

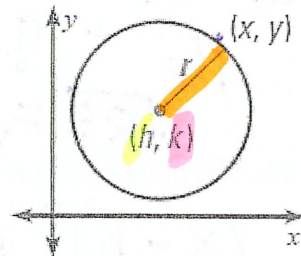
## Chapter 10.7: Write and Graph Equations of Circle

Goal: Be able to write equations of circles in the coordinate plane.

### The Standard Equation of a Circle:

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

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



Example #1: Write the standard equation of the circle with center  $(-4, 0)$  and radius 7.1.

$$(x+4)^2 + y^2 = 50.41$$

Example #2: Write the standard equation of the circle with center  $(0, -5)$  and radius 3.7.

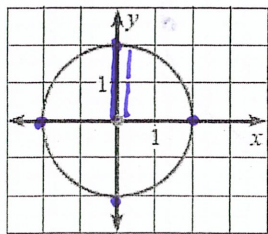
$$(x-0)^2 + (y-(-5))^2 = 3.7^2$$
$$x^2 + (y+5)^2 = 13.69$$

Example #3: Write the standard equation of the circle with center  $(-3, -5)$  and radius 6.1.

$$(x+3)^2 + (y+5)^2 = 37.21$$

Example #4: Write the standard equation of the circles shown below.

a.

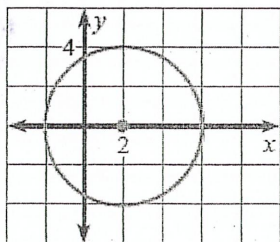


Center:  $(0, 0)$

$$r = 2$$

$$x^2 + y^2 = 4$$

b.

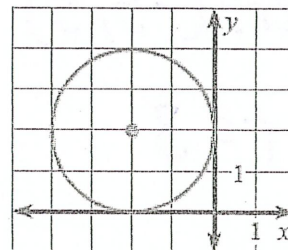


Center:  $(2, 0)$

$$r = 4$$

$$(x-2)^2 + y^2 = 16$$

c.



Center:  $(-2, 2)$   $r = 2$

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

Example #5: The point (1, 2) is on a circle whose center is (5, -1). Write the standard equation of the circle.

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

$$(x-5)^2 + (y+1)^2 = 25$$

$$(1-5)^2 + (2+1)^2 = r^2$$

$$16 + 9 = r^2 \quad 25 = r^2$$

$$\sqrt{25} = \sqrt{r^2} \rightarrow 5 = r$$

Example #6: The point (-3, 4) is on a circle whose center is (-1, 2). Write the standard equation of the circle.

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

$$(x+1)^2 + (y-2)^2 = 8$$

$$(-3-(-1))^2 + (4-2)^2 = r^2$$

$$4 + 4 = r^2$$

$$8 = r^2$$

Example #7: Graph the following circles using their given equations.

a.  $(x-2)^2 + (y+3)^2 = 16$

center: (2, -3)

$$\sqrt{r^2} = \sqrt{16}$$

$$r = 4$$

b.  $(x+5)^2 + (y-5)^2 = 9$

center: (-5, 5)

$$\sqrt{r^2} = \sqrt{9} \quad r = 3$$

