

Warm-Up

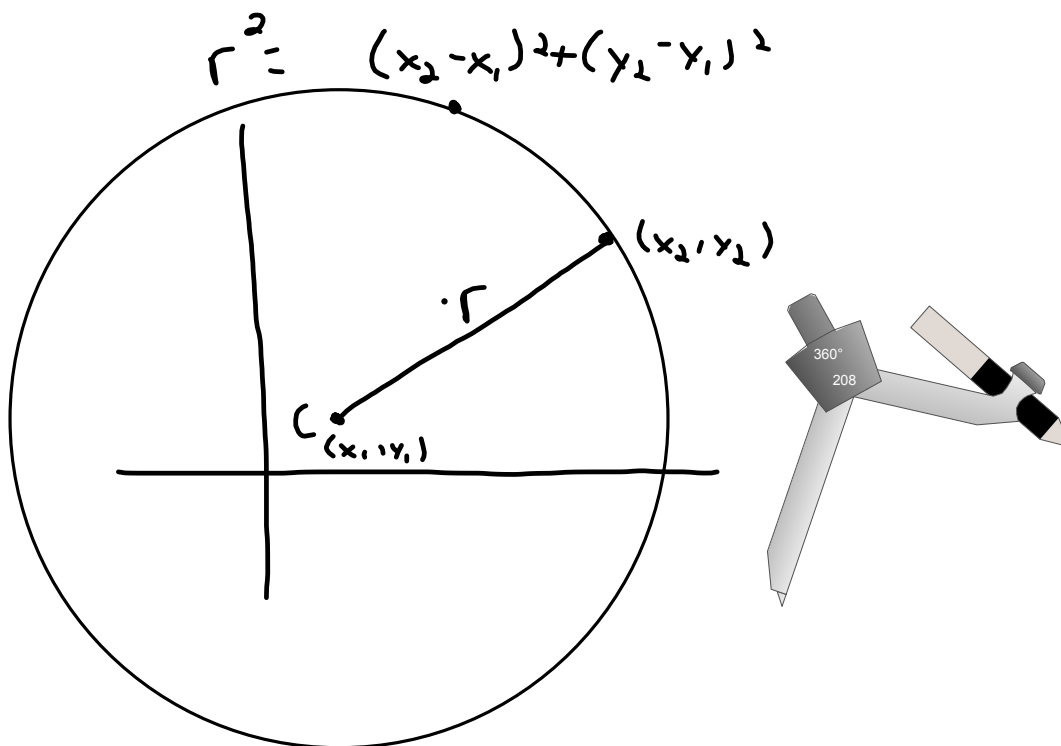
Find the measure of an arc whose length is 17π inches, and radius is 10 inches.

Circles in Coordinate Geometry-Guided Notes

Learning Targets:

- Given an equation of a circle, I can identify the radius and center point.
- Given information about the circle, I can write the equation of that circle
- Given an equation or information about the circle, I can sketch a circle on a coordinate plane.

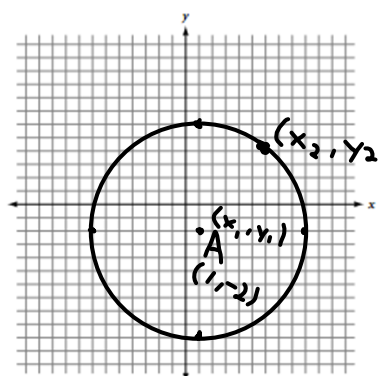
Materials needed: compass.



The distance formula can also be used to find the equation of a circle. What is the equation of a circle with radius r and center (h, k) ? Use graph paper and compass to investigate and make a conjecture.

Step 1 Given its center and radius, graph each circle.

- Circle A:** center = $(1, -2)$, $r = 8$ [Draw point at center; mark radius units from center; draw circle with compass]
- Circle B:** center = $(0, 2)$, $r = 6$



Step 2. For each circle, select any point and label it (x_2, y_2) .

Use the distance formula to write an equation for the distance from the center of the circle (x_1, y_1) .

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

Equation for circle A.

$$8 = \sqrt{(x_2 - 1)^2 + (y_2 + 2)^2}$$

Equation for circle B.

$$6 = \sqrt{(x_2 - 0)^2 + (y_2 - 2)^2}$$

EQUATION OF A CIRCLE:

The equation of a circle with radius r and center (h, k) is:

$$r = \sqrt{(x_2 - h)^2 + (y_2 - k)^2}$$

The standard equation for a circle with center (h, k) and radius r is:

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

(h, k) is the center

$r =$ radius

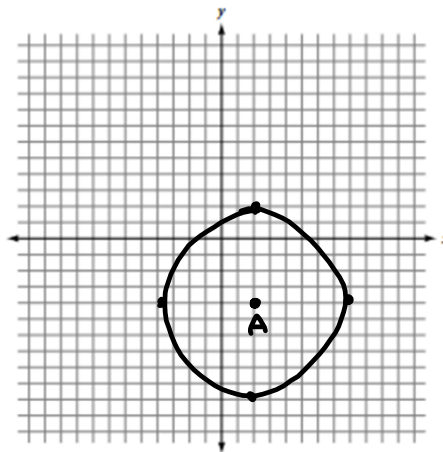
1.) Graph the circle with equation:

$$(x-2)^2 + (y+4)^2 = 36$$

a.) Determine center: $(2, -4)$

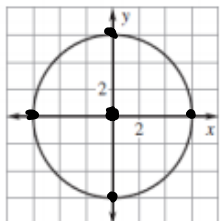
b.) Radius is: $6 \leftarrow \sqrt{36}$

c.) Draw point at center; mark radius units from center; draw circle freehand or with compass



2.) Write an equation for the circles shown:

a.)

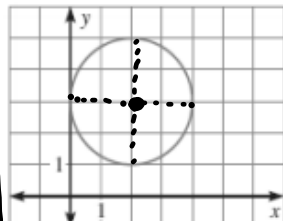


Center: $(0, 0)$
radius: 6

$$(x-0)^2 + (y-0)^2 = 6^2$$

$$x^2 + y^2 = 36$$

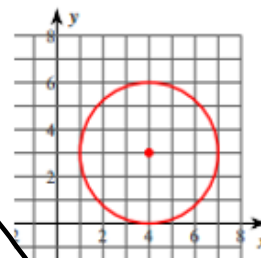
b.)



Center: $(2, 3)$
radius: 2

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

c.)



Center: $(4, 3)$
radius: 3

$$(y-4)^2 + (x-3)^2 = 9$$

3.) Write the standard equation of the circle with the given centers and radii:

a.) center: (0, 0); radius = 3

$$x^2 + y^2 = 9$$

b.) center: (-4, 3); radius = 5

$$(x+4)^2 + (y-3)^2 = 25$$

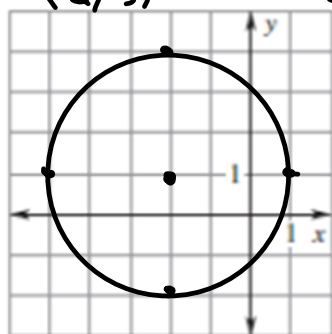
c.) center: (1, -5); radius = 3

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

4.) Identify the center and radius of the following circles. Then graph each circle.

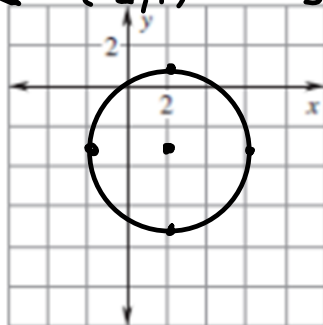
a.) $(x-2)^2 + (y+3)^2 = 16$

center: (2, -3) radius: 4



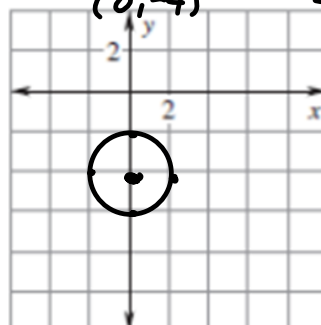
b.) $(x+2)^2 + (y-1)^2 = 9$

center: (-2, 1) radius: 3



c.) $x^2 + (y+4)^2 = 4$

center: (0, -4) radius: 2



Circles in Coordinate Geometry -HW