Acquisition Lesson Planning Form
Plan for the Concept, Topic, or Skill – Equations of Circles
Key Standards addressed in this Lesson: MM3G1a,b
Time allotted for this Lesson:

Standard: MM3G1a,b: Find the equations of circles. Graph a circle given an equation in general form.
Essential Question: How do I indentify the characteristics of circles from equations? What characteristics of circles are necessary to graph and write the equations of circles?
Activating Strategies: Worksheet Prerequisite Skills for Unit 2 Use K – W – L to determine what the students already know about circles, their equations, and how to graph.
Acceleration/Previewing: (Key Vocabulary) Circle, radius, center, general form, standard form
Teaching Strategies: Use the graphic organizer to demonstrate how to graph and write the equation of circle. Circle Learning Task Part I
Task: Circle Learning Task
Distributed Guided Practice: Worksheet Lesson 1: Equations of Circles
Extending/Refining Strategies: Journal: Have students explain how to graph a circle given the center and the radius.
Summarizing Strategies: Ticket Out the Door

PreRequisite Skills for Unit 2

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

1. (7,4),(9,-1) 2. (8,-9),(0,5) 3. (1,-7),(-1,-12)

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

4. (2,0),(10,6) 5. (7,4),(9,-1) 6. (2,-3),(-4,-13)

Completing the square

$ax^2 + bx + c = 0$ $\qquad$ $ax^2 + bx + c = 0$

1. *a* must be 1 (factor out if necessary)
2. rewrite equation leaving a blank and moving c to other side $x^2 + bx + \_\_ = -c + \_\_$
3. take halve the linear term (*b*) and square that number
4. add that number to both sides of the equation $x^2 + bx + (\frac{1}{2}b)^2 = -c + (\frac{1}{2}b)^2$
5. rewrite as $(a \pm \frac{1}{2}b)^2$ = add right side $(x + \frac{1}{2}b)^2 = \_\_\_\_\_$

7. $x^2 + 10x - 21 = 0$

$x^2 + 10x + \_\_ = 21 + \_\_$

$(x + \quad)^2 = \_\_\_\_\_$

8. $x^2 - 4x - 12 = 0$

$x^2 - 4x + \_\_ = 12 + \_\_$

$(x - \quad)^2 = \_\_\_\_\_$

9. $x^2 - 18x + 57 = 60$

$x^2 - 18x + \_\_ = 3 + \_\_$

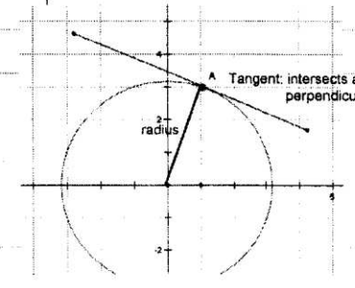
$(x - \quad)^2 = \_\_\_\_\_$

(where did the 3 come from?)

10. $x^2 - 20x - 6 = 7$

11. $x^2 + 5x - 3 = 0$

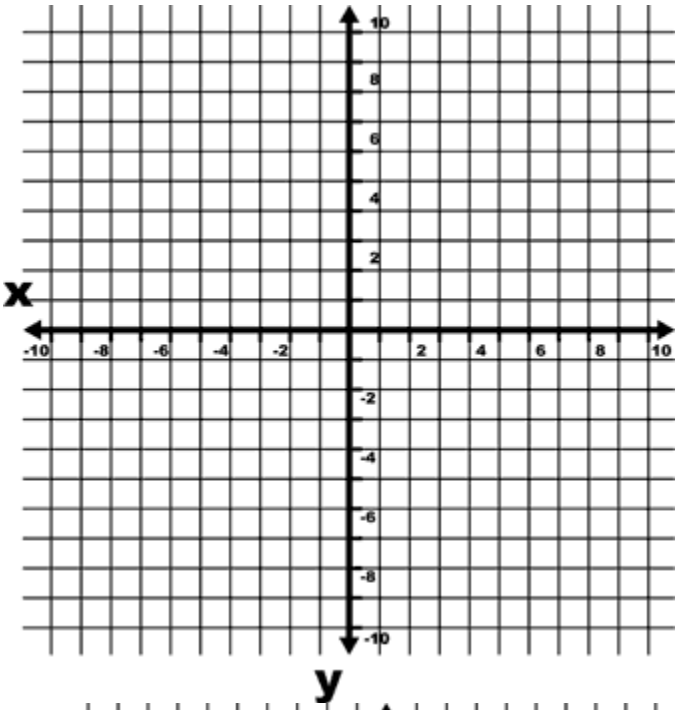
12. $4x^2 + 24x - 19 = 1$



Tangent: intersects a circle at one point perpendicular to the radius

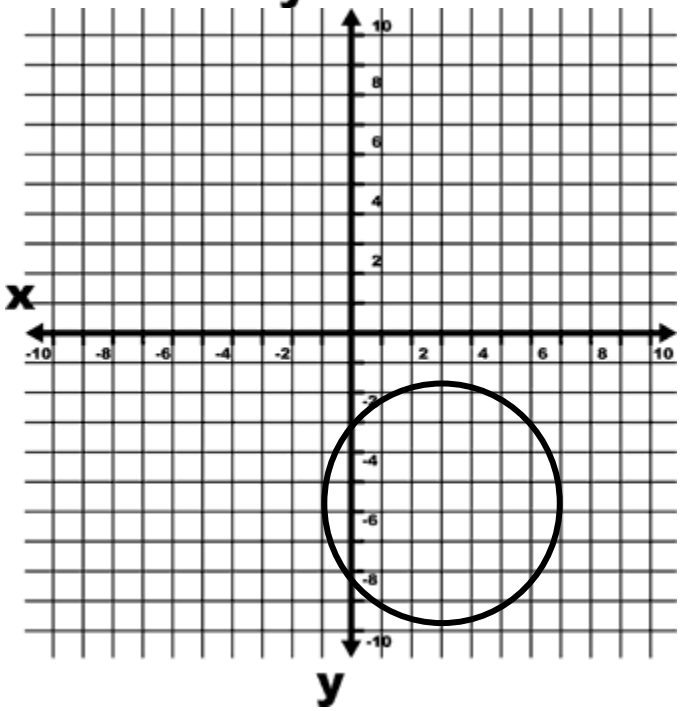
Find the radius if the tangent of the circle is at (1 , 3).

Graphic Organizer Writing equations and Graphing circles



To graph a circle from an equation:

1.) Write the equation in standard form
$x^2 + y^2 = r^2$ or $(x - h)^2 + (x - k)^2 = r^2$
EXAMPLE: $(x - 2)^2 + (x - 1)^2 = 16$
2.) Determine the center (h,k), graph
center (2,1)
3.) Determine the radius
radius $\sqrt{16} = 4$
4.) Graph four points on the circle
(2±4, 1) (2, 1±4)
(6,1) (-2,1) (2,5) (2,-3)
5.) Connect coordinate points.



To write an equation for a circle from a graph:

1.) Determine the center of the circle
(h,k)

_____

2.) Determine the radius
distance between (h,k) and a point on the circle (x,y)
$d = \sqrt{(x - h)^2 + (x - k)^2}$

_____

3.) Write in standard form of equation of a circle.
$x^2 + y^2 = r^2$ or $(x - h)^2 + (x - k)^2 = r^2$

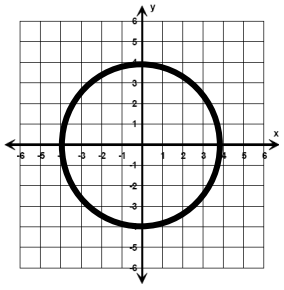
_____

Guided Practice
Lesson 1: Equations of Circles

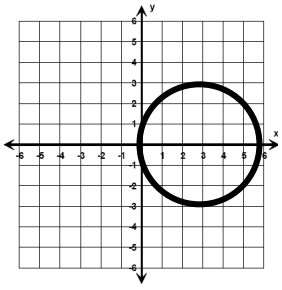
Name:_____ Block:_____ Date:_____

Write the standard equation for each circle graphed below:

1.



2.



Write the standard equation of a circle with each given radius and center:

3. r = 4; C(0,0)

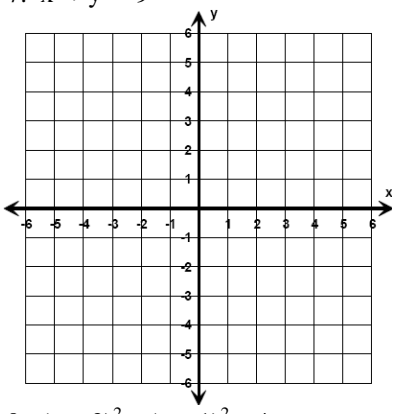
4. r = 1; C(2,3)

5. r = 10; C(-2,-7)

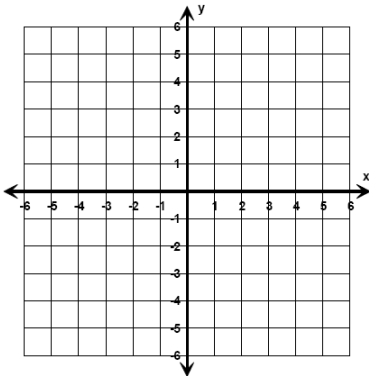
6. r = 1/3; C(-2,-2)

Graph each equation. Label the center and the radius.

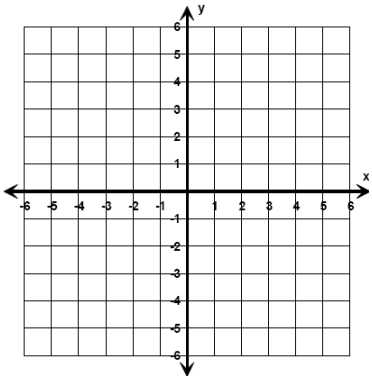
7. $x^2 + y^2 = 9$



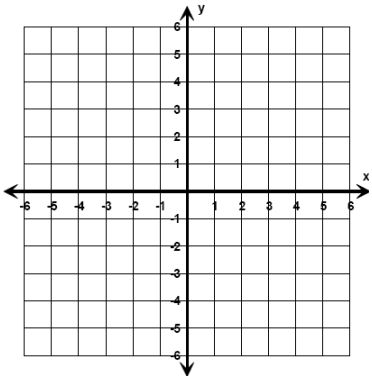
8. $(x - 2)^2 + y^2 = 4$



9. $(x + 3)^2 + (y + 1)^2 = 4$



10. $(x)^2 + (y + 3)^2 = 25$

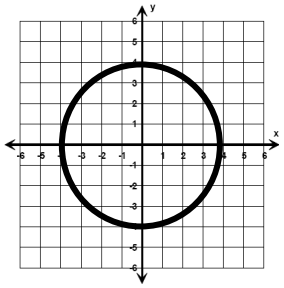


Guided Practice **KEY**
Lesson 1: Equations of Circles

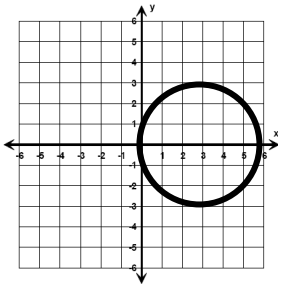
Name:_____ Block:_____ Date:_____

Write the standard equation for each circle graphed below:

1.



2.



Write the standard equation of a circle with each given radius and center:

3. r = 4; C(0,0)

$x^2 + y^2 = 16$

4. r = 1; C(2,3)

$(x - 2)^2 + (y - 3)^2 = 121$

5. r = 10; C(-2,-7)

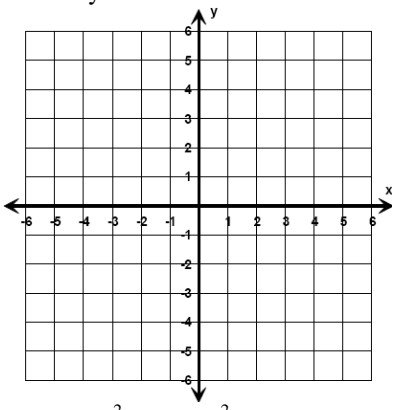
$(x + 2)^2 + (y + 7)^2 = 100$

6. r = 1/3; C(-2,-2)

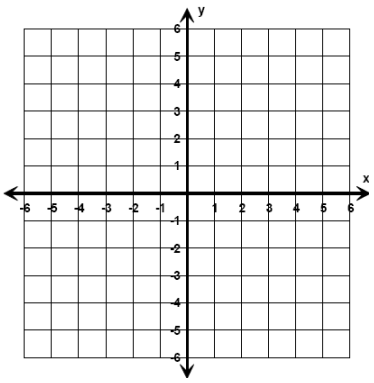
$(x + 2)^2 + (y + 2)^2 = 1 / 9$

Graph each equation. Label the center and the radius.

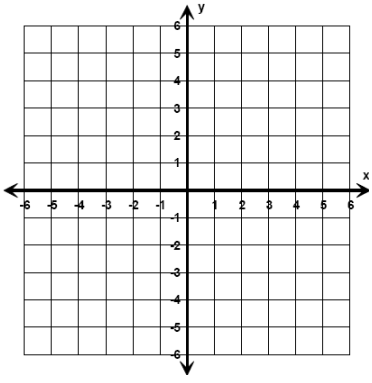
7. $x^2 + y^2 = 9$



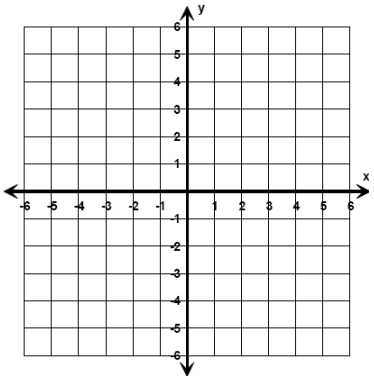
8. $(x - 2)^2 + y^2 = 4$



9. $(x + 3)^2 + (y + 1)^2 = 4$



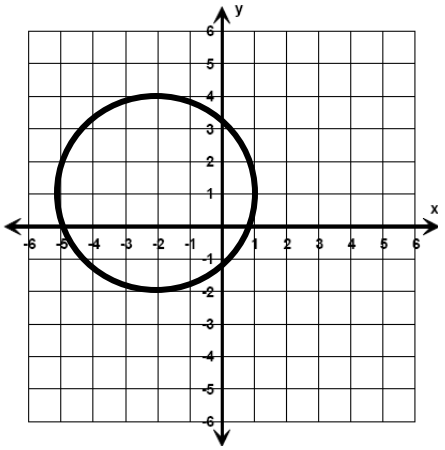
10. $(x)^2 + (y + 3)^2 = 25$



Ticket Out the Door Name:_____ Date:_____
Unit 2: Lesson 1

Write the standard equation for the circle graphed below:

1.



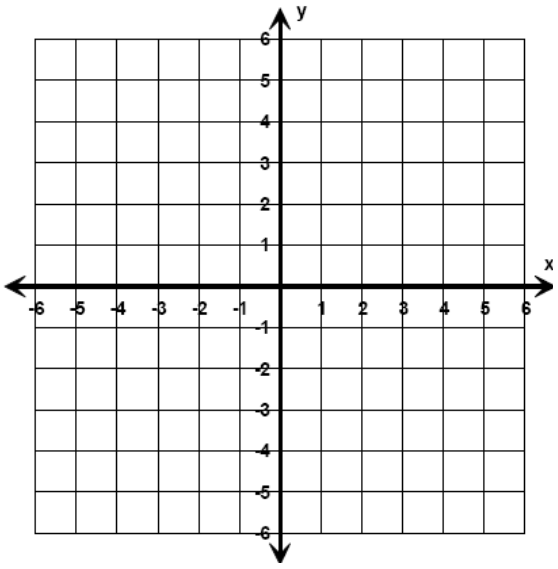
Write the standard equation of a circle with each given radius and center:

2. r = ¼; C(1,0)

3. r = 15; C(-6,9)

Graph the following equation. Label the center and radius.

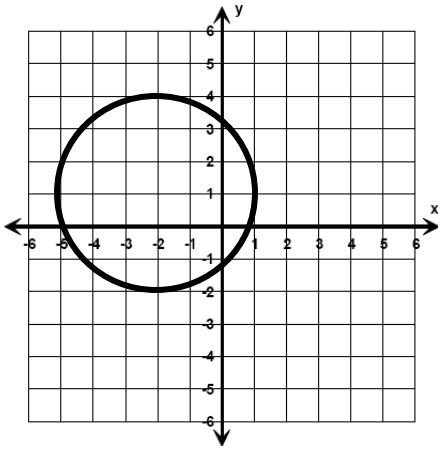
4. $(x + 2)^2 + (y - 4)^2 = 16$



Ticket Out the Door Name:___**KEY**_____ Date:_____
Unit 2: Lesson 1

Write the standard equation for the circle graphed below:

1.



Write the standard equation of a circle with each given radius and center:

2. r = ¼; C(1,0)

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

3. r = 15; C(-6,9)

$(x + 6)^2 + (y - 9)^2 = 225$

Graph the following equation. Label the center and radius.

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