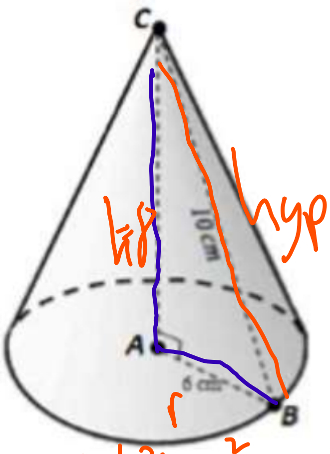
Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

The cone shown has a base with a radius of AB. The length of AB=6 cm and the length of BC =10 cm. What is the volume of the cone?



A. $288\,\pi\ cm^3$

B. $360\,\pi\ cm^3$

C. $\frac{640}{3}\pi\ cm^3$

D. $\boxed{96\pi\ cm^3}$

$V = \frac{1}{3}\underbrace{B}_{\pi r^2}h$

$\frac{1}{3}\pi r^2 h$

$\frac{1}{3}(\pi)(6)^2(8)$

$\frac{1}{3}(36)8 = 96\pi$

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

$6^2+b^2=10^2$

$36+b^2=100$

$-36 \qquad -36$

$\sqrt{b^2}=\sqrt{64}$

$b=8$

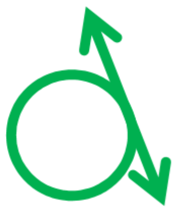
Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

A Circle and Line May:

- Never Intersect

no solution

- 1 Point of Intersection



1 solution

tangent

- 2 Points of Intersection

Secant

2 unique solutions

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

Solve by Graphing

- Graph the circle and the line.
- Tell the point(s) of intersection as an ordered pair.
- *Not as exact as algebraically.*

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

1. Solve by Graphing

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

$x^2 + y^2 = 4$ circle

c(0,0)

r=2

$2x - y = 5$ line

y=mx+b

+y +y

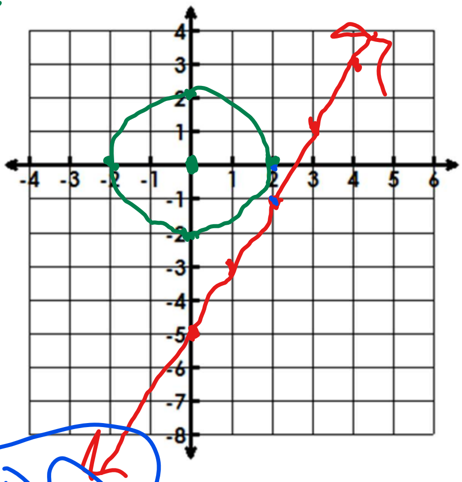
2x = y+5

-5 -5

y = 2x - 5

m = 2/1

b = -5



no solution

no intersection

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

2. Solve by Graphing

c(0,0)
r=3

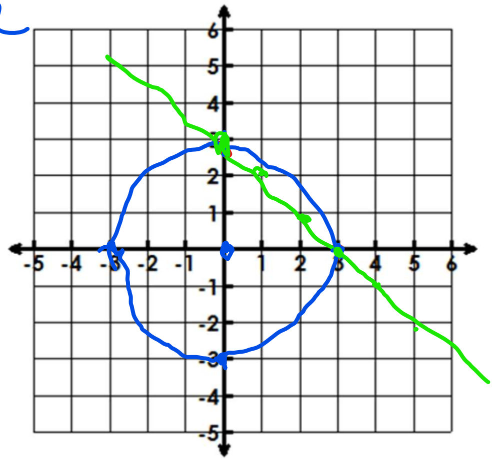
$x^2+y^2=9$ circle

$x+y=3$ line

$-x \quad -x$

$y=-x+3$

m=-1
b=3



2 solutions
(0,3)
(3,0)

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

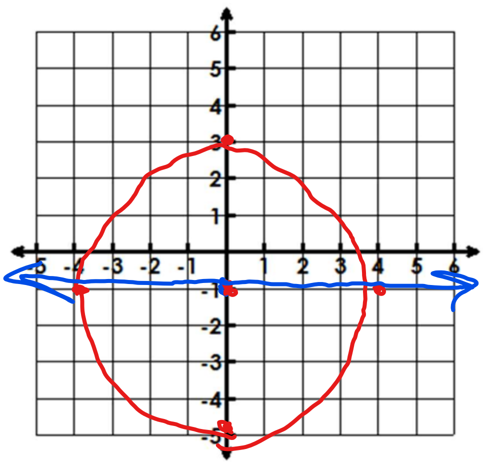
3. Solve by Graphing

c(0,-1)
r=4

$x^2 + (y+1)^2 = 16$ circle

$y = -1$ line horizontal

b=-1



2 solutions
(-4,-1)
(4,-1)

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

Solve by Algebraically

plain variable

- Solve the linear for one of the Variables. x or y
- Substitute the linear into the circle equation.
- Solve for the variable.
- Substitute your solution back into the Linear to find the other variable.

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

3. Solve Algebraically

$$x^2 + y^2 = 34 \rightarrow (y+2)^2 + y^2 = 34$$

$$x - y = 2$$

$+y \quad +y$

$x = y+2$

$(y+2)(y+2)$

$y^2+2y+2y+4$

$y^2+4y+4+y^2=34$

$2y^2+4y+4=34$ factor

$-34 \quad -34$

$\frac{2y^2+4y-30=0}{2}$

$y^2+2y-15=0$

$(y+5)(y-3)=0$

$y=-5 \quad y=3$

-15	
1	15
3	5

$+5 \quad 3$

$x=y+2$	y
$x=-5+2=-3$	-5
$x=3+2=5$	3

$(-3,-5)$
$(5,3)$

2 solutions! :)

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

4. Solve Algebraically

$$x^2 + y^2 = 10 \rightarrow (-3y+10)^2 + y^2 = 10$$

$$x + 3y = 10$$

$$-3y \quad -3y$$

$$x = -3y + 10$$

$(-3y+10)(-3y+10)$

$9y^2 - 30y - 30y + 100$

$9y^2 - 60y + 100 + y^2 = 10$

$10y^2 - 60y + 100 = 10$ Factor

$-10 \quad -10$

$\frac{10y^2 - 60y + 90}{10} = \frac{0}{10}$

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

$(y-3)(y-3) = 0$

$\boxed{y = 3}$

+9

1 | 9

-3 | -3

$x = -3(3) + 10$

$-9 + 10$

$\boxed{x = 1}$

(1, 3)

1 solution

Learning target: I can determine if and where a line and circle intersects on a coordinate plane.

5. Solve Algebraically

$(x-3)^2+y^2=8 \rightarrow (5-3)^2+y^2=8$

$x=5$

$2^2+y^2=8$

$4+y^2=8$
$-4 \qquad -4$

$\sqrt{y^2}=\sqrt{4}$

$y=\pm 2$

$y=2,\ y=-2$

$x=5$	y
5	2
5	-2

(5, 2)
(5, -2)

2 solutions

Geometry | 5 - Coordinate Geometry | Notes

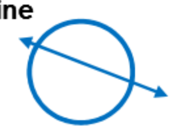
Name: ______________________________ Date: ______________

Intersections of Circles & Lines – Practice

3 Possibilities for Intersection of a Circle and a Line

0 points of intersection
(no real solution)

1 point of intersection
(one real solution)



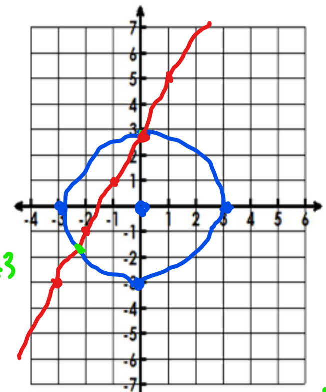
2 points of intersection
(2 real solutions)

Solve Systems Graphically:

circle
c(0,0)
r=3

1. $x^2 + y^2 = 9$
$-2x + y = 3$
$+2x \quad +2x$
$y = 2x+3$

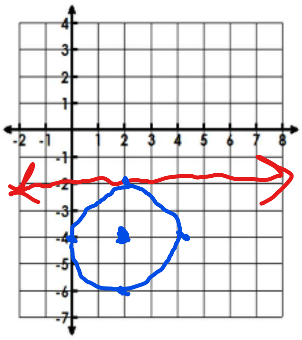
$x \approx -2.4$
$y = 2(-2.4)+3$
$y = -4.8+3$
$y \approx -1.8$



2 **Point(s) of intersection:** (0,3) (-2.4,-1.8)

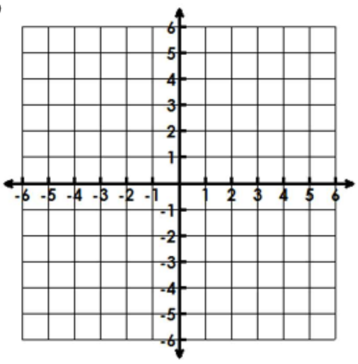
(2,-4) circle r=2

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



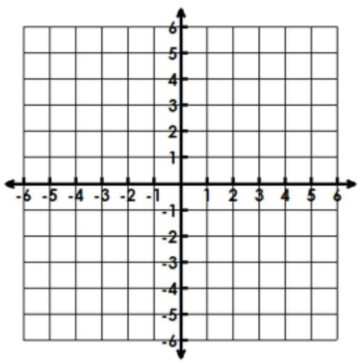
1 **Point(s) of intersection:** (2,-2)

3. $x^2 + y^2 = 16$
$x - y = 4$



Point(s) of intersection: (0,-4)(4,0)

4. $x^2 + y^2 = 9$
$2y = x + 8$



Point(s) of intersection: No Solution

CCGPS Geometry Unit 9 – Modeling Geometry 9.2 – Notes

Solve Algebraically:

1. Solve the linear equation for a variable.
2. Then, substitute the linear equation into the equation representing the circle.
3. Solve for a variable by using one of the methods for solving a quadratic equation.
4. Substitute the value(s) back into the linear equation to get the 2nd variable.

5. $x^2 + y^2 = 10$
$x - y = 2$

Point(s) of intersection: (3,1)(-1,-3)

6. $(x-2)^2 + (y)^2 = 5$
$x - 3y = -3$

Point(s) of intersection: (3,2)(0,1)

7. $x^2 + y^2 = 20$ → $(-2y+10)^2 + y^2 = 20$
$x + 2y = 10$
$-2y \quad -2y$
$x = -2y + 10$

$4y^2 - 40y + 100 + y^2 = 20$
$5y^2 - 40y + 100 = 20$
$-20 \quad -20$
$\frac{5y^2 - 40y + 80}{5} = \frac{0}{5}$
$y^2 - 8y + 16 = 0$
$(y-4)(y-4) = 0$
$\boxed{y = 4}$

$x = -2(4) + 10$
$x = -8 + 10$
$\boxed{x = 2}$

Point(s) of intersection: (2,4)

8. $x^2 + y^2 = 20$ → $x^2 + (2)^2 = 20$
$y = 2$

$x^2 + 4 = 20$
$-4 \quad -4$
$\sqrt{x^2} = \sqrt{16}$
$x = \pm 4$
$x = 4$, $x = -4$

x	y = 2
4	2
-4	2

Point(s) of intersection: (4,2) (-4,2)

Geometry in Coordinate Plane Name________________________

Lines and Circles Recap Date______________ Period____

Write the equation of a line parallel to the given line through the given point.

1) $x + y = -2$ (-2, 5)

$y = -x - 2$ x y Same slope

$\boxed{m = -1}$

$y = mx + b$

$5 = -1(-2) + b$

$5 = 2 + b$

$\boxed{3 = b}$

$\boxed{y = -1x + 3}$

2) $3x - 5y = 20$ (-5, 8)

Write the equation of a line perpendicular to the given line through the given point.

3) $\frac{8y}{8} = \frac{40 - 2x}{8}$ (3, 7)
x y

$\perp m =$ opp. reciprocal

$y = -\frac{1}{4}x + 5$

$m = -\frac{1}{4}$ $\boxed{\perp m = 4}$

$y = mx + b$

$7 = 4(3) + b$

$7 = 12 + b$

$-12 \quad -12$

$\boxed{5 = b}$

$\boxed{y = 4x + 5}$

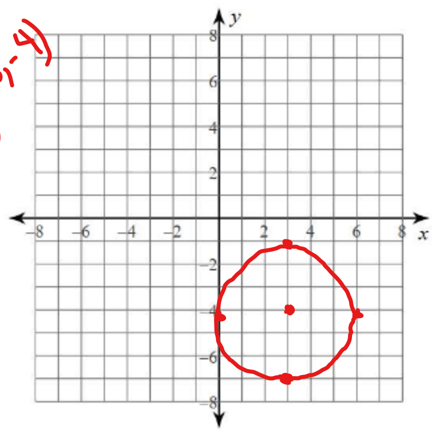
4) $0 = -3y - 4x$ (8, -2)

Identify the center and radius of each. Then sketch the graph.

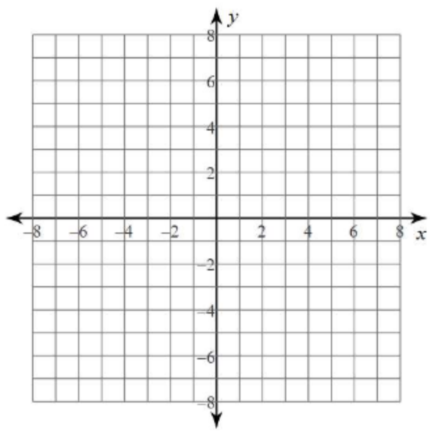
5) $(x - 3)^2 + (y + 4)^2 = 9$

center $(3, -4)$

$r = \sqrt{9} = 3$

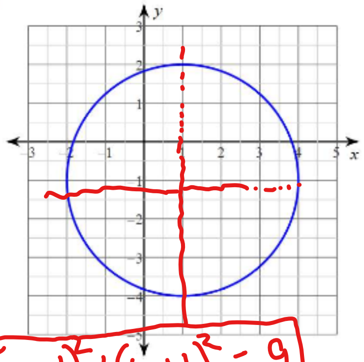


6) $(x - 1)^2 + (y - 4)^2 = 4$



Use the information provided to write the equation of each circle.

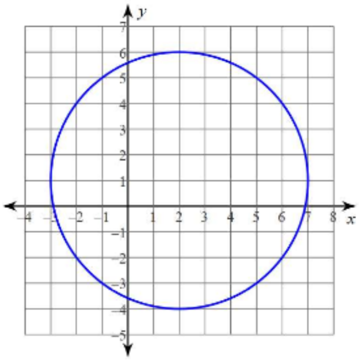
7)



center $(1,-1)$
$r=3$

$\boxed{(x-1)^2+(y+1)^2=9}$

8)



9) Center: $(11,-13)$
Radius: $\sqrt{26}$

$(x-11)^2+(y+13)^2=26$

10) Center: $(-4, 2)$
Radius: 10

Identify the center and radius of each.

11) $x^2 + y^2 + 10x - 22y + 141 = 0$

12) $x^2 + y^2 - 4x - 22y + 109 = 0$

13) $3x^2 + 3y^2 - 30x - 36y + 36 = 0$

$\div 3$

$x^2-10x+\boxed{25}+y^2-12y+\boxed{36}=-12+\boxed{25}+\boxed{36}$

$(x-5)^2+(y-6)^2=49$

$\boxed{\begin{array}{l}\text{Center } (5,6)\\ r=\sqrt{49}=7\end{array}}$

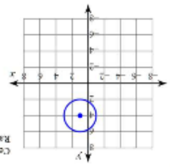
14) $x^2 + y^2 + 14x - 18y + 9 = 0$

) $y=-x+5$

2) $y=\frac{3}{5}x+11$

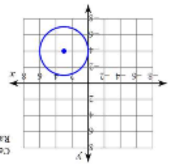
3) $y=4x-5$

4) $y=\frac{3}{4}x-8$



Center: $(3,-4)$
Radius: 3

6)



Center: $(1,4)$
Radius: 2

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

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

9) $(x-11)^2+(y+13)^2=26$

10) $(x+4)^2+(y-2)^2=100$

11) Center: $(-5,11)$
Radius: $\sqrt{5}$

12) Center: $(2,11)$
Radius: 4

13) Center: $(5,6)$
Radius: 7

14) Center: $(-7,9)$
Radius: 11