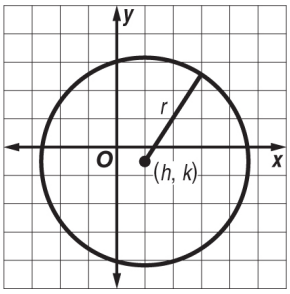
NAME _____ DATE _____ PERIOD _____

10-8 Study Guide and Intervention

Equations of Circles

Equation of a Circle A **circle** is the locus of points in a plane equidistant from a given point. You can use this definition to write an equation of a circle.



Standard Equation of a Circle	An equation for a circle with center at (h, k) and a radius of r units is $(x - h)^2 + (y - k)^2 = r^2$.

Example: Write an equation for a circle with center (-1, 3) and radius 6.

Use the formula $(x - h)^2 + (y - k)^2 = r^2$ with $h = -1$, $k = 3$, and $r = 6$.

$(x - h)^2 + (y - k)^2 = r^2$ Equation of a circle

$(x - (-1))^2 + (y - (-3))^2 = 6^2$ Substitution

$(x + 1)^2 + (y - 3)^2 = 36$ Simplify.

Exercises

Write the equation of each circle.

1. center at (0, 0), radius 8

2. center at (–2, 3), radius 5

3. center at (2, –4), radius 1

4. center at (–1, –4), radius 2

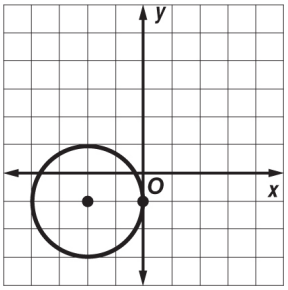
5. center at (–2,–6), diameter 8

6. center at origin, diameter 4

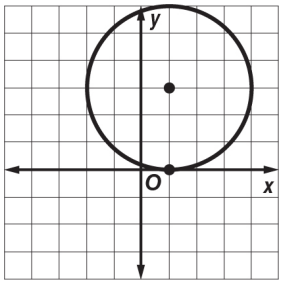
7. center at (3, –4), passes through (−1, −4)

8. center at (0, 3), passes through (2, 0)

9.



10.



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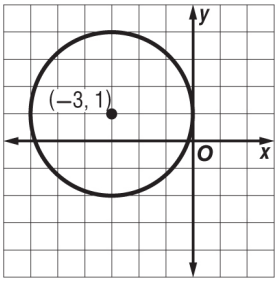
10-8 Study Guide and Intervention *(continued)*

Equations of Circles

Graph Circles If you are given an equation of a circle, you can find information to help you graph the circle.

Example: Graph $(x + 3)^2 + (y + 1)^2 = 9$.



Use the parts of the equation to find (h, k) and r.

Rewrite $(x + 3)^2 + (y - 1)^2 = 9$ to find the center and the radius.

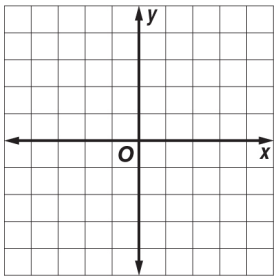
$$[x - (-3)]^2 + (y - 1)^2 = 3^2$$
$$\uparrow \qquad \uparrow \quad \uparrow$$
$$(x - h)^2 + (y - k)^2 = r^2$$

So $h = -3$, $k = 1$, and $r = 3$. The center is at (–3, 1) and the radius is 3.

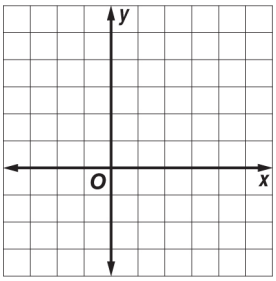
Exercises

For each circle with the given equation, state the coordinates of the center and the measure of the radius. Then graph the equation.

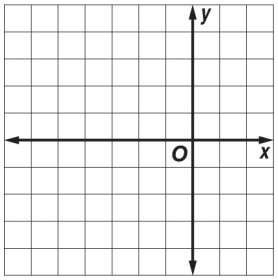
1. $x^2 + y^2 = 16$



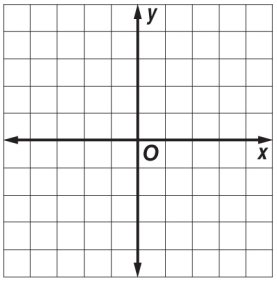
2. $(x - 2)^2 + (y - 1)^2 = 9$



3. $(x + 2)^2 + y^2 = 16$

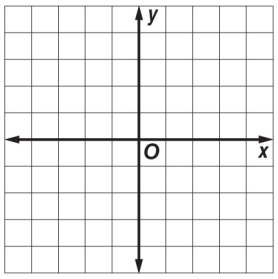


4. $x^2 + (y - 1)^2 = 9$



Write an equation of a circle that contains each set of points. Then graph the circle.

5. $F(-2, 2)$, $G(-1, 1)$, $H(-1, 3)$



6. $R(-2, 1)$, $S(-4, -1)$, $T(0, -1)$