Math Virtual Learning

Geometry/Honors Geometry

Equations of Circles

May 14, 2020

Geometry/Honors Geometry
Lesson: May 14, 2020

Objective/Learning Target:
Students will write equations for circles.

Bell Ringer: In the equation of the circle, determine to center and the radius:

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

Bell Ringer Answer: Center (2,-1) Radius 3

Warm-Up:

Watch Videos: Features of Equations of Circles
Writing Equations of Circles

Click on the link: Intro: Equations of Circles Desmos Activity. Click Join then work through the slides.

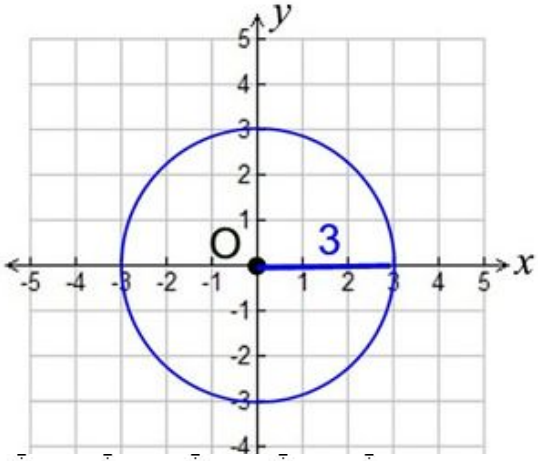
Notes:

- **Circle with Center at Origin (0,0)**

$$x^2 + y^2 = r^2$$

with the center at (0,0)
and the radius r

In the example at the right, $x^2 + y^2 = 9$.
The center is (0,0) and the radius = 3.



- **Circle with Center at Point (*h*, *k*)**

(Known as "center-radius form" or "standard form".)

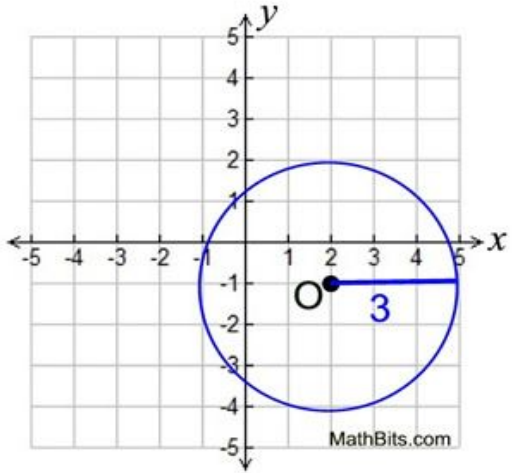
$$(x - h)^2 + (y - k)^2 = r^2$$

with the center at (h, k)
and the radius r

In the example at the right,
the center is (2,-1) and the radius = 3.

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

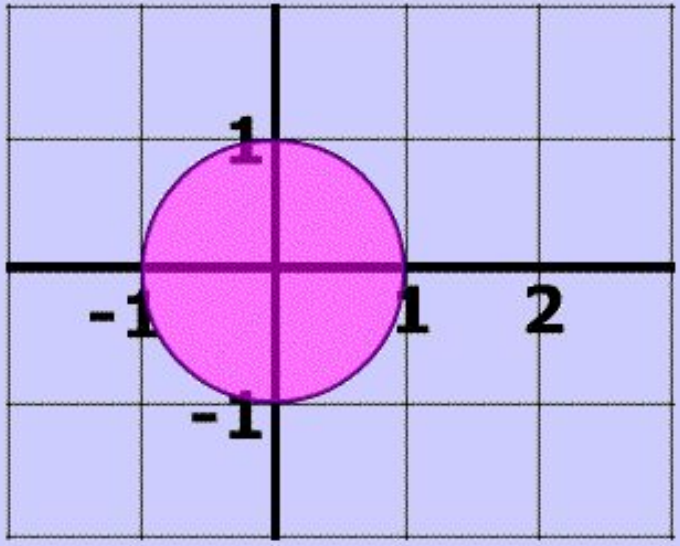
$$(x - 2)^2 + (y + 1)^2 = 9.$$



Example:

What is the equation of the circle pictured on the graph below?

HIDE ANSWER

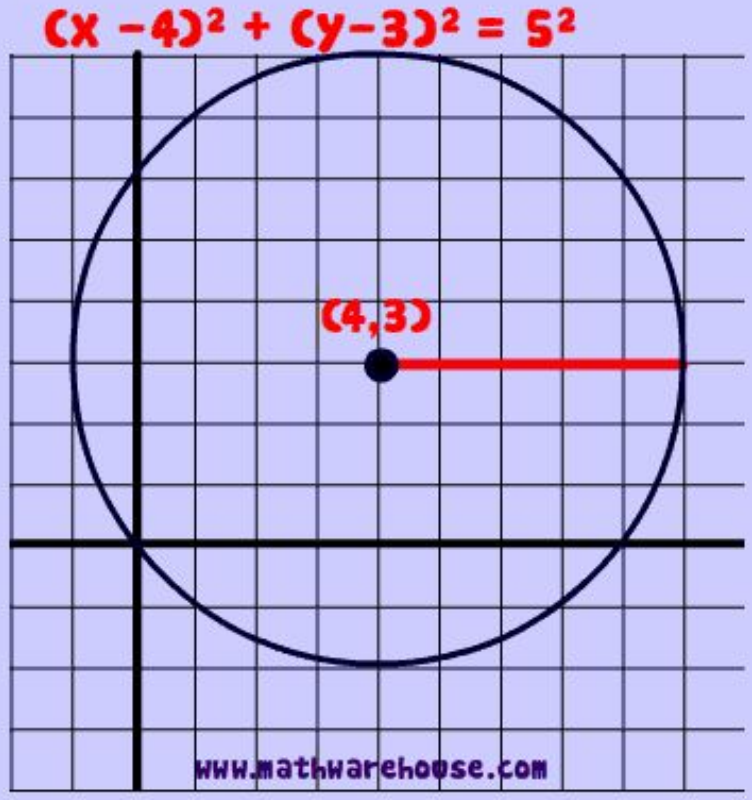


Since the radius of this this circle is 1, and its center is the origin, this picture's equation is.

$$(y-0)^2+(x-0)^2=1^2$$
$$y^2+x^2=1$$

Example:

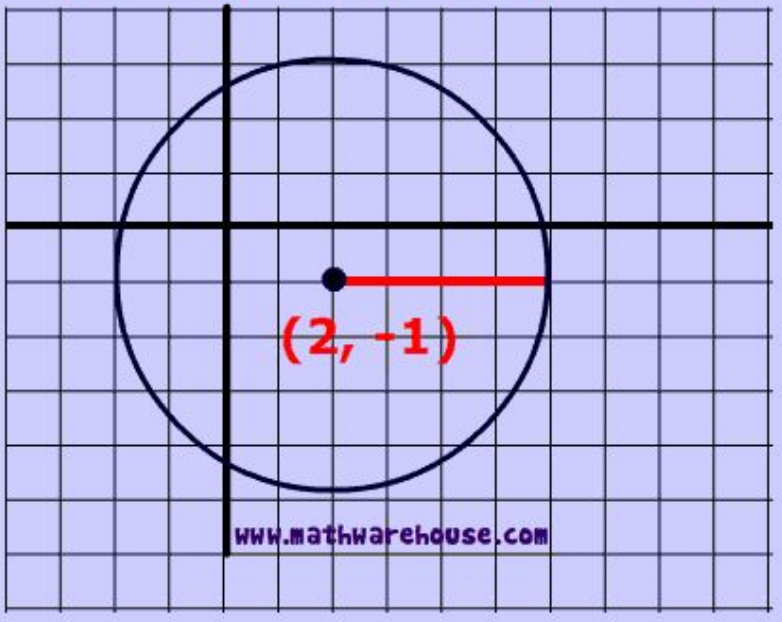
Circle with a center of (4,3) and a radius of 5



Example:

Circle with a center of (2, -1) and a radius of 4

$$(x - h)^2 + (y - k)^2 = r^2$$
$$(x - 2)^2 + (y- -1)^2 = 4^2$$
$$(x - 2)^2 + (y + 1)^2 = 4^2$$



Practice:

1) Write the equation of a circle with center at (4,8) and a radius of 12.

2) Given the equation of a circle, $(x + 4)^2 + (y - 5)^2 = 50$, find the coordinates of the center and the radius.

Answer Key:

Once you have completed the problems, check your answers here.

1)

ANSWER:

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

$$(x-4)^2+(y-8)^2=144$$

2)

ANSWER:

$$(x+4)^2+(y-5)^2=50$$

$$(x-(-4))^2+(y-5)^2=50$$

Remember that a + sign inside the parentheses means that the coordinate will be a negative value.

The **center** is (-4,5) and the **radius** is $\sqrt{50}$ or $5\sqrt{2}$.

Additional Practice:

Interactive Practice

More Interactive Practice

Extra Practice with Answers