

Warm-up

Find the distance.

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

1) (1,3),(5,7)

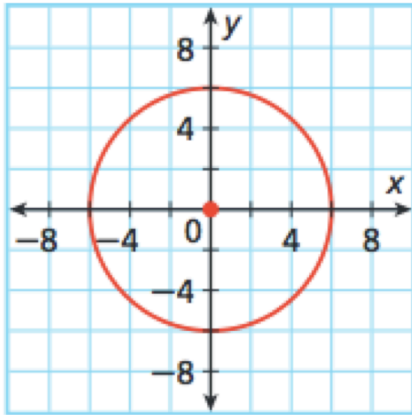
2) (-1,-2),(0,5)

Find the slope.

$$\frac{y_2 - y_1}{x_2 - x_1}$$

3) (1,3),(5,7)

4) (-1,-2),(0,5)



$$x^2 + y^2 = 36$$

Center: (0,0)

$$r^2 = 36$$

radius=6

Standard Form

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

Center is at (h,k)

Radius is r.

X-h	right
X+h	left
Y-k	up

Y+k	down
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$$(x - 2)^2 + (y + 1)^2 = 9$$

$$h=2$$

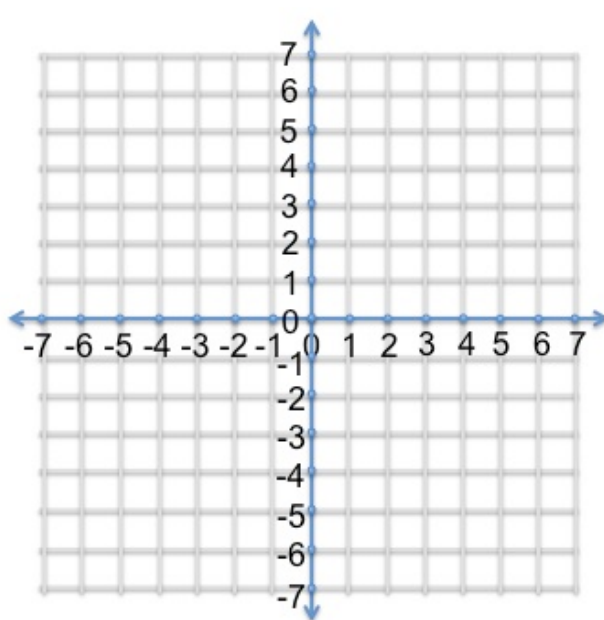
$$k=-1$$

Center at (2,-1)

$$r^2 = 9$$

$$r=3$$

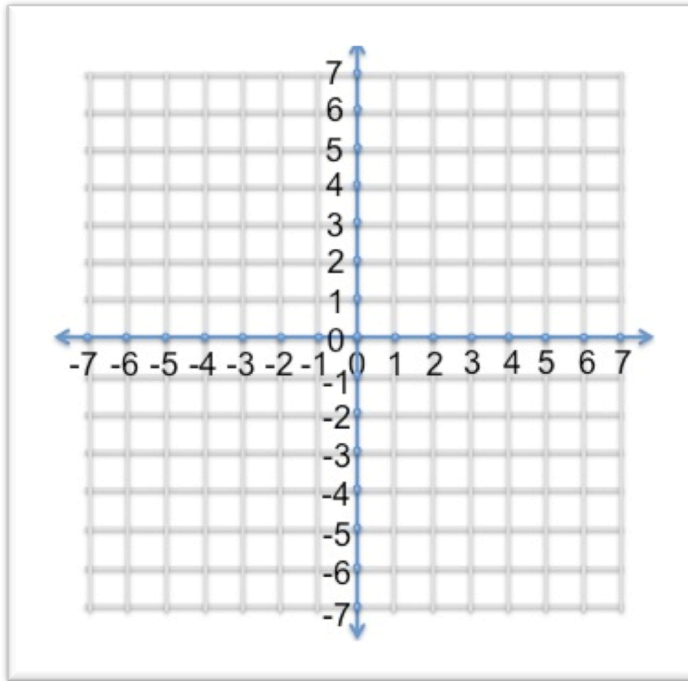
Radius is 3.



I try:

Graph the circle

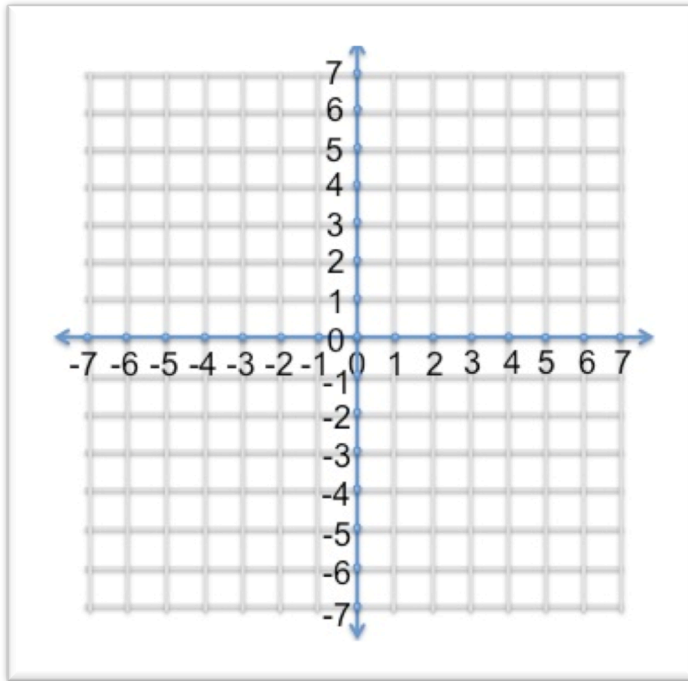
$$(x - 3)^2 + (y + 2)^2 = 25$$



We try:

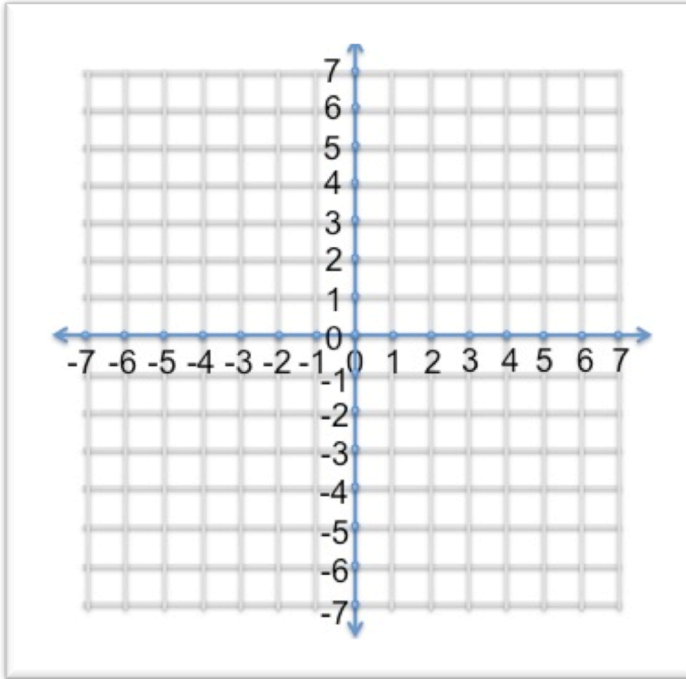
Graph the circle

$$(x + 1)^2 + (y - 3)^2 = 4$$

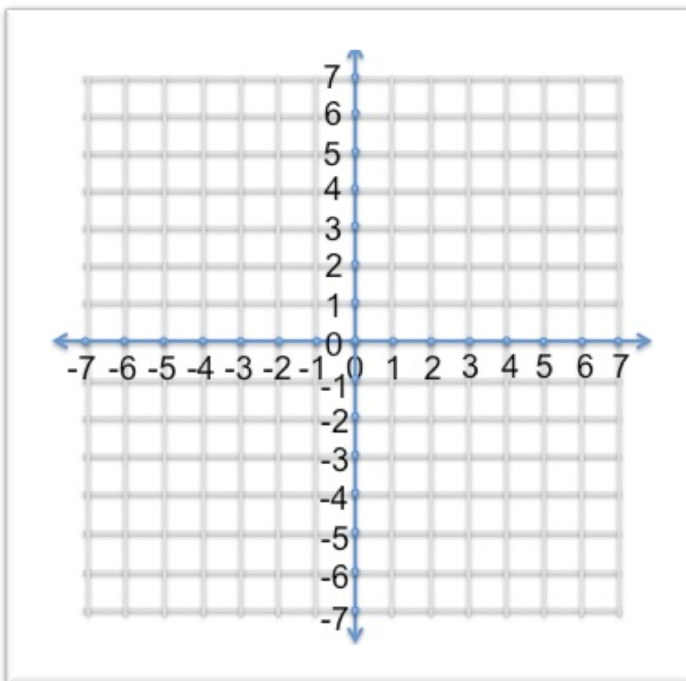


We try:

Graph the circle
 $x^2 + (y - 1)^2 = 4$



You Try in your notebook:
Graph the circle
 $(x - 3)^2 + (y + 1)^2 = 16$



Write the Equation of a circle given center $(-1,9)$ and containing point $(2,5)$.

What do we need to find first? What can we find with a center and a point on the circle? Reflect back to the homework due today.

We can find the radius!
center (-1,9), point (2,5)

Find Radius by using distance formula	$\sqrt{(X_2 - X_1)^2 + (Y_2 - Y_1)^2}$ $\sqrt{(2 - (-1))^2 + (5 - 9)^2}$ $\sqrt{(2 + 1)^2 + (-4)^2}$ $\sqrt{(3)^2 + (-4)^2}$ $\sqrt{9 + 16}$ $\sqrt{25}$ <p>5</p>
Use the center and the radius to find the equation of the circle	<p>Center (-1,9) Radius:5</p> $(x - h)^2 + (y - k)^2 = r^2$ $(x - (-1))^2 + (y - 9)^2 = 5^2$
Simplify	$(x + 1)^2 + (y - 9)^2 = 25$

We Try:

Write the Equation of a circle given center (2,4) and containing point (8,12)

Find the Radius using the distance formula	
Use the Center and radius to find the equation	
Simplify	

A ***Tangent*** is a line in the same plane as the circle that intersects the circle at exactly one point.

The tangent is perpendicular to the radius.

Find the Equation of the line that is tangent to the circle

$$25 = x^2 + y^2 \text{ at point } (3,4)$$

Identify the Center	Center : (0,0)
Find the slope of the radius at the point of tangency.	$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$ $\frac{4 - 0}{3 - 0} = \frac{4}{3}$
Tangent lines are perpendicular to the radius.	$\frac{4}{3} \rightarrow -\frac{3}{4}$
Find the point and slope	Point (3,4)

equation	<p>Slope: $-\frac{3}{4}$</p> <p><i>point – slope form:</i></p> $y - y_1 = m(x - x_1)$ $y - 4 = -\frac{3}{4}(x - 3)$
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We try:

Find the Equation of the line that is tangent to the circle

$$25 = (x - 1)^2 + (y + 2)^2 \text{ at point } (5, -5)$$

Identify the Center	Center :
Find the slope of the radius at the point of tangency.	Slope = $\frac{y_2 - y_1}{x_2 - x_1}$
Tangent lines are perpendicular to the radius.	
Find the point	Point :

slope equation.	<p>Slope:</p> <p><i>Point Slope form:</i></p> $y - y_1 = m(x - x_1)$
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We Try:

Find the Equation of the line that is tangent to the circle

$$100 = (x)^2 + (y)^2 \text{ at point } (8,6)$$

Identify the Center	Center :
Find the slope of the radius at the point of tangency.	Slope = $\frac{y_2 - y_1}{x_2 - x_1}$
Tangent lines are perpendicular to the radius.	
Find point- slope equation	<p><i>point - slope form:</i></p> $y - y_1 = m(x - x_1)$

You Try:

Find the Equation of the line that is tangent to the circle

$$16 = (x + 3)^2 + (y)^2 \text{ at point } (-3, 4)$$

Closure

Closure:

Choose one of the following to do in your notebook.

- 1) Silently write down the steps needed to find the line tangent to a given point on a circle.
- 2) Silently write down the steps on how to graph

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