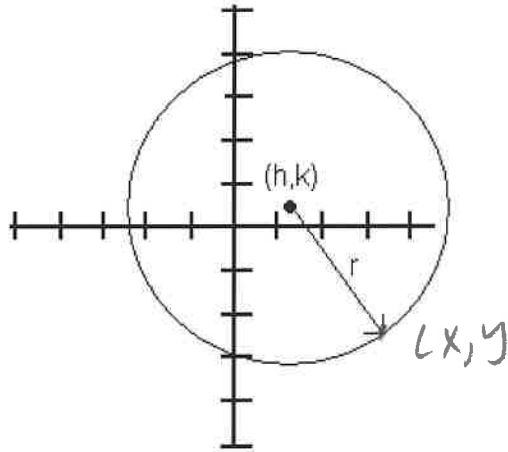# Introduction to Circles

Find a relationship between the x and y coordinate of any point that lies on the circle that is centered at the point (h, k) and has a radius of r.

$$\sqrt{(x-h)^2 + (y-k)^2} = r$$

(h,k)

r

(x,y)

A circle whose center is the point (h, k) with a radius of r has the equation:
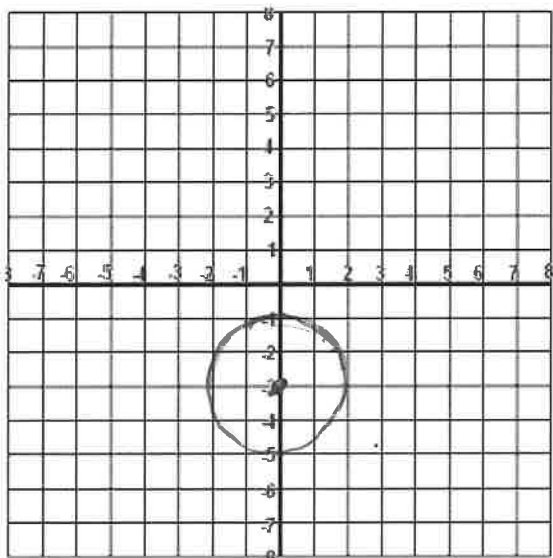
$$(x - h)^2 + (y - k)^2 = r^2$$

This is called the standard equation of a circle

Determine the center and the radius of the circles below and then draw the graph of the equation:

$$x^2 + (y+3)^2 = 4$$

center is $(0, -3)$
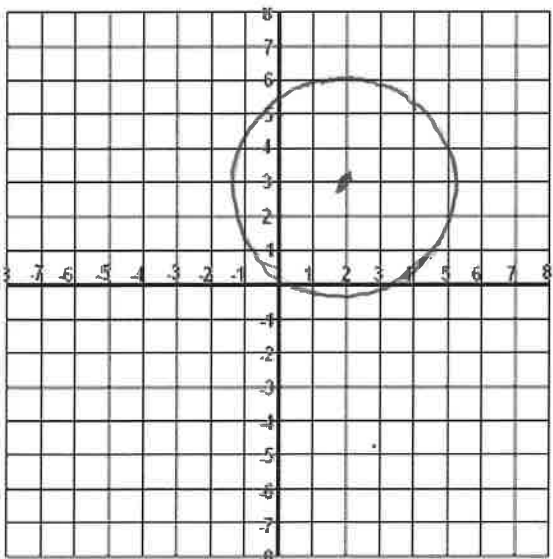
radius is 2

$$(x-2)^2 + (y-3)^2 = 10$$

center is $(2, 3)$

radius is $\sqrt{10}$

Determine the equation of the circle, in standard form
that is centered at the point $(1, -3)$ and has a
radius of 5.

$$(x-1)^2 + (y+3)^2 = 25$$

Determine the standard form of the equation of the circle that has
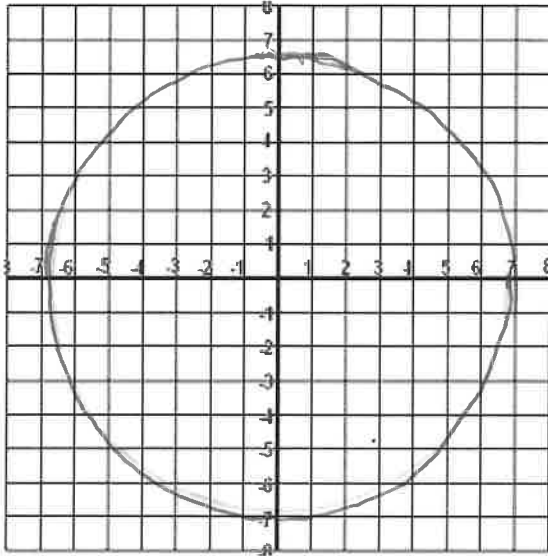diameters at $(3, -1)$ and $(-1, -7)$.

center is $(1, -4)$, the midpoint

$$radius = \sqrt{(3-1)^2 + (-1+4)^2}$$

$$= \sqrt{4+9} = \sqrt{13}$$
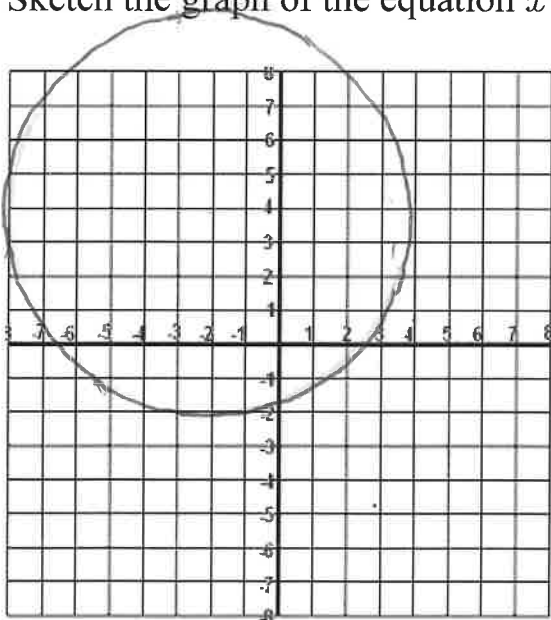
$$(x-1)^2 + (y+4)^2 = 13$$

Sketch the graph of the equation $5x^2 + 5y^2 = 240$

$$x^2 + y^2 = 48$$

center is $(0,0)$

radius is $\sqrt{48}$

Sketch the graph of the equation $x^2 + y^2 + 4x - 8y - 16 = 0$

$$x^2 + 4x + y^2 - 8y = 16$$

$$x^2 + 4x + 4 + y^2 - 8y + 16 = 16 + 4 + 16$$

$$(x+2)^2 + (y-4)^2 = 36$$

center is $(-2, 4)$

radius is 6