**Classwork: Derive & Practrice the Equation of a Circle**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



Consider the circle in a coordinate plane that has its center at $C(h, k)$ and that has a radius *r*.

**A**

A) Let *P* be any point on the circle and let the coordinates of *P* be $(x, y)$.

Create a right triangle by drawing a horizontal line through *C* and a vertical line through *P*, as shown.

- What are the coordinates of point *A*? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

- Write expressions for the lengths of the legs of $∆CAP$.

 $CA=$ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; $PA=$ ­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**B**

B) Use the Pythagorean Theorem to write a relationship among the side lengths of $∆CAP$.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**C**

C) Equation of a Circle:

 $(h, k)$ is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 $r$ is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 $(x, y)$ is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the equation of a circle whose center is at (3 , -8) and radius is 5?
2. What is the equation of a circle whose center is at (6.5 , 9) and radius is $\sqrt{5}$?
3. What is the center and the radius of the circle whose equations is $(x-1)^{2}+ (y+4)^{2}=25$.
4. What is the center and the radius of the circle whose equations is $(x+2)^{2}+ (y+7)^{2}=13$.

**Identify the center and radius of each. Then sketch the graph.**



1. 6.



1. 8.

**Use the information provided to write the equation of each circle. (Really gotta use your brain in #10!)**

1. Center: $\left(13, -13\right)$ 10. Center: $\left(-13, -16\right)$

Radius: $4$ Point on Circle: $(-10, -16)$