Name: _____ # _____

Geometry: Period _____

Ms. Pierre
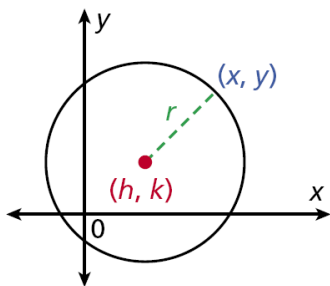
Date: _____

Equations of Circle

Today's Objective

SWBAT write the equations of circles in the coordinate plane and use it to solve problems.

The equation of a circle is based on the Distance Formula and the fact that all points on a circle are equidistant from the center.

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

$$r = \sqrt{(x - h)^2 + (y - k)^2}$$

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

Theorem 11-7-1 (**Equation of a Circle**)

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

Example 1

a. Write the equation of $\odot J$ with center J (2, 2) and radius 4

b. The equation of a circle is $(x - 4)^2 + (y + 1)^2 = 9$. State the center and the radius.

☑ **Check for Understanding**

a. Center at (4, -1), diameter 8

b. The equation of a circle is $x^2 + y^2 = 4$. State the center and the radius.

Example 2

Write the equation for $\odot K$ that passes through $J(6, 4)$ and has a center $K(1, -8)$.

Write the equation for $\odot Q$ that passes through $(2, 3)$ and has a center $Q(2, -1)$

Example 3

The equation of a circle is $x^2 + y^2 - 8x - 8y - 12 = 0$. Wha are the center and radius of the circle?

The equation of a circle is $x^2 + y^2 + 6x - 2y - 15 =$. What are the center and radius of the circle?

Guided Practice

1. Write the equation of the circle with center at $(9, 0)$ and radius 5.

2. The equation of a circle is $(x - 3)^2 + (y + 2)^2 = 16$. State the center and the radius.

3. Write the equation for the circle that passes through $(0, 6)$ and has a center $(-3, 6)$.

4. The equation of a circle is $x^2 + y^2 - 14x - 2y - 50 = 0$. What are the center and radius of the circle?

Independent Practice

1. Write the equation of the circle with center at $(3, 1)$ and diameter 14.

2. The equation of a circle is $x^2 + (y + 1)^2 = 4$. State the center and the radius.

3. Write the equation for the circle that has a center at $(1, -2)$, and passes through $(3, -4)$.

4. The equation of a circle is $x^2 + y^2 + 10x - 16 = 0$. What are the center and radius of the circle?

📖 Home Work

1. A student was asked to write the equation of a circle with its center at the origin and a radius of 4. The student wrote the following equation: $x^2 + y^2 = 4$

What did the student do wrong? Write the correct equation.

2. The equation of a circle is $(x - 8)^2 + y^2 = 64$. State the center and the radius.

3. Write the equation for the circle with a diameter having endpoints at $(0, 4)$ and has a center $(6, -4)$.

4. The equation of a circle is $x^2 + y^2 + 2x + 18y + 1 = 0$. What are the center and radius of the circle?

💡 Enrichment

Which is the graph of the circle represented by the equation

$x^2 + y^2 + 6x - 6y - 7 = 0$?