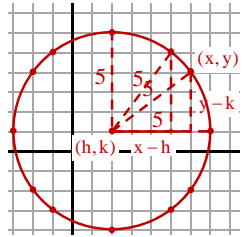


# Lesson 11-7

Objective – To write equations of circles and graph them in the coordinate plane.  
 What 2 criteria are needed to plot a circle on a graph?



Center = (h, k) radius = r

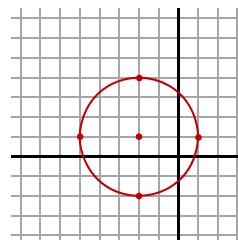
Definition of a Circle  
 The locus of points equally distant from a center point.

$$a^2 + b^2 = c^2$$

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

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

1) Graph a circle with center (-2,1) and radius = 3.



2) Write the equation for this circle.

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

$$(x+2)^2 + (y-1)^2 = 9$$

Circle A passes through (3,0) and has center A(-1,-3).

1) Write the equation for this circle.      2) Graph the circle.

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

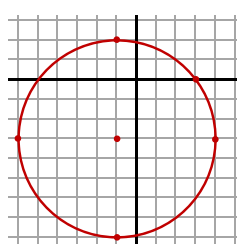
$$(x+1)^2 + (y+3)^2 = r^2$$

passes through (3,0)  
 (x, y)

$$(3+1)^2 + (0+3)^2 = r^2$$

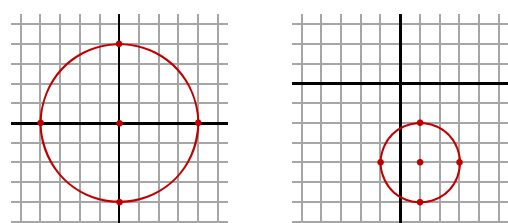
$$16+9 = r^2$$

$$25 = r^2$$

$$(x+1)^2 + (y+3)^2 = 5^2$$


Graph each equation.

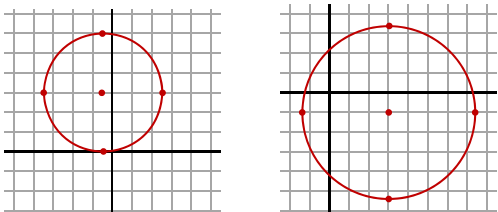
1)  $x^2 + y^2 = 16$       2)  $(x-1)^2 + (y+4)^2 = 4$   
 C(0,0) r = 4      C(1,-4) r = 2



Find the center and radius of each circle and graph.

1)  $(x + \frac{1}{2})^2 + (y-3)^2 = 9$       2)  $(x-3)^2 + (y+1)^2 = 20$   
 $(x-h)^2 + (y-k)^2 = r^2$        $(x-h)^2 + (y-k)^2 = r^2$

$$C = (-\frac{1}{2}, 3) \quad r = 3$$

$$C = (3, -1) \quad r = \sqrt{20} = 2\sqrt{5} \quad r \approx 4.4$$


Find the circumference and area of each circle in terms of  $\pi$ .

1)  $(x-2)^2 + (y+5)^2 = 36$       2)  $(x-1)^2 + y^2 = 24$   
 $(x-h)^2 + (y-k)^2 = r^2$        $(x-h)^2 + (y-k)^2 = r^2$

$$C = (2, -5) \quad r = 6 \quad d = 12$$

$$r = \sqrt{24} = 2\sqrt{6} \quad d = 4\sqrt{6}$$

C =  $\pi \cdot d$       A =  $\pi \cdot r^2$       C =  $\pi \cdot d$       A =  $\pi \cdot r^2$   
 C =  $\pi \cdot 12$       A =  $\pi \cdot 6^2$       C =  $\pi \cdot 4\sqrt{6}$       A =  $\pi \cdot (2\sqrt{6})^2$

$$C = 12\pi \quad A = 36\pi \quad C = 4\sqrt{6} \cdot \pi \quad A = 24\pi$$

## Lesson 11-7

Find the equation of the circle with endpoints  $(-4, -4)$  and  $(2, 0)$ .

$$(x-h)^2 + (y-k)^2 = r^2$$
$$(x+1)^2 + (y+2)^2 = 13$$

$$C(h, k) = \text{Midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left( \frac{-4 + 2}{2}, \frac{-4 + 0}{2} \right)$$
$$C = (-1, -2)$$

Dist. from  $(-1, -2)$  to  $(2, 0)$

$$r = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

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

$$r = \sqrt{9 + 4} = \sqrt{13}$$

