

Geometry

HW 12-1

B

Name _____

Period _____ Date _____

Determine the Center and Radius of the given circles.

1. $(x - 7)^2 + (y + 10)^2 = 81$

Center (7 , -10) Radius = 9

2. $100 = (x + 3)^2 + y^2$

Center (-3 , 0) Radius = 10

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

Center (9 , -2) Radius = 1

4. $36 = (x + 8)^2 + (y + 7)^2$

Center (-8 , -7) Radius = 6

5. $0 = (x - 1)^2 + (y - 11)^2 - 9$

+9 +9Center (1 , 11) Radius = 3

Determine the equation of circle C.

6. Radius = 7cm, C(-3,6)

$(x+3)^2 + (y-6)^2 = 49$

7. Radius = $\sqrt{14}$ cm, C(5, -1)

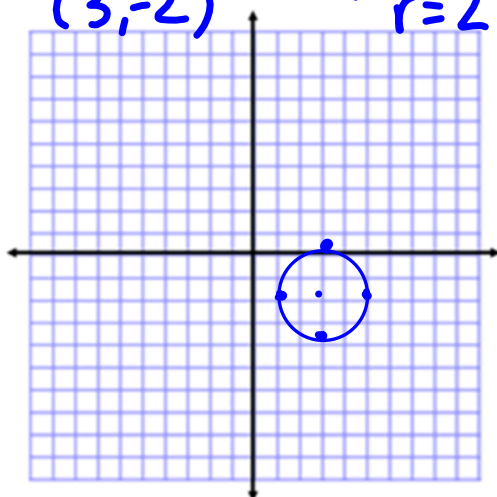
$(x-5)^2 + (y+1)^2 = 14$

8. Radius = 2.5 cm, C(0,-3)

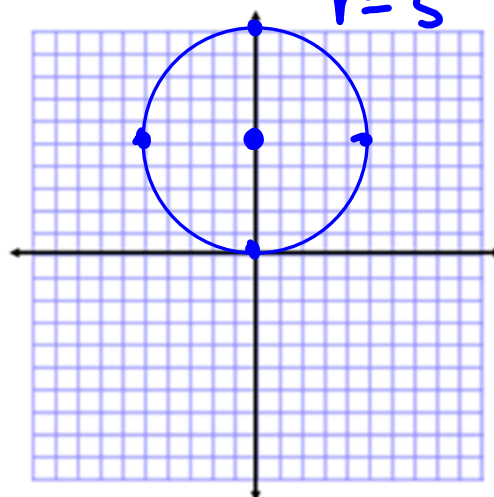
$x^2 + (y+3)^2 = 6.25$

Graph the following circles.

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

(3, -2) r=2

10. $x^2 + (y - 5)^2 = 25$

(0, 5) r=5

Write the standard form of a circle based on the given information.

11. Center: (14, 17), Point on Circle: (15, 17)

$$(x-14)^2 + (y-17)^2 = 1$$

12. Endpoints of diameter: (-17, -9) and (-19, -9)

$$(x+18)^2 + (y+9)^2 = 1$$

Class Notes 2: General Form of a Circle

Warm-Up:

Find the radius and the center of each circle:

a) $x^2 + (y+3)^2 = 36$

b) $(x-1)^2 + (y-4)^2 = 32$

Write the equation of a circle with center $(6, -8)$ and radius $\sqrt{7}$.

Writing the Equation of a Circle in General Form

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General Form of a Circle: $Ax^2 + By^2 + Cx + Dy + E = 0$ Examples:

$$\underbrace{x^2 + y^2 + 2x + 3y + 5 = 0}$$

$$2x^2 + 2y^2 + x - y - 7 = 0$$

Converting from Standard Form to General Form of a circle:

Example: Convert to General form.

a) $x^2 + y^2 = 25$
 $-25 - 25$

$$x^2 + y^2 - 25 = 0$$

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

$$x^2 + (y+2)(y+2) - 9 = 0$$

$$x^2 + y^2 + 2y + 2y + 4 - 9 = 0$$

$$x^2 + y^2 + 4y - 5 = 0$$

$$c) \overbrace{(x-3)^2}^{-16} + \overbrace{(y-4)^2}^{-16} = 16$$

$$(x-3)(x-3) + (y-4)(y-4) - 16 = 0$$

$$x^2 + y^2 - 6x - 8y + 9 = 0$$

TRY IT!!

h k

Given the center $(-3, 0)$ and radius $r = 2$, write the equation of the circle in *general form*.

$$(x+3)^2 + (y-0)^2 = 2^2$$

$$(x+3)(x+3) + y^2 - 4 = 0$$

$$x^2 + 3x + 3x + 9 + y^2 - 4 = 0$$

$$x^2 + y^2 + 6x - 4 = 0$$

Converting from General Form of a circle to Standard Form

Review of completing the square:

Example: Solve for x by completing the square.

a) $x^2 + 2x - 8 = 0$

b) $x^2 - 10x - 11 = 0$

Converting from General Form of a circle to Standard Form:

Example:

a) $x^2 + y^2 + 2x + 4y - 11 = 0$

$$\begin{aligned} & \left(x^2 + 2x + 1\right) + \left(y^2 + 4y + 4\right) = 11 + 11 - 11 \\ & (x+1)(x+1) + (y+2)(y+2) = 11 + 11 - 11 \\ & \rightarrow (x+1)^2 + (y+2)^2 = 16 \end{aligned}$$

$(h,k) = (-1, -2)$
 $r = 4$

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

① move constant

② group x & y

③ add terms $\left(\frac{b}{2}\right)^2$ to each group

④ factor

$$x^2 + 4x + 4 + y^2 - 6y + 9 = 4 + 4 + 9$$

$$(x+2)(x+2) + (y-3)(y-3)$$

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

$$(h,k) = (-2, 3)$$

$r = 3$

c) $x^2 + y^2 + 6x + 5 = 0$

-5 -5

$$\begin{array}{l}
 \hline
 x^2 + 6x + \boxed{9} + y^2 = -5 + \boxed{9} \\
 (x+3)^2 + y^2 = 4 \quad (h,k) = (-3,0) \\
 \text{TRY IT!!}
 \end{array}$$

← leave
2

d) $x^2 + y^2 + 8x - 2y - 8 = 0$

r = 2

e) $x^2 + y^2 = 10y + 24$