Algebra 2C Notes Name: _____

10-3 Circles

Date: _____ Hr: _____

Objectives:

- To write and graph the equation of a circle.
- To find the center and radius of a circle and use them to graph the circle.

Common Core Standard

G.GPE.1 Derive the equation of a circle given the center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

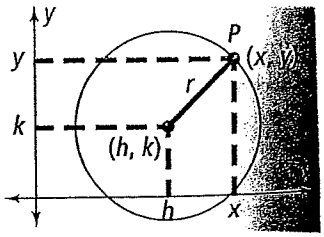
A _____ is the set of all points in a plane that are a distance r from a given point, the _____ of a circle. The distance r is the _____ of the circle.

An equation of a circle with center (0, 0) and radius r in the coordinate plane is $x^2 + y^2 = r^2$

take note

Key Concept Standard Form of an Equation of a Circle

The **standard form of an equation of a circle** with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$.



***Example 1:* Writing an Equation of a Circle**

What is an equation of the circle with center (3, -5) and radius 2?

Example 2: Using Translations to Write an Equation

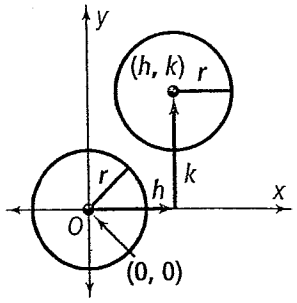
What is an equation for the translation of $x^2 + y^2 = 10$ by 2 units right and 5 units down?

Take note

Key Concept Transforming a Circle

You can use the parameter r to stretch or shrink the unit circle $x^2 + y^2 = 1$ to the circle $x^2 + y^2 = r^2$ with radius r.

You can use the parameters h and k to translate the circle $x^2 + y^2 = r^2$ with center $(0, 0)$ to the circle $(x - h)^2 + (y - k)^2 = r^2$ with center (h, k).



Example 3: Using a Graph to Write an Equation

You row a boat from the water's edge to the center of a circular pond, located 30 feet north and 80 feet west of your starting point. If the location where you began rowing is the origin, what equation represents the water's edge around the pond?

Example 4: **Finding the Center and Radius**

What are the center and radius of the circle with the given equation $x^2 + y^2 + 2x - 6y = 6$?

Example 5: **Graphing a Circle Using Center and Radius**

What is the graph of $x^2 + (y - 1)^2 = 16$?