

Objective: Write and graph a circle given a center and radius.

Warm Up:

Find the arc length and the area of a sector if given a 40° arc of a circle with a radius of 6 cm.

Arc Length:

$$\frac{S}{12\pi} = \frac{40^\circ}{360^\circ}$$

$$S = \frac{40(12\pi)}{360}$$

$$S = \frac{4\pi}{3}$$

Sector Area:

$$\frac{A}{36\pi} = \frac{40^\circ}{360^\circ}$$

$$A = \frac{40(36\pi)}{360}$$

$$A = 4\pi$$

Standard Form for a Circle:

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

Center: (h, k)

Radius: r

Example 1: Determine the center and the radius of the circle

A.) $x^2 + y^2 = 36$

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

B.) $x^2 + y^2 = 49$

center: $(0, 0)$
radius: 7

C.) $25 - x^2 = y^2$
 $\frac{\quad +x^2 \quad +x^2}{x^2 + y^2 = 25}$

Center: $(0, 0)$
radius: 5

D.) $(x - 2)^2 + (y - 8)^2 = 25$

Center: $(2, 8)$
radius: 5

E.) $(x + 4)^2 + (y - 3)^2 = 16$

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

F.) $(x + 8)^2 + (y + 10)^2 = 36$

Center: $(-8, -10)$
radius: 6

Example 2: Write the equation of a circle given the following information:

A.) Center: $(0, 0)$

Point: $(-5, 0)$

$$x^2 + y^2 = 25$$

B.) Center: $(4, 5)$

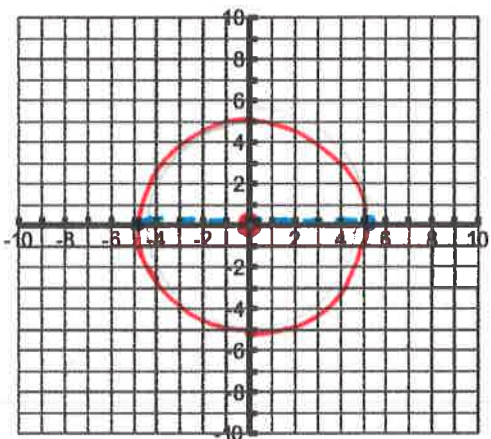
Radius: 4

$$(x - 4)^2 + (y - 5)^2 = 16$$

Example 3: Given the equation of a circle, create its corresponding graph. Then draw in a diameter and list its endpoints.

A.) $x^2 + y^2 = 25$

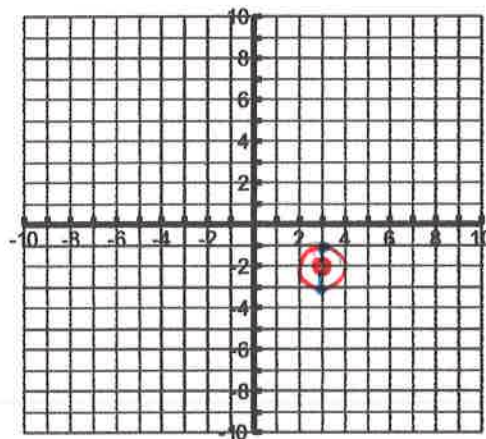
center: $(0,0)$
radius: 5



diameter endpoints:
 $(5,0)$ and $(-5,0)$

B.) $(x - 3)^2 + (y + 2)^2 = 1$

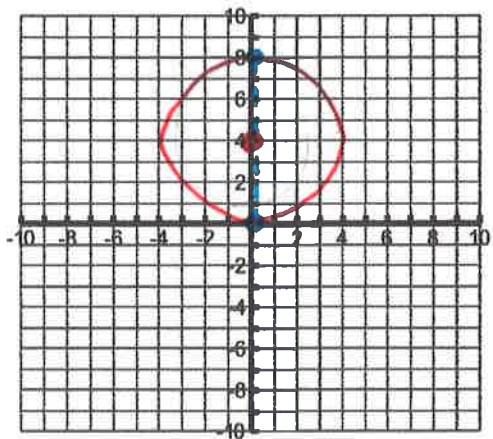
center: $(3,-2)$
radius: 1



diameter endpoints:
 $(3,-1)$ and $(3,-3)$

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

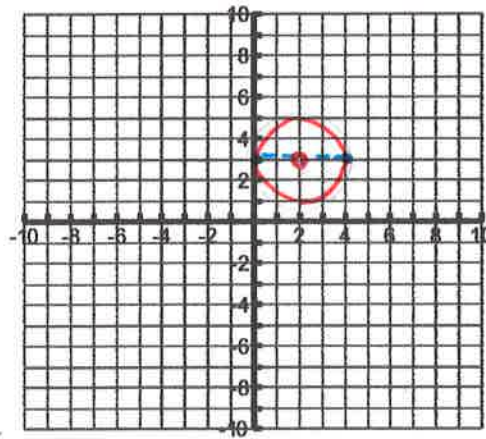
center: $(0,4)$
radius: 4



diameter endpoints:
 $(0,0)$ and $(0,8)$

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

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



diameter endpoints:
 $(0,3)$ and $(4,3)$