

10.3 Circles

Learning Targets for today

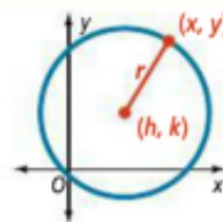
- ① To be able to write an equation of a circle.
- ① To be able to use translations to write equation of circle.
- ① To be able to graph a translated circle.
- ① To be able to use graph to write the equation of a circle.

Key Concepts to Know

Standard Form of a Circle – The standard form of an equation of a circle is

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

Where (h, k) is the center of the circle and r is the radius.



Writing an Equation of a Circle.

Example for you...

Write the standard equation of each circle.

1. Center $(4,2)$; $r = 9$

(h, k) $(x-h)^2 + (y-k)^2 = r^2$
 (9^2)

$$(x-4)^2 + (y-2)^2 = 81$$

2. Center $(0,0)$; $r = 4$

$$(x-0)^2 + (y-0)^2 = 4^2$$
$$x^2 + y^2 = 16$$

Your turn to try...

Write the standard equation of each circle.

1. Center $(8,-6)$; $r = 1$

$$(x-8)^2 + (y+6)^2 = 1$$

2. Center $(5,0)$; $r = 7$

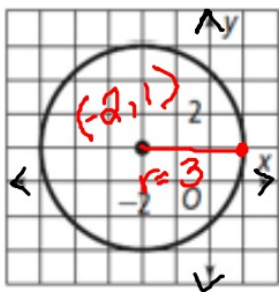
$$(x-5)^2 + y^2 = 49$$

Writing an Equation of a Circle.

Example for you...

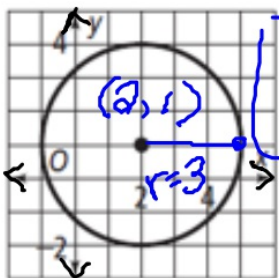
Write the standard equation of each circle.

1.



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

2.

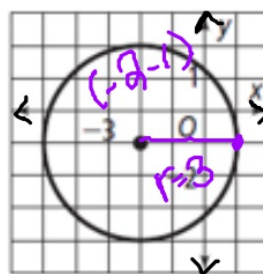


$$(x-2)^2 + (y-1)^2 = 9$$

Your turn to try...

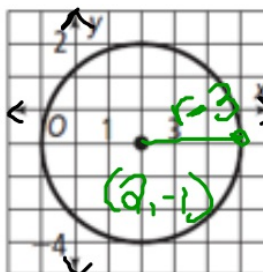
Write the standard equation of each circle.

1.



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

2.



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

Writing an Equation of a Circle Given a Point on the Circle.

Example for you...

Write the standard equation of each circle given the radius and a point on the circle.

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

1. Center (h, k)
 $(5, 9)$; point $(2, 3)$
 x_1, y_1 x_2, y_2

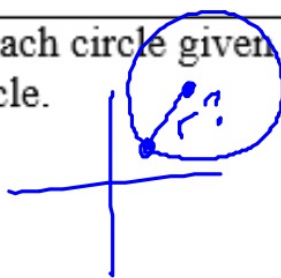
$$d = \sqrt{(2-5)^2 + (3-9)^2}$$

$$d = \sqrt{(-3)^2 + (-6)^2}$$

$$d = \sqrt{9+36}$$

$$d = \sqrt{45} = r \quad (x-5)^2 + (y-9)^2 = \cancel{\sqrt{45}}^2$$

$$(x-5)^2 + (y-9)^2 = 45$$



Your turn to try...

Write the standard equation of each circle given the radius and a point on the circle.

1. Center $(4, 3)$; point $(-1, 1)$
 x_1, y_1 x_2, y_2

$$d = \sqrt{(-1-4)^2 + (1-3)^2}$$

$$d = \sqrt{(-5)^2 + (-2)^2}$$

$$d = \sqrt{25+4}$$

$$d = \sqrt{29} = r \quad (x-4)^2 + (y-3)^2 = \cancel{\sqrt{29}}^2$$

$$(x-4)^2 + (y-3)^2 = 29$$

Graphing a Circle.

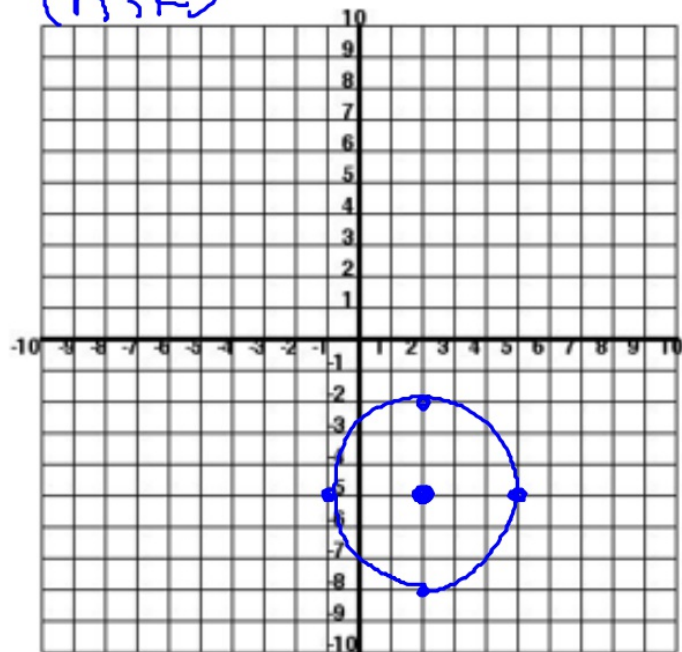
Example for you...

Graph the circle.

1. $(x - 2)^2 + (y + 5)^2 = 9$

$(2, -5)$
 (h, k)

$\sqrt{9} = 3$
 $r = 3$



Your turn to try...

Graph the circle.

1. $x^2 + (y - 5)^2 = 4$

$(0, 5)$

$\sqrt{4} = 2$
 $r = 2$

