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.

h k r

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

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?

$-h$ $-k$ r^2

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?

$-h$ $-k$ r^2

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.

$x_1\ y_1$ $x_2\ y_2$

r = distance from center to point on circle

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

$(x+1)^2+(y-3)^2=5^2$ $\quad (x+1)^2+(y-3)^2=25$

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: