Circles

- A circle is a set of points that are equidistant from the ___Center___.
- The segment that goes from the center to a point on the circle is called the ___radius___.
- The segment that goes from one point on the circle to another point on the circle and crosses over the center is call the ___diameter___.

Distance formula:

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

Example of when you might use this:

Find the distance between $(3, -4)$ and $(-2, -6)$

$$\sqrt{(-6+14)^2 + (-2-3)^2} = \sqrt{(-2)^2 + (-5)^2}$$

$$\sqrt{29}$$

Midpoint formula:

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

Example of when you might use this:

Find the midpoint of the segment with endpoints at $(3, -4)$ and $(-2, -6)$

$$\left(\frac{3+-2}{2}, \frac{-4+-6}{2}\right)$$

$$(1/2, -5)$$

Standard form of a circle:

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

Center: (h, k)

Radius: $\sqrt{12} = r$

Example:

$$(x - 2)^2 + (y + 5)^2 = 25$$

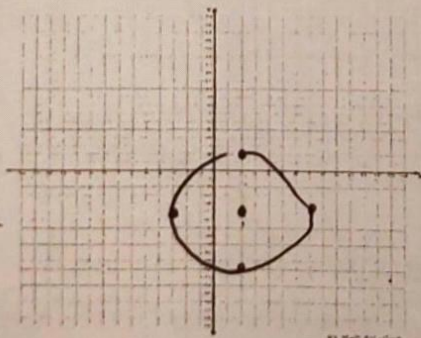What is the center of the graph? $(2, -5)$

What is the radius of the graph? $\sqrt{25} = 5$

Graphing:

$$(x - 2)^2 + (y + 5)^2 = 25$$
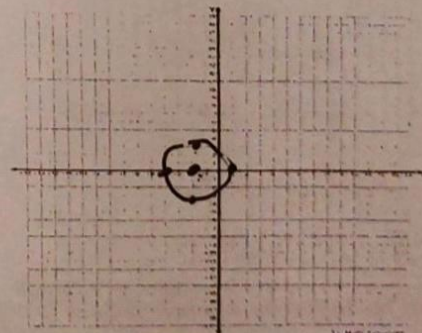
Center: $(2, -5)$

Radius: $\sqrt{25} = r$

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

Center: $(-2, 0)$

Radius: $\sqrt{9} = 3$

Write the equation of a circle that has a center at $(2, 4)$ and a point on the circle is $(3, -5)$.

h, k

$$(x-h)^2 + (y-k)^2 = r^2$$
$$(3-2)^2 + (-5-4)^2 = r^2$$
$$(1)^2 + (-9)^2 = r^2$$
$$82 = r^2$$
$$(x-2)^2 + (y-4)^2 = 82$$

Write the equation of a circle that has endpoints of the diameter of $(-2, 5)$ and $(1, 3)$. $r = \frac{1}{2}$ diameter

$$\left(\frac{-2+1}{2}, \frac{5+3}{2}\right) = (-.5, 4) \text{ center}$$

$$(-.5--2)^2 + (5-4)^2 = 3.25$$

$$(x+.5)^2 + (y-4)^2 = 3.25$$

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