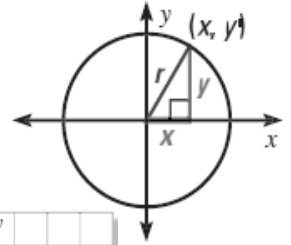


Name: _____ Date: _____ Block: _____

Writing Equations of Circles

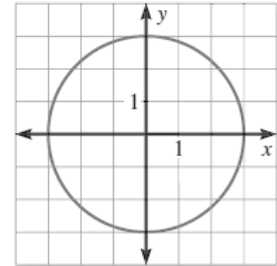
- Given any point on a circle with center (0, 0), the Pythagorean Theorem gives us $x^2 + y^2 = r^2$



Example: Write the equation of the circle shown in the graph...

$r =$ _____

Equation = $x^2 + y^2 = r^2 =$ _____



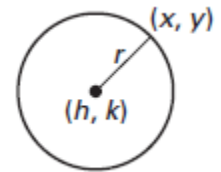
- What if the circle is not centered at (0,0)?

Suppose a circle is centered at point (h, k). Use the distance formula to find r.

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

$r = \sqrt{(x - h)^2 + (y - k)^2}$ substitute

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



The standard equation for a circle with center (h, k) and radius r is:
 $(x - h)^2 + (y - k)^2 = r^2$

Examples:

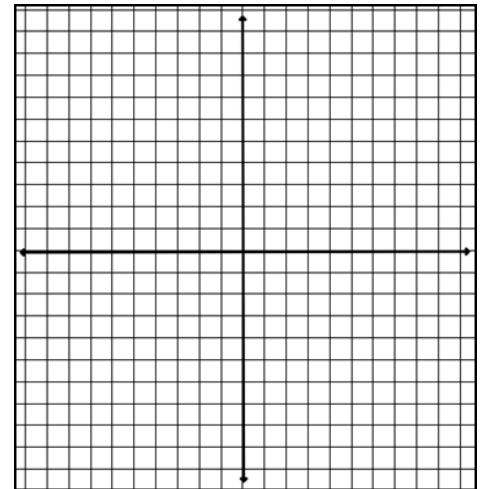
- a) Write the standard equation for a circle with center (-2, 5) and radius 7 b) The point (-5, 6) is on a circle with center (-1, 3). Write the equation of the circle.

Graphing Circles

Example:

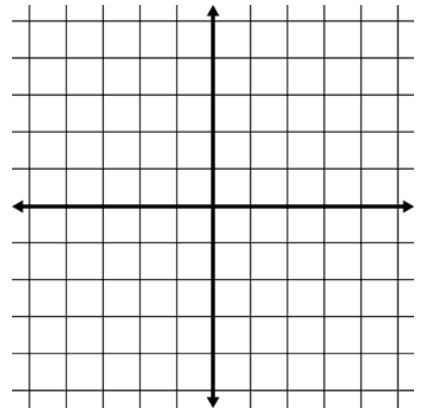
Graph the circle with equation $(x - 4)^2 + (y + 2)^2 = 36$

- Determine center (careful: h, k are subtracted) : _____
- Radius is: _____
- Draw point at center; mark radius units from center; draw circle freehand or with compass



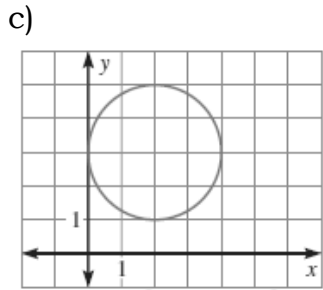
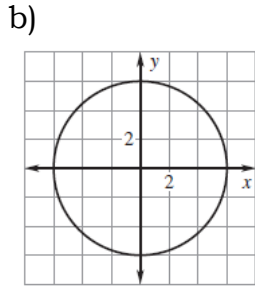
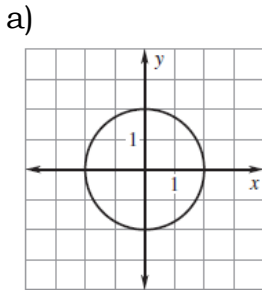
Example: Three forest ranger stations are at $A(-3, 2)$, $B(2, 2)$, and $C(-1, -1.5)$. A fire is 2 miles from A , 3 miles from B , and 3.5 miles from C . Find the location of the fire by graphing.

- Draw three circles to represent situation.
- At what point do they intersect? _____



You try:

1) Write an equation for the circles shown:



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

- a) center: $(0, 0)$; radius: 3
 b) center $(-2, 5)$; radius: 7

3) Write the standard equation of a circle with the given center and point on the circle:

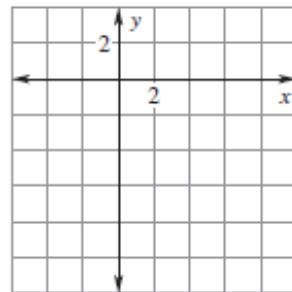
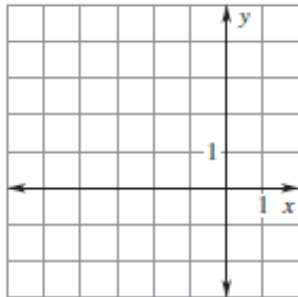
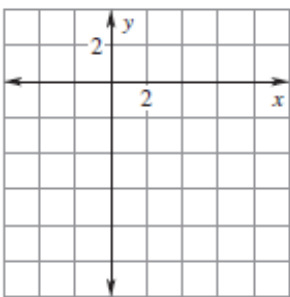
- a) center: $(1, 4)$; point $(3, 4)$ b) center: $(2, 6)$; point $(-1, 2)$ c) center $(-1, 2)$; point $(-3, 4)$

4) Graph the circles:

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

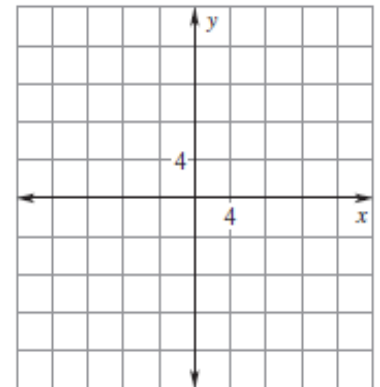
b) $(x + 2)^2 + (y - 1)^2 = 9$

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



5) You bury a time capsule and use a grid to write directions for finding it. Use the following measurements to find the burial location of the time capsule:

- The capsule is about 11 feet from the oak tree at $A(0, 0)$
- The capsule is 8 feet from the flagpole at $B(0, 8)$
- The capsule is 4 feet from the mailbox at $C(-12, 8)$



6) Find the center and radius of the circle: $x^2 + y^2 + 14x - 2y = -1$