Math 1060 ~ Trigonometry

26.5 Circles

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

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

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

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

Learning Objectives

In this section you will:

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> - Define a circle in a plane.
> - Determine whether an equation represents a circle.
> - Graph a circle from a given equation.
> - Determine the center and radius of a circle.
> - Find the equation of a circle from stated properties.

A **circle** with center (h,k) and radius $r > 0$ is the set of all points (x,y) in the plane whose distance to (h,k) is r.
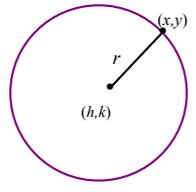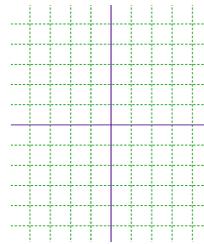
The **Standard Equation of a Circle** with center at (h,k) and radius $r > 0$ is $(x-h)^2 + (y-k)^2 = r^2$.

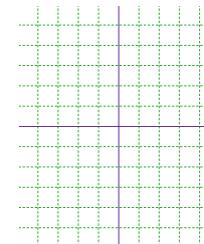Ex 1: Write an equation of a circle with center at (2,-1) and radius 5.

Ex 2: Find the center and radius of the circle given by the equation

$(x+4)^2 + (y+3)^2 = 9$. Graph the circle.

Ex 3: Put this equation in standard form and graph the circle.

$3x^2 + 3y^2 + 6x - 12y - 60 = 0$

Ex 4: Select the equations which might be a circle, put the equation in standard form and determine the center and radius.

a) $x^2 - y^2 + 3x - 2y - 6 = 0$ b) $x^2 + 6x - 2y + 6 = 0$ c) $2x^2 + 2y^2 - 4x - 10 = 0$

d) $3x + 2y - 8 = 0$ e) $x^2 + y^2 + 9 = 0$ f) $3x^2 + 2y^2 + 6x - 12y - 6 = 0$

Ex 5: Write an equation of a circle with the points (-2,6) and (3,-1) as endpoints of the diameter.