

## 2.3 Practice Problems

1. Write the standard form of the equation of a circle centered at  $(2, -5)$  and a radius of 3.

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

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

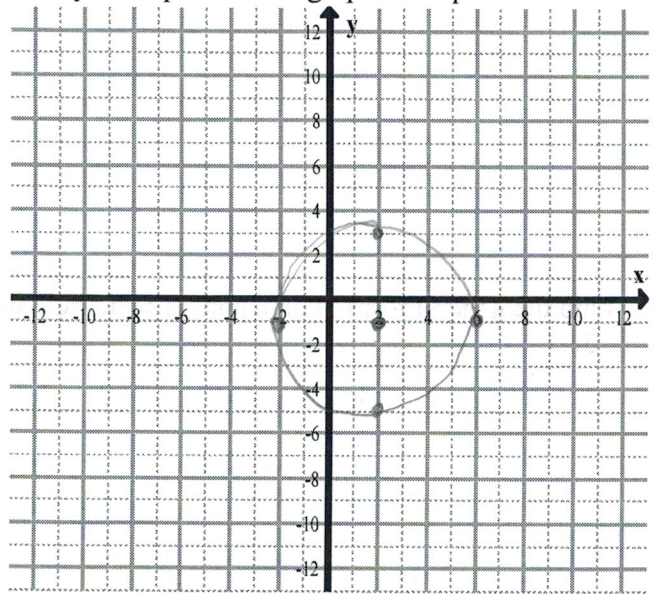
$$(x-2)^2 + (y+5)^2 = 9$$

2. Identify the center and radius of the circle described by the equation and graph the equation.

$$(x-2)^2 + (y+1)^2 = 16$$

Center  $(2, -1)$

Radius = 4



3. Find the intercepts of the circle.  $(x+4)^2 + (y-1)^2 = 16$

x-int  $y=0$

$$(x+4)^2 + (0-1)^2 = 16$$

$$(x+4)^2 + (-1)^2 = 16$$

$$(x+4)^2 + 1 = 16$$

$$(x+4)^2 = 15$$

$$\sqrt{(x+4)^2} = \sqrt{15}$$

$$x+4 = \pm\sqrt{15}$$

$$x = -4 \pm \sqrt{15}$$

$$(-4 + \sqrt{15}, 0)$$

$$(-4 - \sqrt{15}, 0)$$

y-int  $x=0$

$$(0+4)^2 + (y-1)^2 = 16$$

$$4^2 + (y-1)^2 = 16$$

$$16 + (y-1)^2 = 16$$

$$(y-1)^2 = 0$$

$$(y-1)^2 = 0$$

$$\sqrt{(y-1)^2} = \sqrt{0}$$

$$y-1 = 0$$

$$y = 1$$

$$(0, 1)$$

4. Write the equation of the circle in standard form.  $x^2 + y^2 + 4x - 6y + 9 = 0$

$$x^2 + 4x + y^2 - 6y = -9$$
$$x^2 + 4x + \underline{4} + y^2 - 6y + \underline{9} = -9 + 4 + 9$$

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

Magic # for x  
 $= \left(\frac{4}{2}\right)^2 = 2^2 = 4$

Magic # for y  
 $= \left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$

5. Find the general form of an equation of a circle whose center is  $(-3, 5)$  and contains the point  $(-3, 7)$

use distance formula to find radius

$$d = \sqrt{(-3 - (-3))^2 + (5 - 7)^2}$$
$$= \sqrt{0^2 + (-2)^2}$$
$$= \sqrt{4}$$
$$= 2$$

std form  $\rightarrow (x+3)^2 + (y-5)^2 = 4$

$$(x+3)(x+3) + (y-5)(y-5) = 4$$

$$x^2 + 6x + 9 + y^2 - 10y + 25 = 4$$

$$x^2 + 6x + y^2 - 10y + \underset{-4}{34} = \underset{-4}{4}$$

gen form  $\rightarrow x^2 + 6x + y^2 - 10y + 30 = 0$