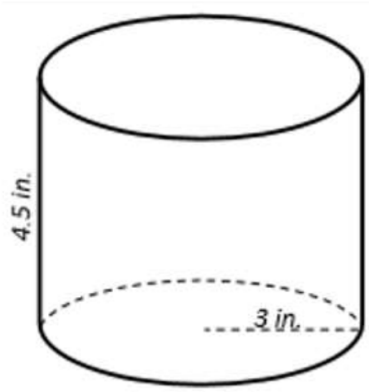
What is the volume of a cylinder with a radius of 3 inches and a height of 9/2 inches?



A. $\frac{81}{2}\pi\ in^3$ B. $\frac{27}{4}\pi\ in^3$

C. $\frac{27}{8}\pi\ in^3$ D. $\frac{9}{4}\pi\ in^3$

B · h

$V = \pi r^2 \cdot h$

$= \pi(3)^2(9/2)$

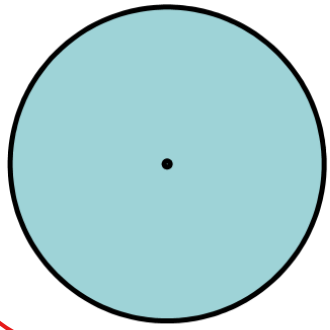
$\pi\ 9(9)$

$\frac{81\pi}{2}$

Standard Form of a Circle

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

The center of the circle is (h, k)

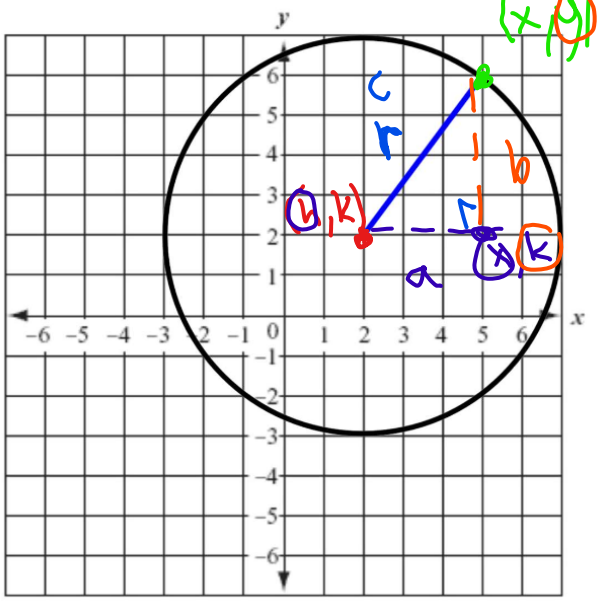


r is the radius of the circle

r^2

radius $=\sqrt{r^2}=r$

Where does this formula come from?



$a^2 + b^2 = c^2$

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

opposite

center (h,k)

EX 1 Write an equation of a circle with center (3, -2) and a radius of 4.

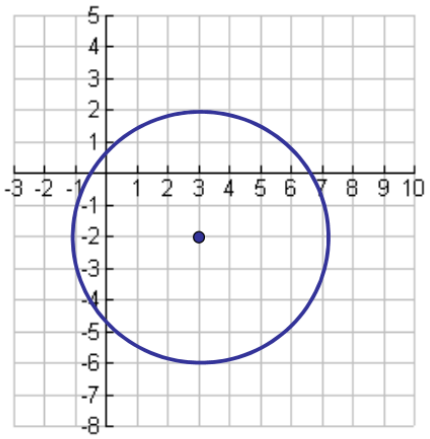
h, k

r

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

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

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



EX 2 Write an equation of a circle with center (-4, 0) and a *diameter* of 10. $r = 5$

h k

opposite

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

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

$$(x+4)^2 + y^2 = 25$$

EX 3 Write an equation of a circle with center (2, -9) and a *radius of* $\sqrt{11}$.

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

$$(x-2)^2+(y+9)^2=(\sqrt{11})^2$$

$$(x-2)^2+(y+9)^2=11$$

$$r=\sqrt{11}$$

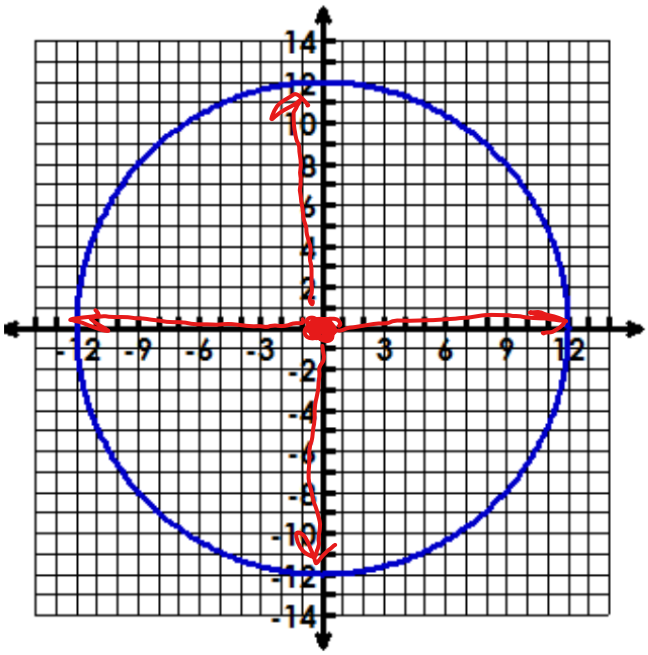
EX 4 Find the coordinates of the center and the measure of the radius.

$$(x-6)^2+(y+3)^2=25$$

h k $\sqrt{r^2}=\sqrt{25}$

(6, -3) r = 5

5. Find the center, radius, & equation of the circle.



The center is

$(0,0)$

The radius is

12

The equation is

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

$x^2+y^2=144$

6. Find the center, radius, & equation of the circle.

The center is

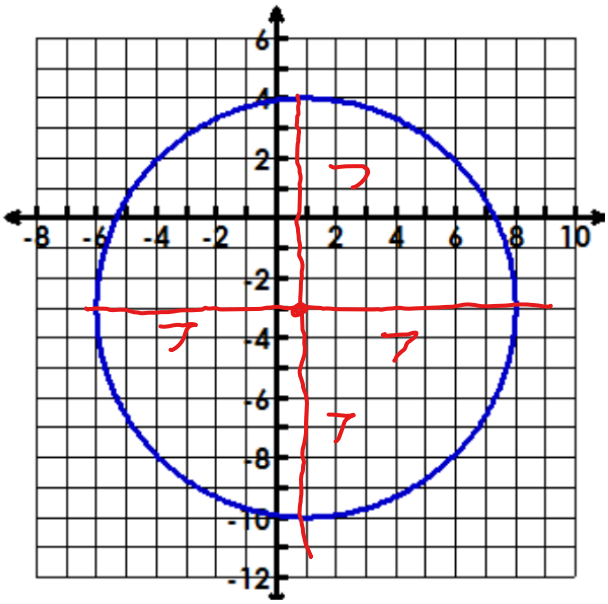
$(1, -3)$

The radius is

7

The equation is

$(x-1)^2 + (y+3)^2 = 49$



7. Identify the center & radius, then graph the circle

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

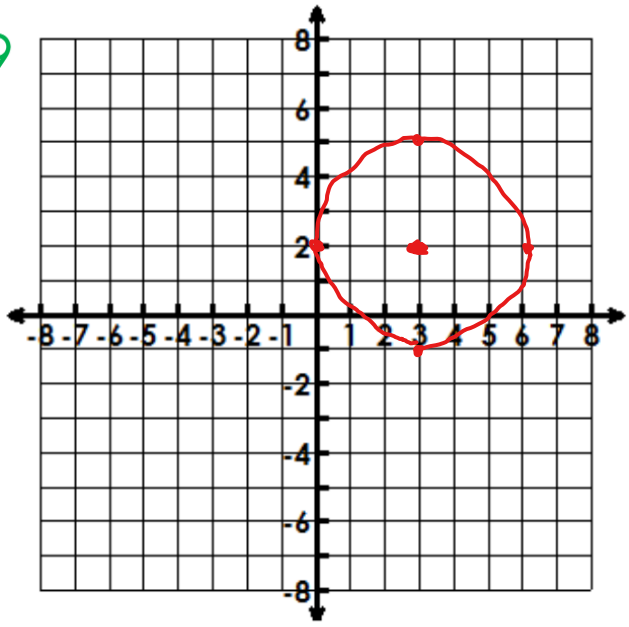
Center

$(3, 2)$

Radius

$\sqrt{9} = \sqrt{r^2}$

$r = 3$



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

General Form of a Circle

$$Ax^2 + By^2 + Cx + Dy + E = 0$$

- *Squared binomials have been* multiplied *out.*
- *Every term is on the* left *side, and equal to* 0 *.*
- *Squared terms go first in alpha order.*

Converting from General to Standard

1. 'A' needs to be 1. Divide if needed.
2. Reorder terms so all x terms are together and all y terms are together.
3. Move c to the other side of the equal sign.
4. Complete the square (as needed) for x.
5. Complete the square(as needed) for y.
6. Factor the left & simplify the right.

8. Write the **standard** equation of the circle.
State the center & radius.

$x^2 + y^2 - 8x + 7 = 0$

$x^2 - 8x + y^2 = -7$

add / multiply

$(x^2 - 8x + 16) + y^2 = -7 + 16$

$(x-4)(x-4)$

$(x-4)^2$

half / square

16

16	1
8	2
-4	-4

$(x-4)^2 + y^2 = -7 + 16$

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

9. Write the **standard** equation of the circle.
State the center & radius.

General

$x^2 + y^2 + 4x - 6y - 3 = 0$

$+3 \quad +3$

$x^2+4x+\boxed{4} + y^2-6y+\boxed{9} = 3+\boxed{4}+\boxed{9}$

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

Standard

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

10. Write the **standard** equation of the circle.
State the center & radius.

$$\frac{2x^2}{2} + \frac{2y^2}{2} - \frac{16x}{2} + \frac{4y}{2} + \frac{20}{2} = \frac{0}{2}$$

$x^2 + y^2 - 8x + 2y + 10 = 0$
$-10 \quad -10$

$x^2 - 8x + \boxed{16} + y^2 + 2y + \boxed{1} = -10 + \boxed{16} + \boxed{1}$

$(x-4)^2 + (y+1)^2 = 7$

$$\boxed{(x-4)^2 + (y+1)^2 = 7}$$

Half it
Drop it
Square it
Add it

11. Write the **general** form of the equation of the circle.

$$(x-4)^2+(y+3)^2=36$$

$(x-4)(x-4)$

$x^2-4x-4x+16$

$x^2-8x+16$

$(y+3)(y+3)$

$y^2+3y+3y+9$

y^2+6y+9

$+ \quad = 36$

Simplify! Remember multiply binomial :)

$x^2+y^2-8x+6y+25=36$

$-36 \quad -36$

Simplify and get zero on right!

$$x^2+y^2-8x+6y-11=0$$

$Ax^2+By^2+Cx+Dy+E=0$

Geometry 5- Coordinate Geometry Notes
Name: _____ Date: _____

Equations of Circles

Standard Form of a Circle

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

General Form of a Circle

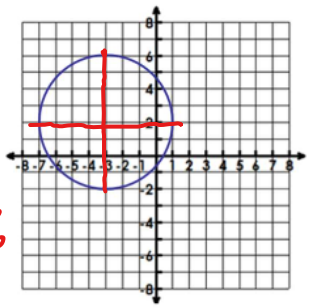
$Ax^2+By^2+Cx+Dy+E=0$

1. Write an equation of a circle with center (-2, 5) and a radius of 3.
$(x+2)^2+(y-5)^2=9$ h k r
2. Write an equation of a circle with center (4, -5) and a diameter of 12.
$(x-4)^2+(y+5)^2=36$
3. Write an equation of a circle with center (5, 6) and a radius of $\sqrt{14}$.
$(x-5)^2+(y-6)^2=14$

4. Find the coordinates of the center and the measure of the radius. $(x-4)^2+(y+7)^2=49$
Center (4, -7) radius = 7

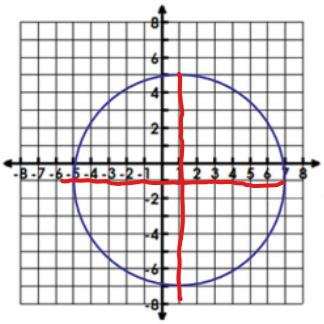
Find center, radius, & equation of the circle.

5.



Center (3, 2)
r = 4
$(x+3)^2+(y-2)^2=16$

6.

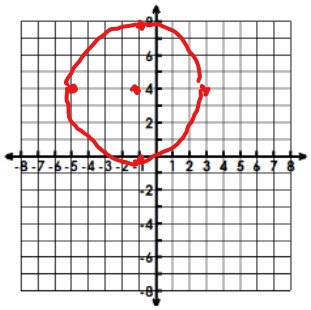


C(1, -1)
r = 6
$(x-1)^2+(y+1)^2=36$

Graph the circle, identify the center & radius.

7. $(x+1)^2+(y-4)^2=16$

Center (-1, 4)
r = 4



Geometry 5- Coordinate Geometry Notes

Converting from General to Standard Form

A. A needs to be 1. Divide if needed.

B. Move the x terms together and the y terms together.

C. Move E to the other side of the equals sign.

D. Complete the square (as needed) for x. Complete the square (as needed) for y.

E. Factor the left & simplify the right.

Write the standard form of the equation for the circle. State the center and radius.

8. $x^2 + y^2 + 4x - 14 = 0$

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

Center $(-2, 0)$

$r = \sqrt{18} = 3\sqrt{2}$

9. $x^2 + y^2 - 2x + 8y - 3 = 0$

$x^2 - 2x + \square + y^2 + 8y + \square = 3 + \square + \square$ (+3, +3, +16)

$(x-1)^2 + (y+4)^2 = 20$

Center $(1, -4)$

$r = \sqrt{20} = 2\sqrt{5}$

10. $2x^2 + 2y^2 - 20x + 8y + 16 = 0$

$(x-5)^2 + (y+2)^2 = 21$

Center $(5, -2)$

$r = \sqrt{21}$

Write the general form of the equation for the circle.

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

$(x-5)(x-5) + (y+2)(y+2) = 25$

$x^2 - 10x + 25 + y^2 + 4y + 4 = 25$

$x^2 + y^2 - 10x + 4y + 29 = 25$

$-25 \quad -25$

$x^2 + y^2 - 10x + 4y + 4 = 0$

12. $(x+6)^2 + (y+1)^2 = 9$

$x^2 + y^2 + 12x + 12y + 28 = 0$