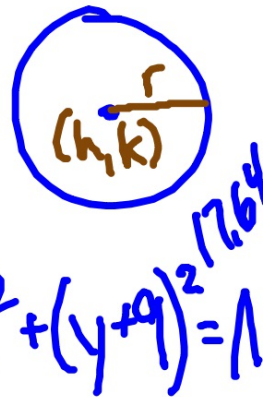


12.12 EQ: **HOW DO YOU GRAPH CIRCLES?**

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

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



**Examples:**

1) Write the standard equation of a circle with center  $(0, -9)$  and radius 4.2.

$$(x - 0)^2 + (y - -9)^2 = 4.2^2 \Rightarrow x^2 + (y + 9)^2 = 17.64$$

2) Write the standard equation of the circle with a center  $(0, 0)$  and radius 2.5.

$$(x - 0)^2 + (y - 0)^2 = 2.5^2 \Rightarrow x^2 + y^2 = 6.25$$

3) Write the standard equation of the circle with center  $(-2, 5)$  and diameter 14.

$$(x - -2)^2 + (y - 5)^2 = 7^2 \Rightarrow (x + 2)^2 + (y - 5)^2 = 49$$

$$r = 14 \div 2 = 7$$

4) The equation of a circle is  $(x - 4)^2 + (y + 2)^2 = 36$ . What are the center and the radius of the circle?

Center:  $(4, -2)$

Radius:  $\sqrt{36} = 6$

5) The equation of a circle is  $(x + 1)^2 + (y + 3)^2 = 16$ . What are the center and the radius of the circle?

Center:  $(-1, -3)$

Radius:  $4 = \sqrt{16}$

6) The point  $(-5, 6)$  is on a circle with center  $(-1, 3)$ . Write the standard equation of the circle.

$r =$  distance from center to point on circle

$$r = \sqrt{(-1 - (-5))^2 + (3 - 6)^2} = 5$$

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

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

7) Write an equation of the circle that is to the right 2 units and up one unit from  $x^2 + y^2 = 1$ .

$$(0, 0) \rightarrow (2, 1)$$

move center  
don't change  $r$

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

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

Summary: