

Algebra 2 Honors

Circles

Finding the Center and Radius



Find the equation of the circle with endpoints of the diameter at $(5, 3)$ and $(-1, -5)$.

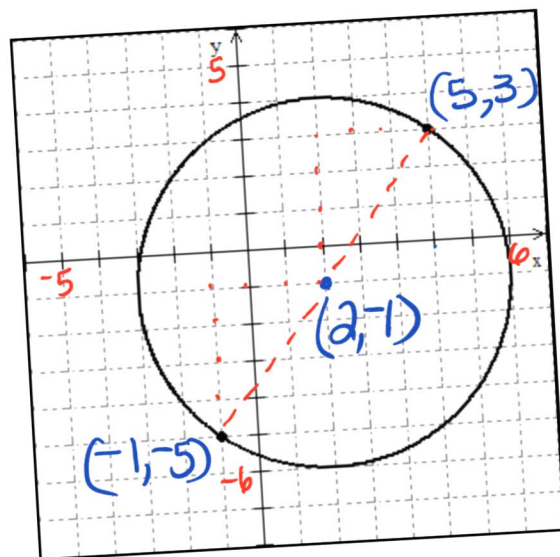
Center: $(2, -1)$ Radius: 5

Equation: $(x-2)^2 + (y+1)^2 = 25$

$$\begin{aligned} 1) \quad r &= \sqrt{(5-2)^2 + (3+1)^2} \\ r &= \sqrt{3^2 + 4^2} \\ r &= 5 \end{aligned}$$

$$\begin{aligned} \text{diameter} &= 10 \\ (h, k) &= (2, -1) \end{aligned}$$

$$\frac{\Delta y}{\Delta x} = \frac{4}{3}$$



Completely Editable 10.2

Lesson 2: Circles

DEFINITION OF A CIRCLE

A circle is the (locus) set of all points (x, y) in a plane whose distance from a _____ point in the plane is _____ (equidistant).

Verbal Vocabulary

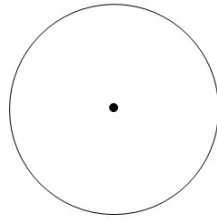
The _____ is the point that is the same distance from every point on the circle.

The distance between the center of the circle and any point on the circumference is called the _____.

Standard form of an equation of a circle
Center at $(0, 0)$ and radius r :

Center at (h, k) and radius r :

Visual Vocabulary



Writing an Equation of a Circle

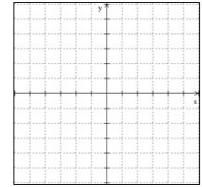
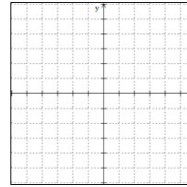
EX #1: Write the equation of a circle with the following characteristics:

- A.** The center is at the origin and the radius is 7. **B.** The center is $(5, -2)$ and the radius is 8.

Write an Equation with Translations

EX #2: What is an equation for each translation?

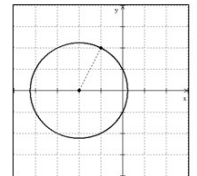
- A.** $x^2 + y^2 = 1$; left 4 units and down 3 units. **B.** $x^2 + y^2 = 9$; right 2 units and up 3 units.



Using the Distance Formula to Find a Radius

EX #3: Find the radius of the circle and write the equation in standard form.

DISTANCE BETWEEN TWO POINTS: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

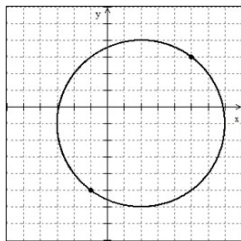


Finding the Center and Radius

EX #4: Find the equation of the circle with endpoints of the diameter at $(5, 3)$ and $(-1, -5)$.

Center: _____ Radius: _____

Equation: _____



Completing the Square

EX#5: Find standard form of the equation for the circle by completing the square.

A. $x^2 - 6x + y^2 + 2y = 6$

A Challenging Circle

EX #6: Write the equation for a circle with area that is 25π and the center is located at $(3, -2)$.

EX #7: A tanker truck overturned on a highway, spilling hazardous material. Everyone within a 1.5-mile radius of the spill must evacuate. The map that safety workers are using shows the spill site at coordinates $(4.5, 5)$. Each unit of measurement is 1 mi. Write an equation that describes the boundary of the evacuation region. How many square miles need to be evacuated?

NOTES

Circles Practice

Problems 1 – 4, write an equation of a circle with the given center and radius.

1. $(0,0)$; $r = 6$

2. $(-4,5)$; $r = 9$

3. $(-1,-5)$; $r = 3.5$

4. $(-6,0)$; $r = 4.75$

Problems 5 – 8, write an equation for each translation.

5. $x^2 + y^2 = 9$; down 2

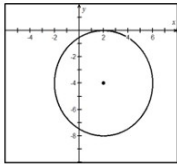
6. $x^2 + y^2 = 4$; left 3

7. $x^2 + y^2 = 12$; left 5 and up 3

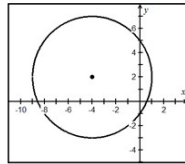
8. $x^2 + y^2 = 32$; right 3 and down 2

Problems 9 – 10, write an equation for each circle.

9.



10.

**Problems 11 – 14**, for each equation, find the center and radius of the circle.

11. $(x + 3)^2 + (y + 5)^2 = 121$

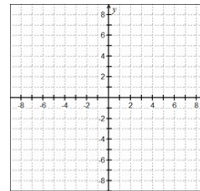
12. $(x - 9)^2 + (y + 2)^2 = 27$

13. $(x - 8)^2 + (y - 7)^2 = 96$

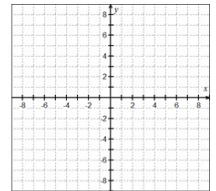
14. $(x + 6)^2 + (y - 1)^2 = 225$

Problems 15 – 18, use the center and the radius to graph each circle.

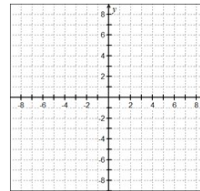
15. $(x + 3)^2 + (y - 4)^2 = 9$



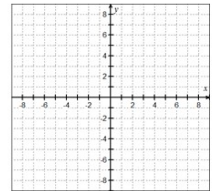
16. $(x + 2)^2 + (y + 4)^2 = 16$



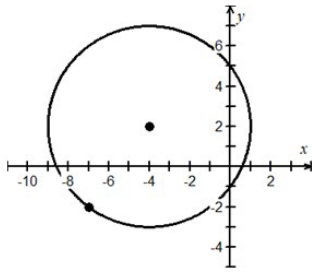
17. $(x + 4)^2 + y^2 = 18$



18. $(x - 2)^2 + (y - 3)^2 = 27$

**Problems 19 – 22**, use the given information to write an equation of the circle.19. The circle passes through the point $(\sqrt{5}, 0)$ with the center at the origin.20. The area of the circle is 78.54 square inches with the center at $(7, 4)$.21. The circumference of the circle is 7π with the center at $(-3, 4.5)$.

Lesson Warm-Ups



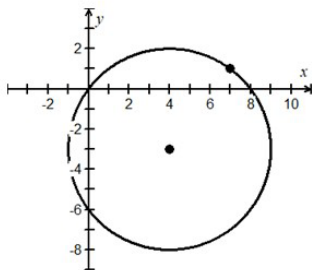
3. Write the equation for the graph of the circle.

Name _____ Date _____ Period _____

Lesson 10.2: Circles

Warm-Up #2

1. Use the graph of the circle to answer the following questions.



2. Identify the center and radius of the circle.

3. Write the equation for the graph of the circle.

Form A

10.2 Circles

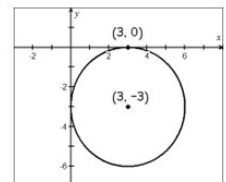
Form B

Name _____

Date _____ Period _____

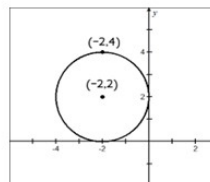
1. Write an equation of the circle whose center is $C(4, 1)$ and a radius of $r = 7$.

2. Write an equation in standard form of the circle.

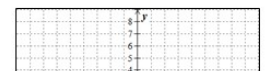
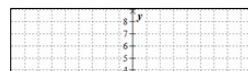


3. Use the center and radius to graph the circle.
 $(x + 2)^2 + (y - 3)^2 = 9$

2. Write an equation in standard form of the circle.



3. Use the center and radius to graph the circle.
 $(x - 1)^2 + (y - 2)^2 = 25$



Daily Lesson Quiz

Grade: _____

Grade: _____