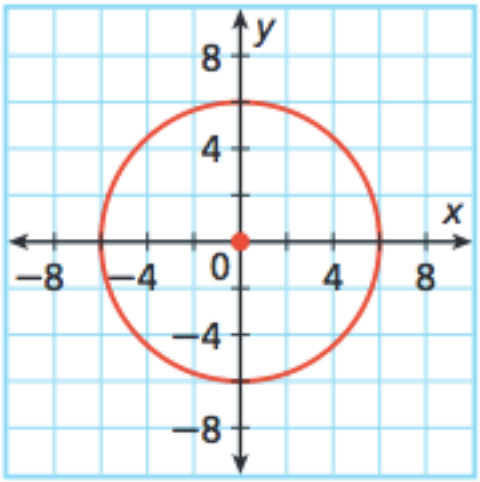
Circles
10.2

Parent Function
$$x^2 + y^2 = r^2$$

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

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

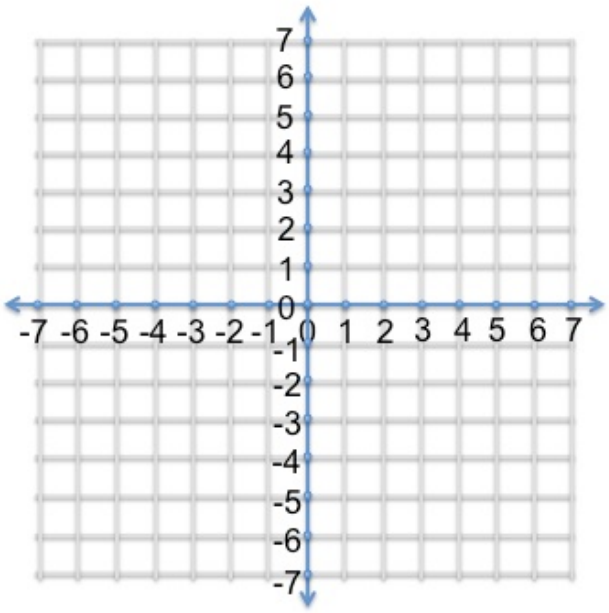
h=2

k=-1

Center at (2,-1)

r=3

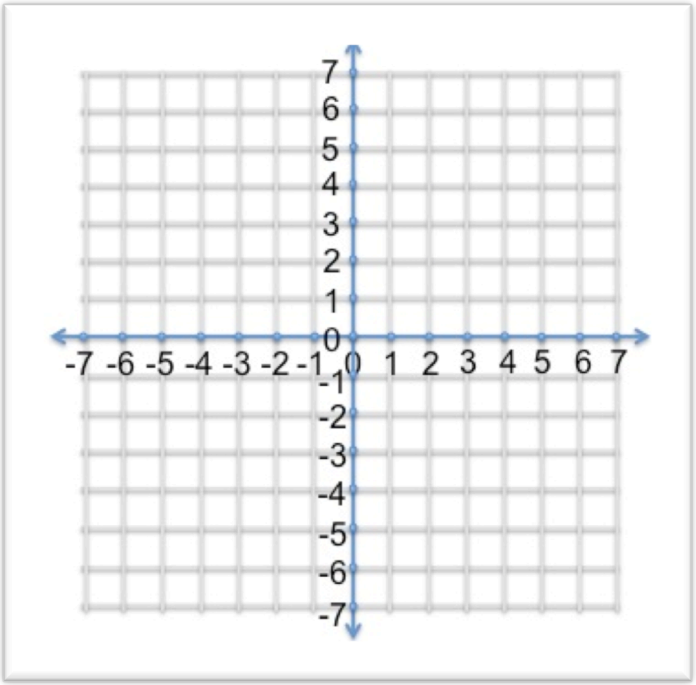
Radius is 3.



I try:

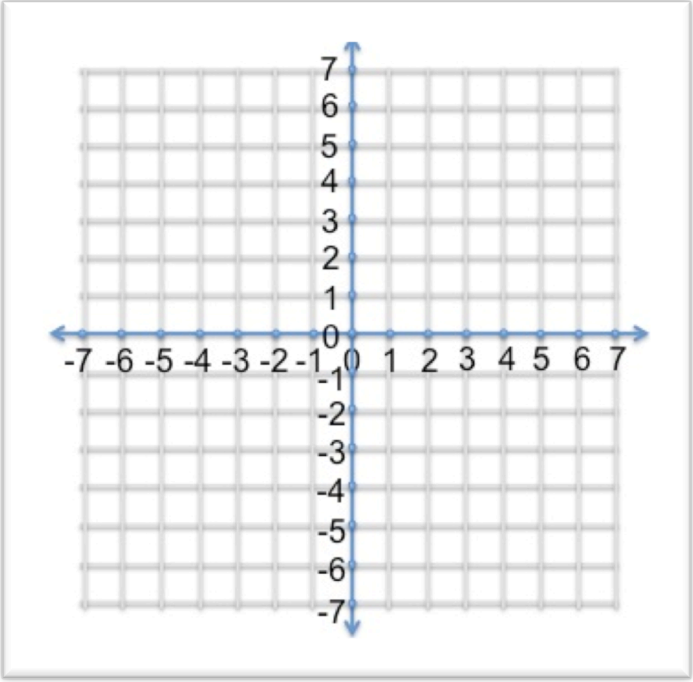
Graph the circle

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



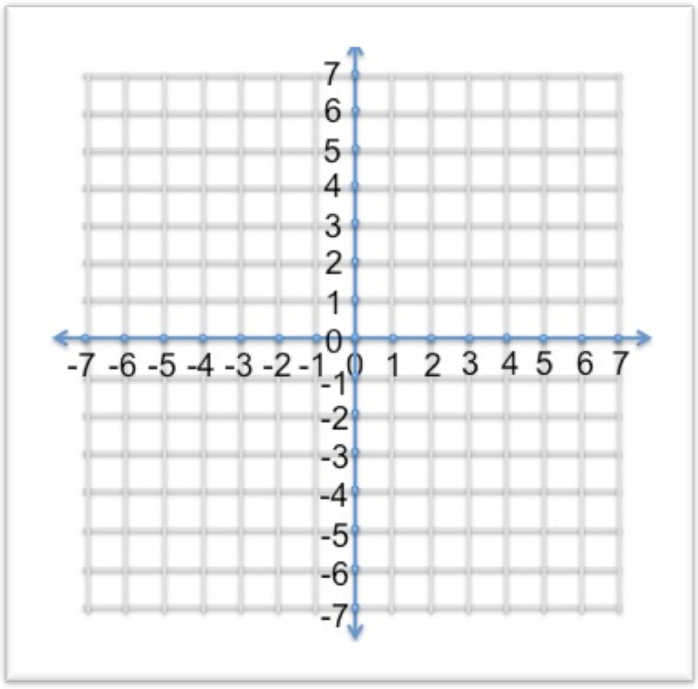
We try:

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



We try:

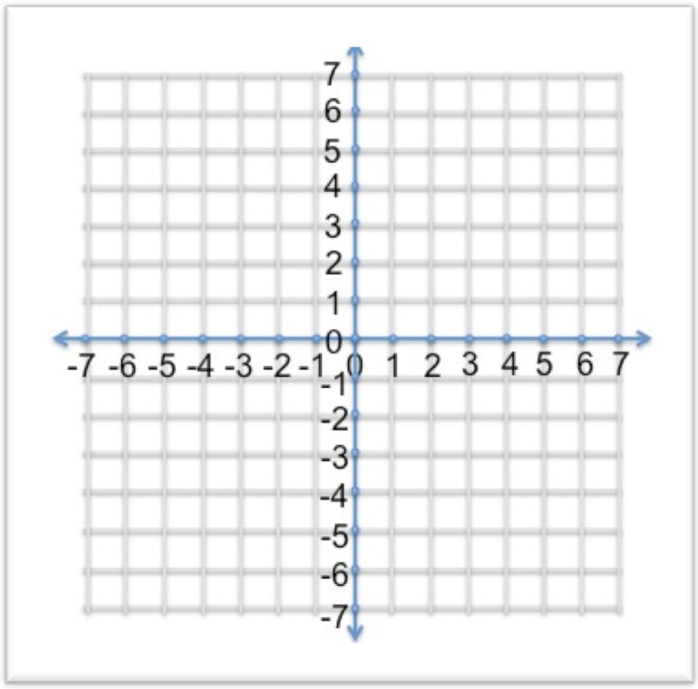
Graph the circle
$x^2 + (y - 1)^2 = 16$



You Try:

Graph the circle

$(x-3)^2+(y+1)^2=36$



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

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

intercept equation using the point and slope	Slope: $-\frac{3}{4}$ $slope\ intercept\ form$: $y - y_1 = m(x - x_1)$ $y - 4 = -\frac{3}{4}(x - 3)$

We try:

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

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

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

intercept equation using the point and slope	Slope: $slope\ intercept\ form$: $y - y_1 = m(x - x_1)$

We Try:

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

$25 = (x + 6)^2 + (y + 4)^2 at\ point\ (-9, -8)$

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

slope	

You Try:

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

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

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

Ellipses
10.3

An ***Ellipse*** is the set of points in a plane such that the sum of the distances from any point P on the ellipse to two fixed points called the Foci, is constant.

The ***major axis*** is the longer axis.
The ***minor axis*** is the shorter axis.
The ***vertices*** are the endpoints of the major axis.
The ***co-verticies*** are the endpoints of the minor axis.

Here are some examples of Ellipses.

$$\frac{x^2}{4}+\frac{y^2}{9}=1$$

$$\frac{(x-2)^2}{4}+\frac{(y+1)^2}{9}=1$$

Standard Form for the Equation of an Ellipse Center at (h, k)

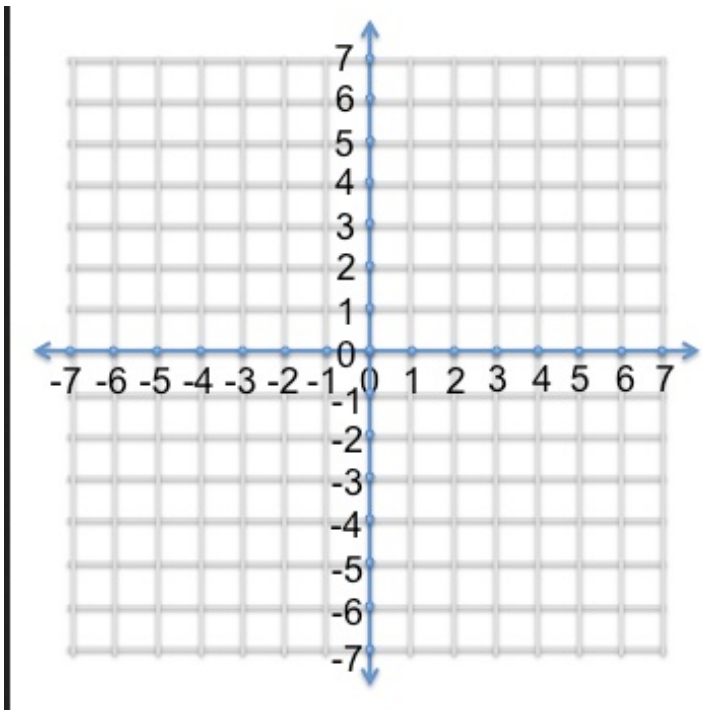
MAJOR AXIS	HORIZONTAL	VERTICAL
Equation	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$	$\frac{(y-k)^2}{a^2}+\frac{(x-h)^2}{b^2}=1$
Vertices	$(h+a, k), (h-a, k)$	$(h, k+a), (h, k-a)$
Foci	$(h+c, k), (h-c, k)$	$(h, k+c), (h, k-c)$
Co-vertices	$(h, k+b), (h, k-b)$	$(h+b, k), (h-b, k)$

Pg 738

Graph the Ellipse

Identify the Domain and Range

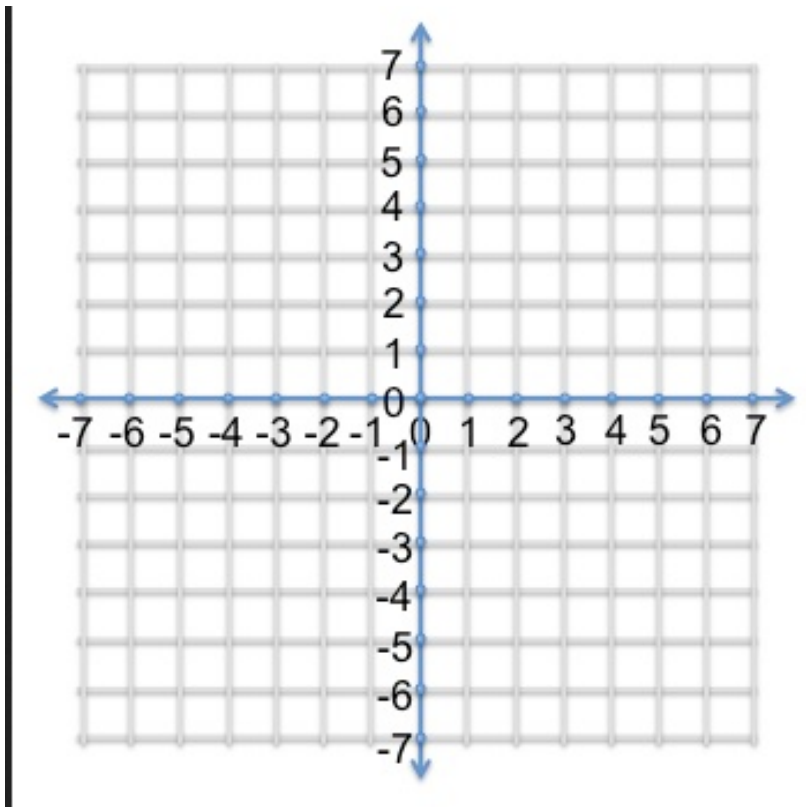
$$\frac{x^2}{64}+\frac{y^2}{25}=1$$



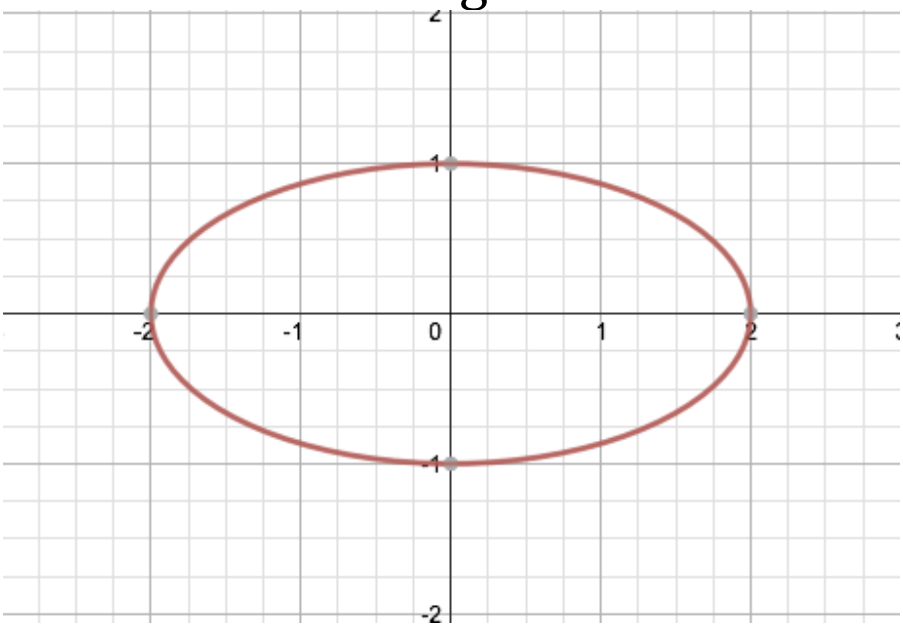
Graph the Ellipse

Identify the Domain and Range

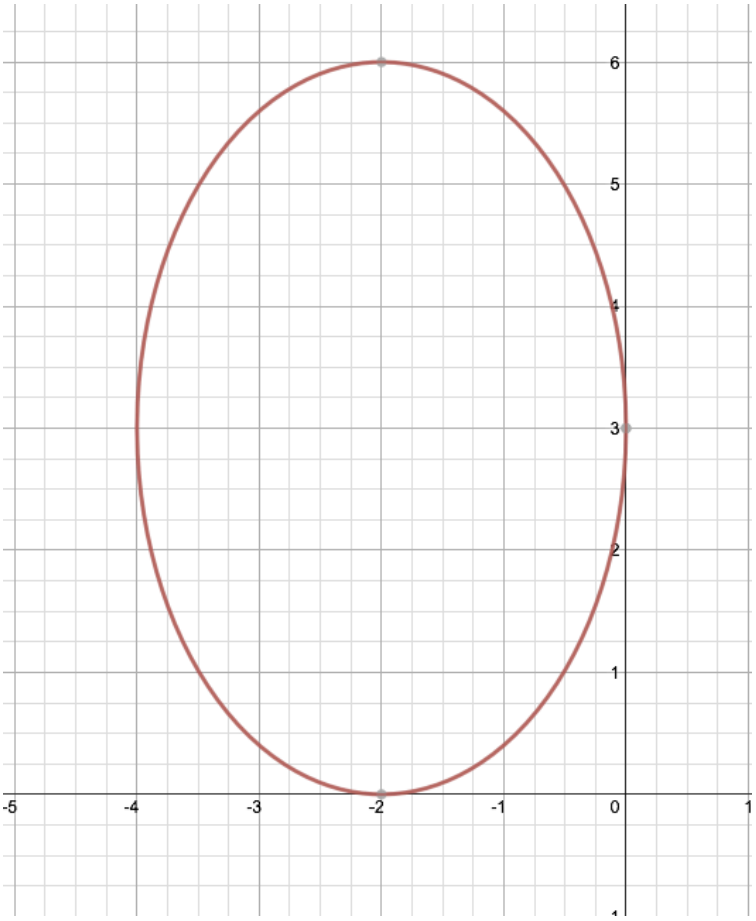
$$\frac{(x-1)^2}{4}+\frac{(y+2)^2}{25}=1$$



Write the equation and state the domain and range.



Write the equation and state the domain and range



Closure:
Choose one of the following.

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

3) Silently write down the steps on how to graph
$$\frac{(x-1)^2}{25}+\frac{(y+2)^2}{4}=1$$

Be ready to share with a partner.