

The Equation of a Circle #2

Equation of a Circle #2

You have already learned how to:

- write the equation of a circle when given the center and radius
- find the center and radius of a circle when given the equation
- sketch the graph of a circle

What two things do you need to write an equation of a circle?

center + radius

How would you write an equation of a circle given the following?

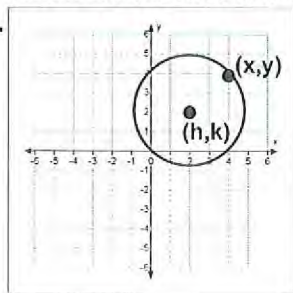
Center: (2,3)
Point on Circle: (4,1)

What are we missing?

radius

Today we will discuss how to write the equation of a circle when given the center and a point on the circle.

Remember when we derived the equation of the circle...



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

Ex: Write the equation of the circle with the given information.

- Center: (-9,4)
Point on circle: (-2,1)

Hint: Let the center be (h,k) and let the point on the circle by (x,y).

$$\begin{aligned} (x-h)^2 + (y-k)^2 &= r^2 \\ (x+9)^2 + (y-4)^2 &= r^2 \\ (-2+9)^2 + (1-4)^2 &= r^2 \\ (7)^2 + (-3)^2 &= r^2 \\ 49 + 9 &= r^2 \\ 58 &= r^2 \end{aligned}$$

$$(x+9)^2 + (y-4)^2 = 58$$

The Equation of a Circle #2

Ex: Write the equation of the circle with the given information.

2. Center at origin $(0,0)$
Point on circle: $(5,0)$

$$\begin{aligned}(x-h)^2 + (y-k)^2 &= r^2 \\ (x-0)^2 + (y-0)^2 &= r^2 \\ (5-0)^2 + (0-0)^2 &= r^2 \\ (5)^2 + (0)^2 &= r^2 \\ 25 + 0 &= r^2 \\ 25 &= r^2\end{aligned}$$

$$\begin{aligned}(x-0)^2 + (y-0)^2 &= 25 \\ \text{or} \\ x^2 + y^2 &= 25\end{aligned}$$

Try this by yourself!

Ex: Write the equation of the circle with the given information.

4. Center at origin $(0,0)$
Point on circle: $(9,-1)$

4)
$$\begin{aligned}(x-h)^2 + (y-k)^2 &= r^2 \\ (x-0)^2 + (y-0)^2 &= r^2 \\ (9-0)^2 + (-1-0)^2 &= r^2 \\ (9)^2 + (-1)^2 &= r^2 \\ 81 + 1 &= r^2 \\ 82 &= r^2\end{aligned}$$

$$\begin{aligned}(x-0)^2 + (y-0)^2 &= 82 \\ \text{or} \\ x^2 + y^2 &= 82\end{aligned}$$

Ex: Write the equation of the circle with the given information.

3. Center: $(0,1)$
Point on circle: $(-3,-4)$

$$\begin{aligned}(x-h)^2 + (y-k)^2 &= r^2 \\ (x-0)^2 + (y-1)^2 &= r^2 \\ (-3-0)^2 + (-4-1)^2 &= r^2 \\ (-3)^2 + (-5)^2 &= r^2 \\ 9 + 25 &= r^2 \\ 34 &= r^2\end{aligned}$$

$$\begin{aligned}(x-0)^2 + (y-1)^2 &= 34 \\ \text{or} \\ x^2 + (y-1)^2 &= 34\end{aligned}$$

Homework:

Write Equations HW #2

5)
$$\begin{aligned}(x-h)^2 + (y-k)^2 &= r^2 \\ (x-2)^2 + (y-3)^2 &= r^2 \\ (4-2)^2 + (1-3)^2 &= r^2 \\ (2)^2 + (-2)^2 &= r^2 \\ 4 + 4 &= r^2 \\ 8 &= r^2\end{aligned}$$

$$(x-2)^2 + (y-3)^2 = 8$$