Goals:

- I can write equations of circles.
- I can graph circles.

Name: _____

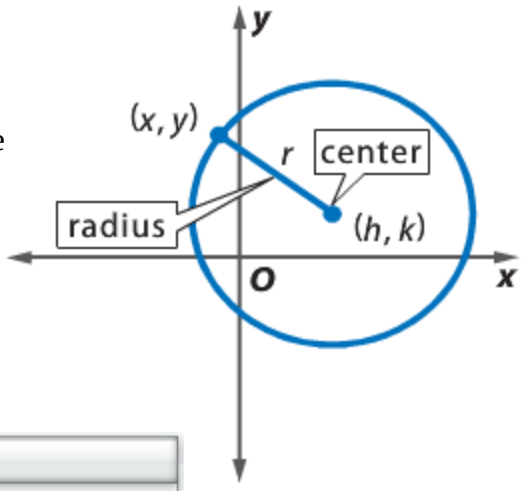
Algebra II
Conics | Circles
Hartzler

Vocabulary and Formulas

Circle: the set of all points in a plane that are equidistant from a given point in the plane

Center (h, k): the point that is equidistant from all points around a circle

Radius: any segment with endpoints at the center and a point on the circle is a radius of the circle.



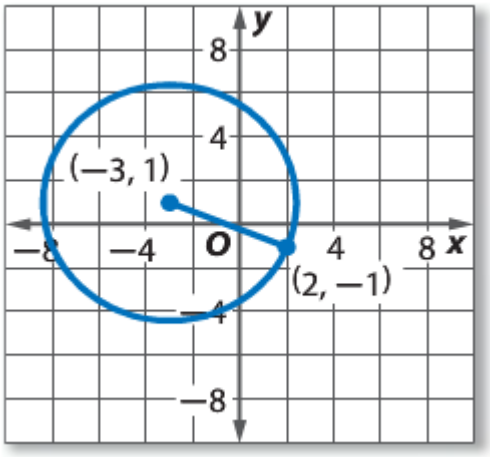
Midpoint: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

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

KeyConcept Equations of Circles

Standard Form of Equation	$x^2 + y^2 = r^2$	$(x - h)^2 + (y - k)^2 = r^2$
Center	(0, 0)	(h, k)
Radius	r	r

Example 1: Write an Equation from a Graph



Steps	Explanation
$(x - h)^2 + (y - k)^2 = r^2$	Standard form of the circle.
	Plug in what you know.
	Simplify inside the parentheses
	Use distance formula to find the radius
	Simplify for r^2
	Write the final equation of the circle!

Example 2: Write an equation for a circle if the endpoints of a diameter are at $(7, 6)$ and $(-1, -8)$.

Step 1: Find the center. $(h, k) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	Midpoint Formula using the two points given.
Step 2: Find the radius. $r = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)}$	Distance formula using one of the points given and the center. Since $r = \sqrt{260}$ then $r^2 = 260$.
Step 3: Put it all together! $(x - h)^2 + (y - k)^2 = r^2$	Substitute *h*, *k*, and r^2 into the standard form of the equation of a circle.

Example 3: Write an equation for each circle given the center and radius.

Center: $(4, 9)$, $r = 6$

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

Substitute in what you have:

Example 4: Graph an Equation in Standard Form

Find the center and radius of the circle with equation $(x-1)^2+(y+2)^2=100$. Then graph the circle.

Questions to ask yourself?
What is the center of the circle?
What is the radius?
What are some other points on the circle?

x	y
0	
6	
8	
10