Algebra 2
Unit: Conic Sections
Section: Introduction to Conic Sections

Review Worksheet Key

1) Find the distance between each pair of points.

a. (3, 5) and (7, -10)

d = $\sqrt{241}$

b. (-2, 11) and (3, -1)

d = 13

2) Find the midpoint between each pair of points.

a. (3, 5) and (7, -10)

(5, -2.5)

b. (-2, 11) and (3, -1)

(0.5, 5)

3) Describe how you can tell if an equation defines a parabola, a circle, an ellipse, or a hyperbola. Give an example of each and describe it.

The equation for a ***parabola*** has one squared term. If the x is squared, the parabola opens up or down (if the 'p' value is positive or negative) and if the y is squared, the parabola opens left or right. And example would be: $x = -\frac{1}{16}y^2$.

The equation for a ***circle*** has both an x squared and a y squared term which are added together. The general formula for a circle centered at the origin is $x^2 + y^2 = r^2$, where r is the radius of the circle. Later

you will learn the formula for a circle centered at another point. This equation is $(x - h)^2 + (y - k)^2 = r^2$. The point (h, k) tells where the center of the circle is and the 'r' tells the length of the radius. And example would be $(x - 5)^2 + (y + 3)^2 = 36$. The center is at (5, -3) and the radius is 6.

The equation of an ***ellipse*** also has two squared terms which are also added together. The difference between this equation and the equation of a circle is that the x term and the y term are divided by a number and the equation equals 1. The general form of an ellipse cantered at the origin is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. Later you will learn the formula for an ellipse centered at another point. This equation is $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$. The center is at (h, k) and the 'a' and 'b' value tell how far the vertices and co-vertices are from the center. And example would be $\frac{(x+5)^2}{9} + \frac{(y-2)^2}{36} = 1$. This ellipse is centered at (-5, 2) and is a vertical ellipse.

The equation of a ***hyperbola*** has two squared terms which are subtracted. If the x term is first, it is a horizontal hyperbola (opens left and right) and if the y term if first, it is a vertical hyperbola (opens up and down). The general form of a hyperbola centered at the origin is $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (the y could be first). Later you will learn the equation of a hyperbola centered at another point. This equation is $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ (the y could be first). An example would be $\frac{(y-4)^2}{25} - \frac{(x+3)^2}{36} = 1$. This hyperbola is centered at (-3, 4) and opens up and down.