**8.12**

**Name (print first and last)** _____  **Per_____  Date:__4/9 due 4/10**

**8.12 Equation of a circle**                                           **Geometry Regents 2013-2014 Ms. Lomac**

SLO: I can write equations of circles given endpoints of a diameter and can identify the center and radius of a circle when given an equation.

(1) ☐  We know that equations for circles can be written $(x – h)^2 + (y – k)^2 = r^2$ where $(h, k)$ is the center and $r$ is the radius. We have written equations when we know the center and radius by "dragging the center back to the origin" and figuring out the distance from the center of the circle to a point on the circle.  What if we know the equation, and have to figure out the center and radius?

$$( x \ – \ h )^2 \ + \ ( y \ – \ k )^2 \ = \ r^2$$
$$(x − 2)^2 + (y + 5)^2 = 4$$

Center _____  (HINT, this means what point did we have to drag the center from?)

Radius _____  (HINT, $r^2$ is what you see in the equation.  What do you have to do to find r?)

(2) ☐ For each multiple choice question below, EXPLAIN why each answer is correct or incorrect

EXAMPLE:  Which equation represents a circle whose center is $(3,−2)$?
  1) $(x + 3)^2 + (y − 2)^2 = 4$  incorrect because dragging the center +3 and -2 would make the new center at (6,-4) instead of (0,0)
  2) $(x − 3)^2 + (y + 2)^2 = 4$  correct because dragging the center -3 and +2 would make the new center (0,0)
  3) $(x + 2)^2 + (y − 3)^2 = 4$  incorrect because the 2 and 3 are with the wrong variables
  4) $(x − 2)^2 + (y + 3)^2 = 4$  incorrect because of the reasons given for answer 1 and answer 3.

  ☐ (a) Which equation represents the circle whose center is $(−2,3)$ and whose radius is 5?

1) $(x − 2)^2 + (y + 3)^2 = 5$ _____

_____

2) $(x + 2)^2 + (y − 3)^2 = 5$ _____

_____

3) $(x + 2)^2 + (y − 3)^2 = 25$ _____

_____

4) $(x − 2)^2 + (y + 3)^2 = 25$ _____

_____

  ☐ (b) What is an equation of a circle with center $(7,−3)$ and radius 4?

1) $(x − 7)^2 + (y + 3)^2 = 4$ _____

_____

2) $(x + 7)^2 + (y − 3)^2 = 4$ _____

_____

3) $(x − 7)^2 + (y + 3)^2 = 16$ _____

_____

4) $(x + 7)^2 + (y − 3)^2 = 16$ _____

_____

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(3) ☐ If we know the endpoints for the diameter, we can figure out what we need to write the equation. To write the equation of a circle we need the _____ and the _____. To help get your mind around the problem, consider:

Is the center ALWAYS on the diameter? _____ When it is on the diameter, where is it located? _____

Once you find the center point, how can you use an endpoint of the diameter to figure out the radius?_____

_____

(4) ☐ Write an equation of the circle whose diameter AB has endpoints A(5,12) and B(-5,12).

Center: _____ Radius: _____ Equation: _____

(5) ☐ Each pair of points are the endpoints of the diameter of a circle. For each circle, find the center and radius and write an equation. SHOW YOUR WORK

a)  (−2,3) and (6,3)

b) $(5, 12)$ and $(−5, 12)$

c) $(2, 5)$ and $(2, 13)$

(6) ☐ Answer each question below.

5  Which equation represents the circle whose center is (−2,3) and whose radius is 5?
1)  $(x-2)^2 + (y+3)^2 = 5$
2)  $(x+2)^2 + (y-3)^2 = 5$
3)  $(x+2)^2 + (y-3)^2 = 25$
4)  $(x-2)^2 + (y+3)^2 = 25$

3  The center and radius of the given circle $(x-3)^2 + (x+8)^2 = 39$ are:
1)  $(3,-8), r = 39$
2)  $(-3,-8), r = \sqrt{39}$
3)  $(-3,8), r = \sqrt{39}$
4)  $(3,-8), r = \sqrt{39}$

9  A circle is represented by the equation $x^2 + (y+3)^2 = 13$. What are the coordinates of the center of the circle and the length of the radius?
1)  $(0,3)$ and 13
2)  $(0,3)$ and $\sqrt{13}$
3)  $(0,-3)$ and 13
4)  $(0,-3)$ and $\sqrt{13}$

1  What are the center and radius of a circle whose equation is $(x-A)^2 + (y-B)^2 = C$?
1)  center = $(A,B)$; radius = $C$
2)  center = $(-A,-B)$; radius = $C$
3)  center = $(A,B)$; radius = $\sqrt{C}$
4)  center = $(-A,-B)$; radius = $\sqrt{C}$

9  The center of a circular sunflower with a diameter of 4 centimeters is (−2,1). Which equation represents the sunflower?
1)  $(x-2)^2 + (y+1)^2 = 2$
2)  $(x+2)^2 + (y-1)^2 = 4$
3)  $(x-2)^2 + (y-1)^2 = 4$
4)  $(x+2)^2 + (y-1)^2 = 2$
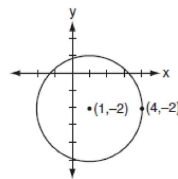
10  The center of a circle represented by the equation $(x-2)^2 + (y+3)^2 = 100$ is located in Quadrant
1)  I
2)  II
3)  III
4)  IV

3  Which equation represents circle $O$ with center (2,−8) and radius 9?
1)  $(x+2)^2 + (y-8)^2 = 9$
2)  $(x-2)^2 + (y+8)^2 = 9$
3)  $(x+2)^2 + (y-8)^2 = 81$
4)  $(x-2)^2 + (y+8)^2 = 81$

5  Which equation represents the circle shown in the accompanying graph?



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