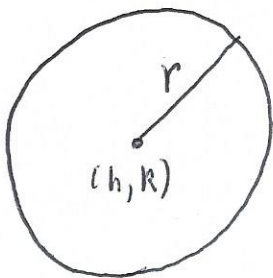


4/08

Graphs of Equations 1-1

2) Circles



Important bits of information about a circle

- 1) Center - Locates
- 2) Radius - Sizes

Equation of a circle in Standard Form w/ center (h, k) and radius r :

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

Examples

- 1) Center $(3, 5)$
Radius is 7

Equation: $(x-3)^2 + (y-5)^2 = 7^2$

- 2) Center $(-9, 0)$
Radius is $\sqrt{10}$

Equation: $(x+9)^2 + (y-0)^2 = (\sqrt{10})^2$
or
 $(x+9)^2 + y^2 = 10$

- 3) Center is the Origin

Equation: $x^2 + y^2 = .02^2$

Radius is .02

Examples

1) $(x+5)^2 + (y-7)^2 = 121$

Center $(-5, 7)$ Radius 11

2) $(x-4)^2 + y^2 = 40$

Center $(4, 0)$ Radius $\sqrt{40}$ or $2\sqrt{10}$
or ≈ 6.32

3) $x^2 + y^2 = .0009$

Center $(0, 0)$ Radius .03

Webassign Problems

Write the standard form of a circle with the given characteristics.

The endpoints of a diameter are $(-1, -2)$ and $(1, 2)$.

The middle of a diameter is the center

So use the midpoint formula

$$\left(\frac{1+(-1)}{2}, \frac{2+(-2)}{2} \right) = \left(\frac{0}{2}, \frac{0}{2} \right) = (0, 0)$$

So the center is $(0, 0)$

To find the radius we can find the distance from the center to 1 end of the radius. Let's find the distance between the center and $(1, 2)$.

Distance Formula

$$\begin{array}{cc} (0, 0) & (1, 2) \\ x_1, y_1 & x_2, y_2 \end{array}$$

$$d = \sqrt{(1-0)^2 + (2-0)^2} = \sqrt{(1)^2 + (2)^2} = \sqrt{5}$$

$$r = \sqrt{5}$$

So the equation of our circle in standard form is

$$x^2 + y^2 = (\sqrt{5})^2 \text{ or } x^2 + y^2 = 5$$