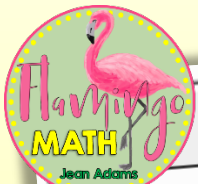


Precalculus Honors

Circles



Finding Standard Form Equations

EX #4A: Write the equation of the circle that passes through the point $(6, 4)$ and has a center at $(2, 1)$.

$$\begin{aligned}(6-2)^2 + (4-1)^2 &= r^2 \\ r^2 &= 4^2 + 3^2 \\ r^2 &= 25\end{aligned}$$

$$\begin{aligned}(h, k) &= (2, 1) \\ (x, y) &= (6, 4)\end{aligned}$$

$$\underline{\underline{(x-2)^2 + (y-1)^2 = 25}}$$

4B. Write the equation of the line tangent to the circle at $(6, 4)$.

(1) slope from $(2, 1)$ to $(6, 4)$

$$m = \frac{4-1}{6-2} = \frac{3}{4}$$

(2) slope $\perp$ to radius $m_2 = -\frac{4}{3}$

Completely Editable

8.2

Lesson 8.2: Circles

DEFINITION OF A CIRCLE

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

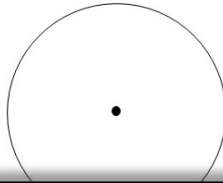
Verbal Vocabulary

Exploration: Label the circle in the visual vocabulary at the right, using the highlighted words below.

The **center** of a circle is the point that is the same distance from every point on the circle.

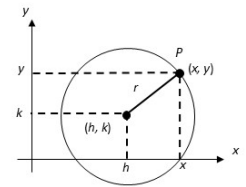
A line segment within a circle that touches two points on the circle is called a **chord**, while the distance around the circle is known as the **circumference**, and the

Visual Vocabulary



Pythagorean Relations

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



Circle Formulas

Standard Form
center at $(0, 0)$

Standard Form
Center at (h, k)

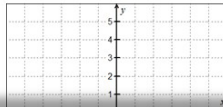
Writing an Equation of a Circle

EX #1: What is the equation of the circle with center at $(5, -2)$ and radius 6?

EX #2: What is the equation of the circle with a radius of 5 and the center located on the x-axis where $x = -3$?

Using Translations to Write an Equation

EX #3: Write the equation for the translation of $x^2 + y^2 = 4$ by 3 units right and 2 units down. Sketch the original circle and the translated circle. Find the distance between the two centers.



Finding Standard Form Equations

EX #4A: Write the equation of the circle that passes through the point $(6, 4)$ and has a center at $(2, 1)$.

4B. Write the equation of the line tangent to the circle at $(6, 4)$.

Completing the Square

EX #7: A circle contains the points $(0, 0)$, $(6, 8)$ and $(7, 7)$. Find the standard form equation of the circle by solving a system of three equations.

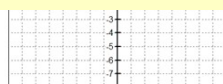
Challenging Circles

EX #6: The diameter of a circle contains the points $(5, 5)$ and $(-3, -1)$.

6A. Write the equation of the circle in standard form.

6B. Find the equation of the tangent line to the circle at $(-3, -1)$.

NOTES



8.2 Circles Homework

Name _____

Date _____ Period _____

Problems 1 – 6, the graph of a circle is given. Match each graph to its equation.

A. $(x + 2)^2 + (y - 1)^2 = 4$

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

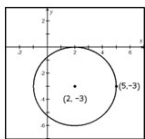
C. $(x - 2)^2 + (y + 1)^2 = 9$

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

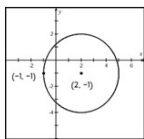
E. $(x - 2)^2 + (y + 3)^2 = 9$

F. $x^2 + y^2 = 16$

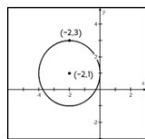
1.



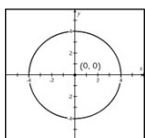
2.



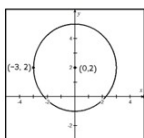
3.



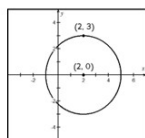
4.



5.



6.



Problems 7 – 10, find the equation of the circle.

7. Center: $(-4, 5)$, Radius: $\sqrt{12}$

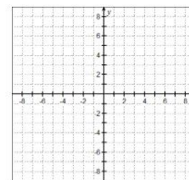
8. Center: $(4, -3)$, Area: 36π

9. Center: $(4, 2)$ and tangent to the x -axis

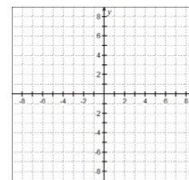
10. Endpoints of a diameter are $(3, -4)$ and $(-3, 6)$

Problems 11 – 16, find the center and radius of each circle. Then graph the circle.

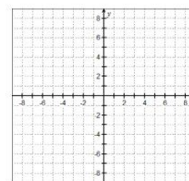
11. $(x + 2)^2 + (y - 3)^2 = 16$



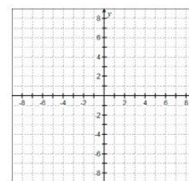
12. $(x - 1)^2 + (y + 2)^2 = 12$



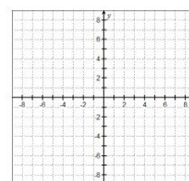
13. $x^2 + (y - 3)^2 = 25$



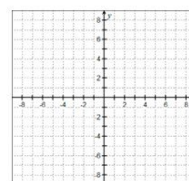
14. $x^2 + y^2 = 18$



15. $x^2 + y^2 - 8x + 4y + 11 = 0$



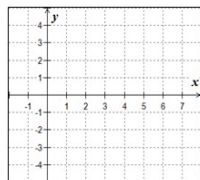
16. $x^2 + y^2 + 8x - 6y - 15 = 0$



Problems 17-19, solve.

17. Find the x - and y -intercepts of the graph of the circle given by the equation $(x - 2)^2 + (y - 4)^2 = 16$

18. Solve for y and sketch. Find the area of the circle that lies above the x -axis. $(x - 4)^2 + y^2 = 9$



19. Given $(x + 3)^2 + (y + 2)^2 = 32$

A. Sketch the circle.

B. Write the equation of the line that is tangent to the circle at the point $(1, -6)$.

C. Sketch the tangent line.

20. An earthquake was felt up to 86 miles from its epicenter. Your house is located 62 miles east and 48 miles south of the epicenter.

A. Let the epicenter be represented at the origin. Write an equation in standard form that would describe the outer boundary of the quake.

B. Would you have felt the earthquake?

C. How far away from the outer boundary of the quake do you live?

21. A strawberry farmer has a circular sprinkling system which covers an area of 2100 square feet.

A. Find the radius of the region that is covered by the sprinkler system. Round your answer to three decimal places.

Practice Sets

Lesson Warm-Ups

3. Find the center and radius of the circle.
 $x^2 + y^2 + 6x - 8y - 11 = 0$

Name _____ Date _____ Period _____

Lesson 8.2: Circles

Warm-Up # 2

1. Write an equation of the circle whose center is $C(3, -4)$ and a radius of $r = 5$.
2. Find the equation of the circle with center $C(4, -2)$ and contains the point $P(2, 3)$.

3. Find the center and radius of the circle.
 $x^2 + y^2 - 6x + 8y + 9 = 0$

8.2 Circles

Form A

Name _____

Date _____ Period _____

1. Write an equation of the circle whose center is $C(3, -2)$ and a radius of $r = \sqrt{7}$

2. Find an equation of the circle with center $C(-2, 3)$ and contains the point $P(4, 5)$.

3. Find the center and radius of the circle.
 $x^2 + y^2 + 8x - 10y + 37 = 0$

8.2 Circles

Form B

Name _____

Date _____ Period _____

1. Write an equation of the circle whose center is $C(-3, 5)$ and a radius of $r = 6$

2. Find an equation of the circle with center $C(-4, 6)$ and contains the point $P(1, 2)$.

3. Find the center and radius of the circle.
 $x^2 + y^2 - 4x + 6y - 36 = 0$

Daily Lesson Quiz

Grade: _____

Grade: _____