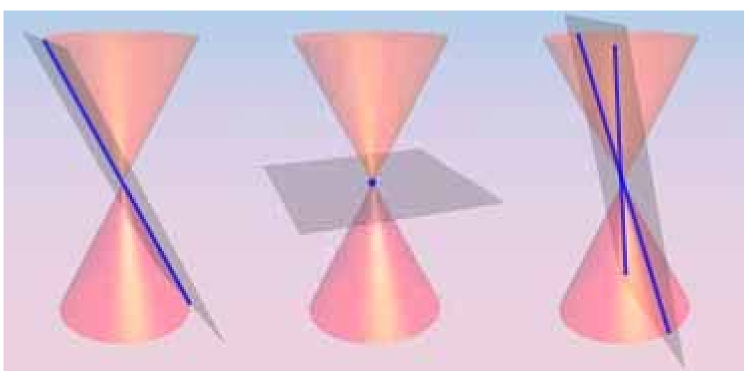
To form a conic section, we'll take this double cone and slice it with a plane. When we do this, we'll get one of several different results.

A circle, an ellipse, a parabola, or a hyperbola.



http://mrhiggins.net/algebra2/wp-content/uploads/2008/05/allconics.jpg

You may also get what are called degenerate conic sections.



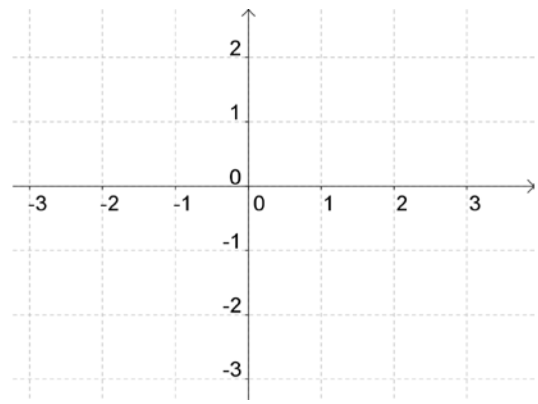
As we study conic sections, we will be looking at special cases of the general second-degree equation: $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$.

The Circle

A **circle** is the set of all points that are equidistant from a fixed point. The fixed point is called the *center* and the distance from the center to any point on the circle is called the *radius*.

The standard form of the equation of a circle is $(x-h)^2+(y-k)^2=r^2$, where the center of the circle is the point (h,k) and the radius is *r*.

Example 1: State the center and the radius (length of radius) of the circle $\frac{(x-1)^2}{4}+\frac{y^2}{4}=1$, then graph it.



Sometimes the equation will be given in the general form, and your first step will be to rewrite the equation in the standard form. You'll need to complete the square to do this.

Example 2: Write the equation in standard form then find the center and the radius.
$x^2+6x+y^2-9y+44=26$

We can also write the equation of a circle, given appropriate information.

Example 3: Write the equation of the circle with center $\left(5,-\frac{3}{4}\right)$ and has radius $3\sqrt{5}$.

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

Example 4: Write an equation of a circle with center $\left(\frac{9}{2},\frac{7}{2}\right)$ which passes through the point $(5,1)$.

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

Example 5: Write an equation of a circle if the endpoints of the diameter of the circle are (6, -3) and (-4, 7).