

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

CCGPS Analytic Geometry  
Conic Sections - Circles

Warm-up

Find the distance between the following sets of points.

1.  $(2, 4)$  and  $(-1, 5)$

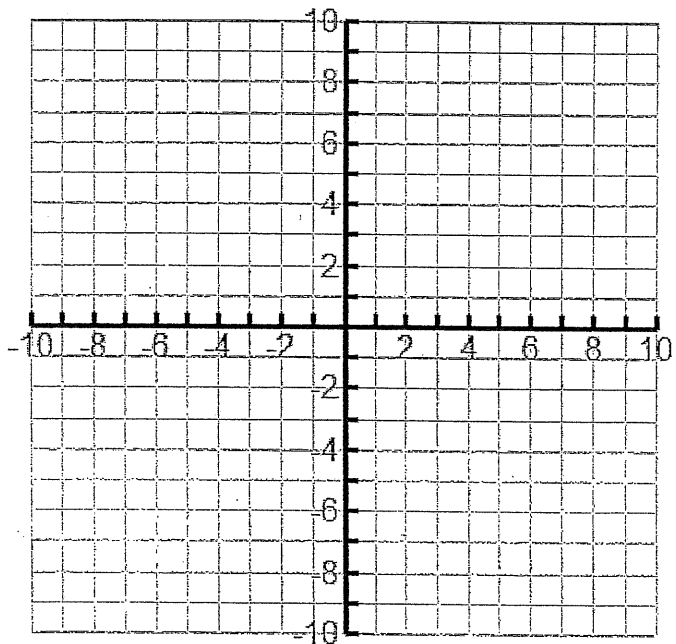
Find the midpoint between the following sets of points.

2.  $(1, 0)$  and  $(3, -5)$

---

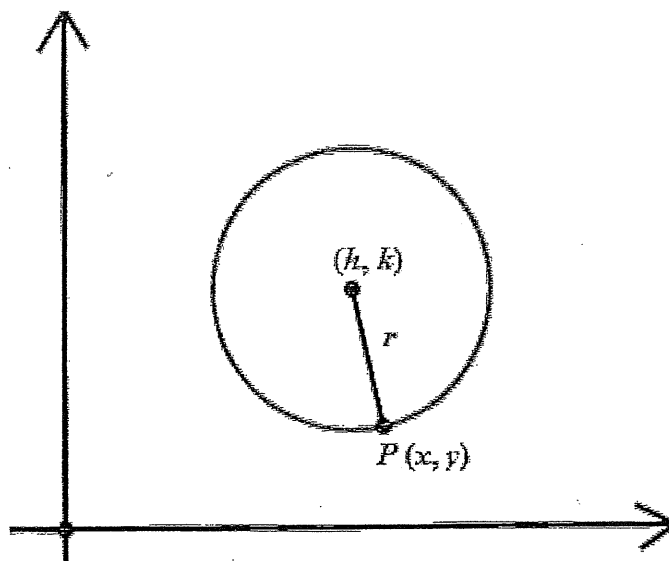
On the coordinate plane provided,

1. Plot the point  $(3, 4)$
2. Find the distance between  $(0, 0)$  and  $(3, 4)$
3. Plot 5 more points that are the same distance away from  $(0, 0)$ . What are the coordinates of these points?
4. What shape do you see forming?
5. If  $(2, y)$  is a point on the \_\_\_\_\_, what is the value of  $y$ ?



Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

A circle is the set of all points equidistant from a fixed point called the \_\_\_\_\_ . The distance between the center and a point on a circle is called the \_\_\_\_\_. The standard equation for a circle with center at \_\_\_\_\_ and radius \_\_\_\_\_ is \_\_\_\_\_.



Examples:

Write the equation of the circle centered at (0, 0).

1. Radius of 8

2. Radius of  $5\sqrt{2}$

Write the equation of a circle that passes through the given point and whose center is at the origin.

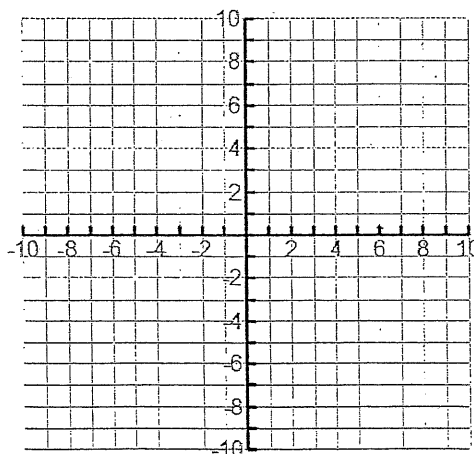
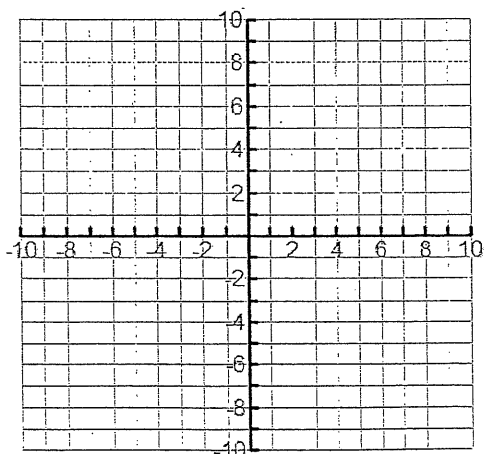
3. (-2, 5)

To graph a circle you need to know the center and the radius. First graph the center of the circle. Next graph points r spaces away from the center both horizontally and vertically. Finally sketch the circle.

Examples: Graph the equation of the circle.

4.  $y^2 = 16 - x^2$

5.  $6x^2 + 6y^2 = 54$



## Conics - Circle Homework

Use the information provided to write the standard form equation of each circle.

1) Center:  $(-10, -5)$   
Radius: 7

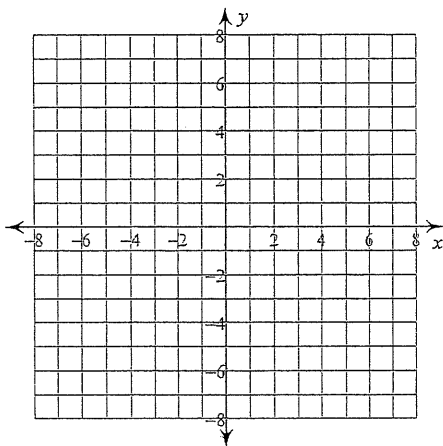
2) Center:  $(13, 16)$   
Radius: 1

3) Center:  $\left(\frac{11}{2}, 5\right)$   
Radius: 4

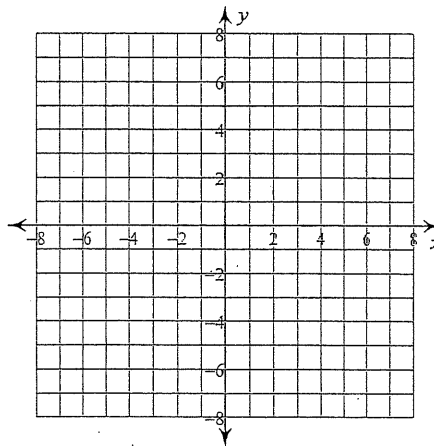
4) Center:  $(-5, -5)$   
Radius: 6

Graph each equation.

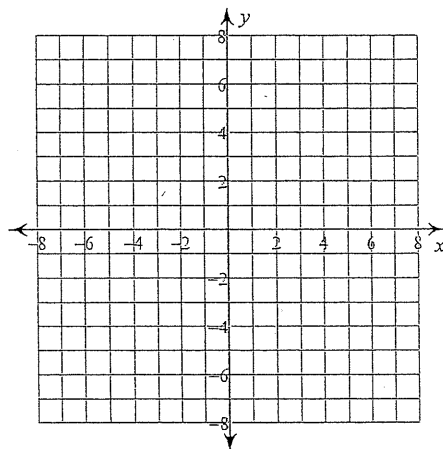
5)  $x^2 + y^2 = 25$



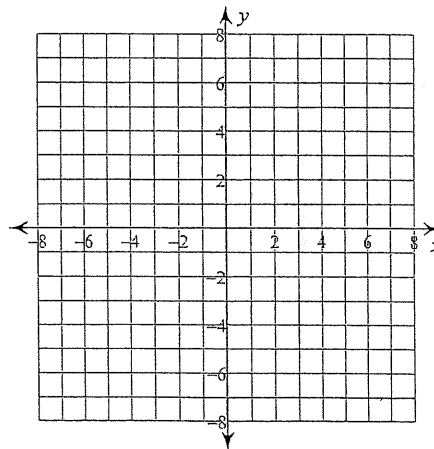
6)  $x^2 + y^2 = 36$



7)  $x^2 + y^2 = 33$



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



CCGPS Analytic Geometry  
Conic Sections - Circles

Warm-up

Find the distance between the following sets of points.

$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

1.  $x_1, y_1$      $x_2, y_2$   
 1. (2, 4) and (-1, 5)  
 $d^2 = (-1-2)^2 + (5-4)^2$   
 $d^2 = 3^2 + 1^2$   
 $\sqrt{d^2} = \sqrt{10}$      $d = \sqrt{10}$

Find the midpoint between the following sets of points.

2. (1, 0) and (3, -5)  
 $\frac{1+3}{2}, \frac{0-5}{2}$      $(2, -\frac{5}{2})$

On the coordinate plane provided,

- Plot the point (3, 4)
- Find the distance between (0, 0) and (3, 4)
- Plot 5 more points that are the same distance away from (0, 0). What are the coordinates of these points?
- What shape do you see forming? *circle*
- If (2, y) is a point on the \_\_\_\_\_, what is the value of y?  $(3, 4)$

$3^2 + 4^2 = 9 + 16 = 25 = 5^2$

$d^2 =$   
 $x_1, y_1$      $x_2, y_2$   
 5) (2, y) and (3, 4)  $d=5$

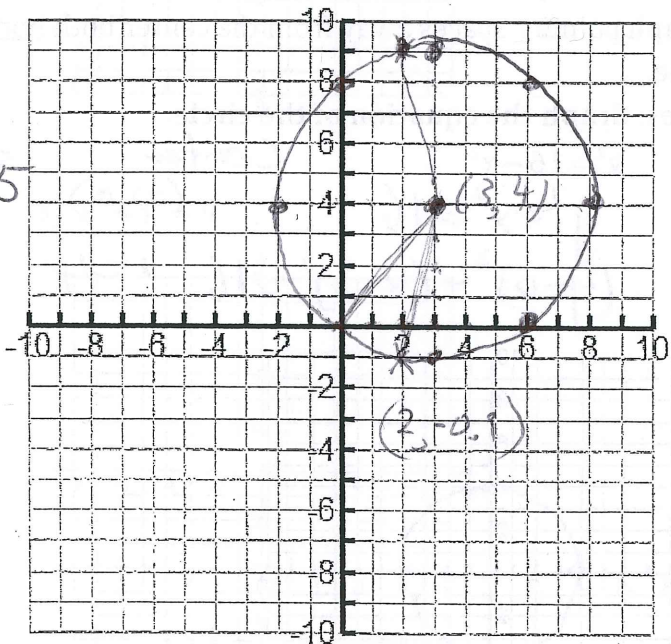
$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

$$5^2 = (3-2)^2 + (4-y)^2$$

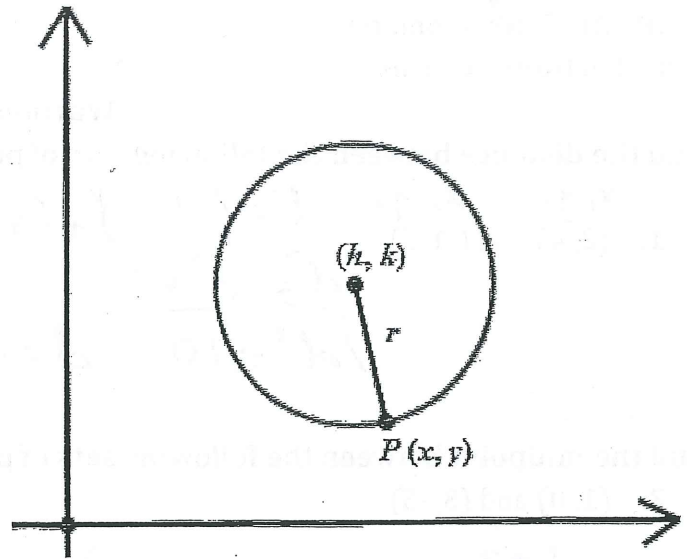
$$25 = 1^2 + (4-y)^2$$

$$24 = (4-y)^2 \quad \pm\sqrt{24} = 4-y$$

$$\pm\sqrt{24} + 4 = y \quad y = \pm\sqrt{24} + 4$$



A circle is the set of all points equidistant from a fixed point called the center  $(h, k)$ . The distance between the center and a point on a circle is called the radius. The standard equation for a circle with center at  $(h, k)$  and radius  $r$  is  $(x-h)^2 + (y-k)^2 = r^2$ .



Examples:

Write the equation of the circle centered at  $(0, 0)$ .

1. Radius of 8  $(h, k) = (0, 0) \quad r = 8$

$$(x-0)^2 + (y-0)^2 = 8^2$$

2. Radius of  $5\sqrt{2}$

$$(x-0)^2 + (y-0)^2 = (5\sqrt{2})^2$$

Write the equation of a circle that passes through the given point and whose center is at the origin.

3.  $(-2, 5)$   $(h, k) = (0, 0)$   $d^2 = 5^2 + 2^2 = 25 + 4 = 29$   $\sqrt{d^2} = \sqrt{29}$   $d = \sqrt{29} = r$

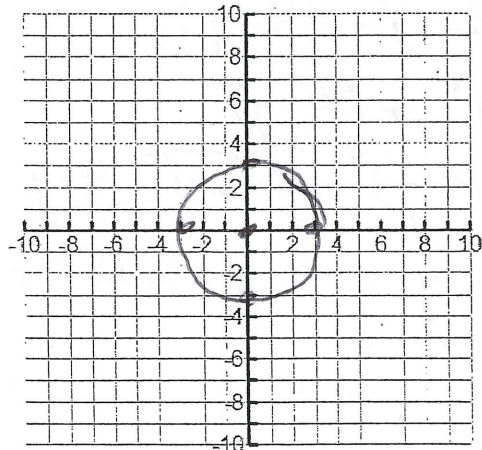
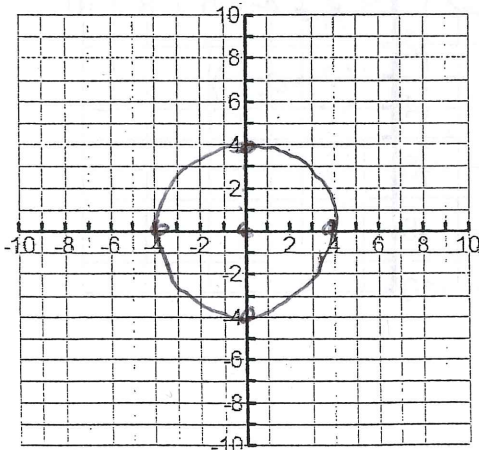
$$(x+2)^2 + (y-5)^2 = 29$$

To graph a circle you need to know the center and the radius. First graph the center of the circle. Next graph points  $r$  spaces away from the center both horizontally and vertically. Finally sketch the circle.

Examples: Graph the equation of the circle.

4.  $y^2 = 16 - x^2$   $y^2 + x^2 = 16$   $(y-0)^2 + (x-0)^2 = 16$   $r = 4$  Center  $(0, 0)$

5.  $\frac{6x^2}{6} + \frac{6y^2}{6} = 54$   $x^2 + y^2 = 9$   $(x-0)^2 + (y-0)^2 = 3^2$  Center  $(0, 0)$   $r = 3$



## Conics - Circle Homework

Use the information provided to write the standard form equation of each circle.

1) Center:  $(-10, -5)$

Radius: 7

$$(x + 10)^2 + (y + 5)^2 = 49$$

2) Center:  $(13, 16)$

Radius: 1

$$(x - 13)^2 + (y - 16)^2 = 1$$

3) Center:  $\left(\frac{11}{2}, 5\right)$

Radius: 4

$$\left(x - \frac{11}{2}\right)^2 + (y - 5)^2 = 16$$

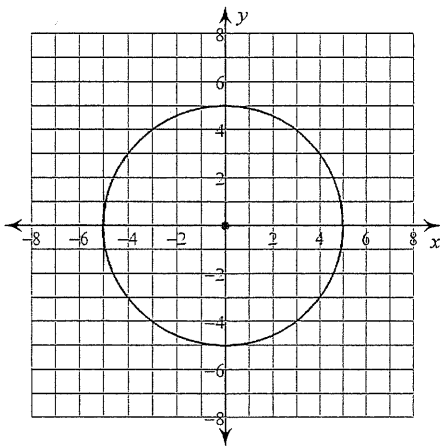
4) Center:  $(-5, -5)$

Radius: 6

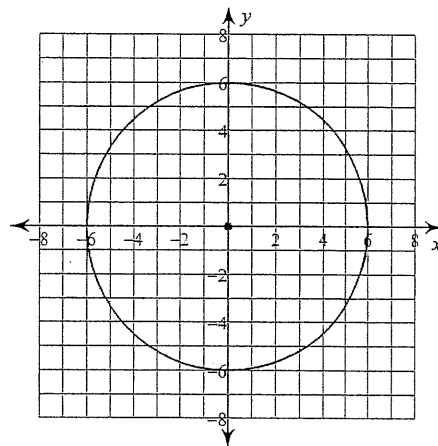
$$(x + 5)^2 + (y + 5)^2 = 36$$

Graph each equation.

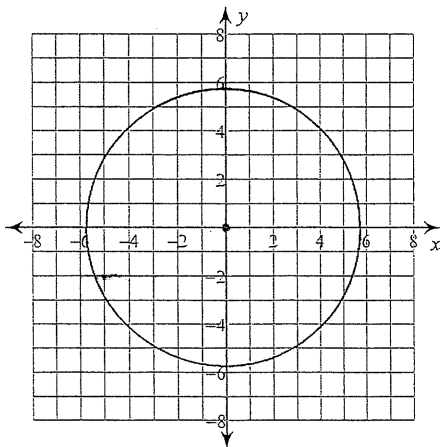
5)  $x^2 + y^2 = 25$



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



7)  $x^2 + y^2 = 33$



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

