

# Lesson 8.10- Circle Equations with Center and Point with Graphing.notebook March 08, 2018

1) Complete the square:  $x^2 + 8x + 15 = 0$

$-15 \rightarrow 15$

$x^2 + 8x = -15$

$(x+4)^2 = -15 + 16$

$x+4 = \pm\sqrt{1}$

$x+4 = \pm 1$

$x+4 = 1$     $x+4 = -1$

$x = -3$     $x = -5$

2) State the translation:  $f(x) = (x-3)^2 + 1$

Right 3  
Up 1

$f(g(2))$  # start inside

$g(2) = 2(2) - 3 = 1$

$f(1) = |1 - 3|^2 + 1 = 5$

$g(x) = 2x - 3$

$f(g(x)) = 2(x-1) - 3 = 2x - 5$

1a)  $(1, -3)$   $r=2$

1b)  $(-1)^2 + (-5+3)^2 = 4$   
 $4 = 4$  yes

2a)  $(2, -1)$   $r=4$

2b)  $(6-2)^2 + (-1+1)^2 = 16$   
 $20 < 16$  outside

3a)  $(1, 4)$   $r=3$

3b)  $(-1)^2 + (-3+4)^2 = 9$   
 $4+1 = 5 < 9$  inside

4)  $(x-4)^2 + (x+3)^2 = 9$

5)  $(x+13)^2 + (y-16)^2 = 16$

Circles

Standard Form of the Equation of a Circle:  
 $(x - h)^2 + (y - k)^2 = r^2$

$(x, y)$  point on circle  
 $(h, k)$  center \* opposite signs  
 $r$  radius (distance from point to center)

1) Write an equation of a circle whose center is  $(2, 5)$  and has the point  $(-7, -1)$  on the circle.

$(x - 2)^2 + (y - 5)^2 = 117$

$(-7 - 2)^2 + (-1 - 5)^2 = 117$

2) Write an equation of a circle whose center is  $(14, 17)$  and has the point  $(15, 17)$  on the circle.

$(x - 14)^2 + (y - 17)^2 = 1$

$(15 - 14)^2 + (17 - 17)^2 = 1$

3) Write an equation of a circle whose center is  $(-13, -16)$  and has the point  $(-10, -16)$  on the circle.

Sketching a Circle:

- Write the equation and identify the radius and center.
- Plot the center of the circle
- Count from the center of the circle the length of the radius (in all 4 directions)  $(L, R, U, D)$
- Connect the (4) points to make a circle!!

1) Graph the circle  $(x - 3)^2 + (y + 1)^2 = 4$

$C \rightarrow (3, -1)$  plot it!

$r = \sqrt{4} = 2 \rightarrow$  count by!

\* ① Equation ② center ③ radius

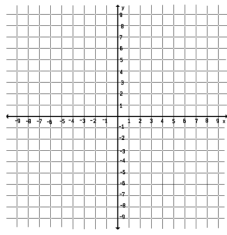
2) Graph the circle  $(x)^2 + (y - 1)^2 = 16$

Directions: Write the equation of the circle and sketch it for each of the following:

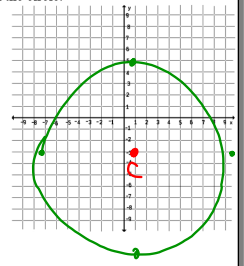
4) A circle whose center is  $(1, -4)$  and has a radius of 4.

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

7) A circle whose center is  $(1, -4)$  and has the point  $(4, -4)$  on the circle.



9) A circle whose center is  $(1, -3)$  and has the point  $(1, 5)$  on the circle.



Exit Ticket *Opposite signs*

1) Write the equation of the circle whose radius is 8 and the center is  $(2, -4)$ .

$$(x - 2)^2 + (y + 4)^2 = 64$$

2) Find the center and radius of:  $(x - 4)^2 + (y + 3)^2 = 9$ .

$$C \rightarrow (4, -3) \quad r \rightarrow \sqrt{9} = 3$$

3) Determine if the point  $(5, -28)$  lie on the circle  $(x + 2)^2 + (x + 4)^2 = 25$ ? *X*