

Name: _____ Period: _____

Accel. Pre-Calculus

Unit 8 Packet

Conics Unit

Accel Pre-Calculus

Name: _____

8.01 Parabolas - Day 1

Date: _____

Parabola: a conic section where the distance from 1 fixed point (focus) and a line (directrix) is equal.

Figure:

Vertex:

Axis of Symmetry:

Focus:

Directrix:

Focal Width:

Vertical Axis of Symmetry	Horizontal Axis of Symmetry
$(x - h)^2 = 4p(y - k)$	$(y - k)^2 = 4p(x - h)$
Vertex: (h, k) Axis of Symmetry: $x = h$ Focus: $(h, k + p)$ Directrix: $y = k - p$ Focal width: $ 4p $	Vertex: (h, k) Axis of Symmetry: $y = k$ Focus: $(h + p, k)$ Directrix: $x = h - p$ Focal width: $ 4p $

Examples: Graph the parabola. State the vertex, AOS, focus, directrix, and focal width.

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

Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____

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

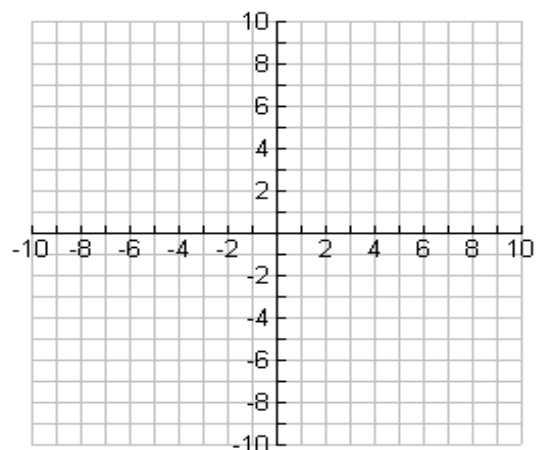
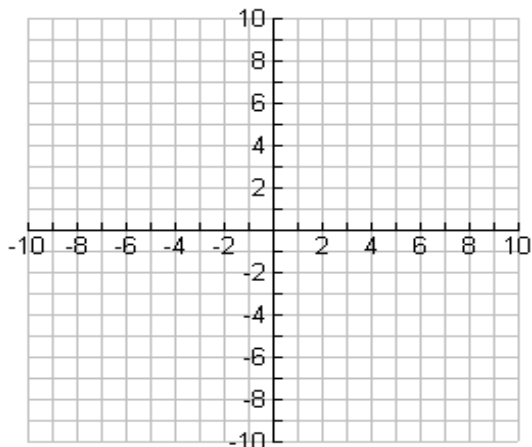
Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____



8.01 Practice: Graph the parabola. State the vertex, AOS, focus, directrix, and focal width.

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

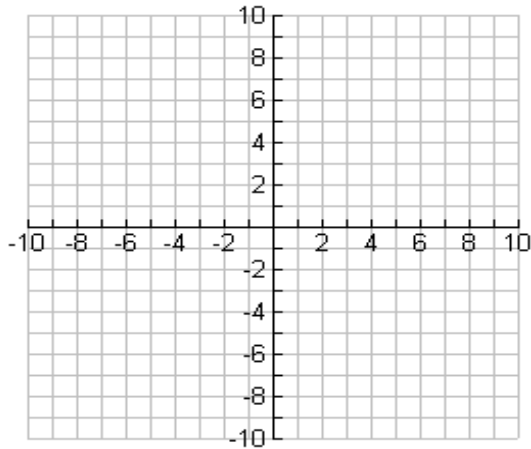
Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____



2. $(y - 3)^2 = 12(x - 1)$

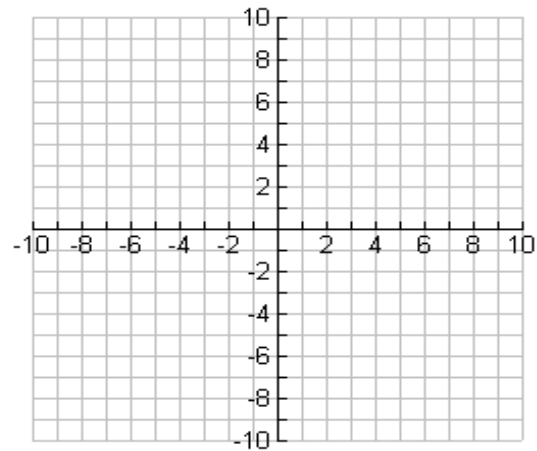
Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____



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

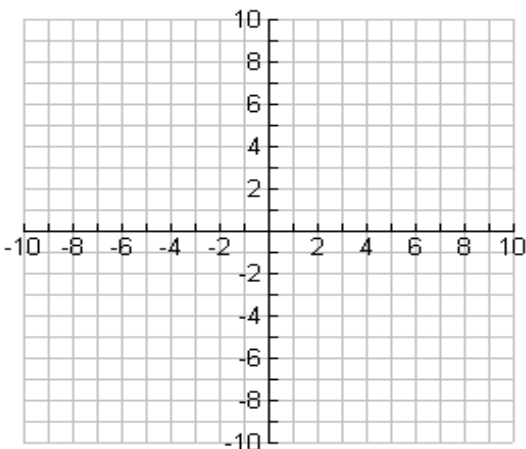
Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____



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

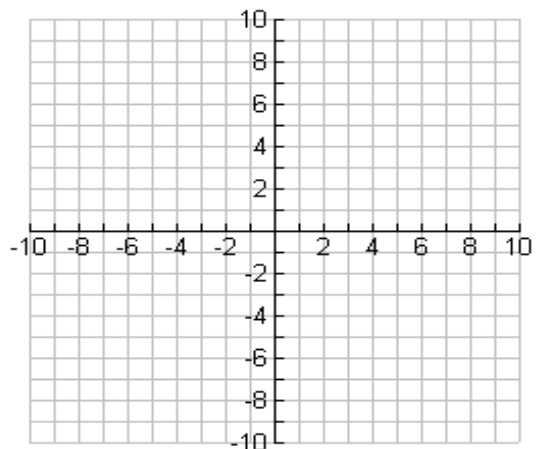
Vertex: _____

Axis of Symmetry: _____

Focus: _____

Directrix: _____

Focal Width: _____



8.02 Parabolas - Day 2

Date: _____

Write the standard form of the equation and graph each parabola. Find the vertex, focus, focal width, axis of symmetry, and directrix.

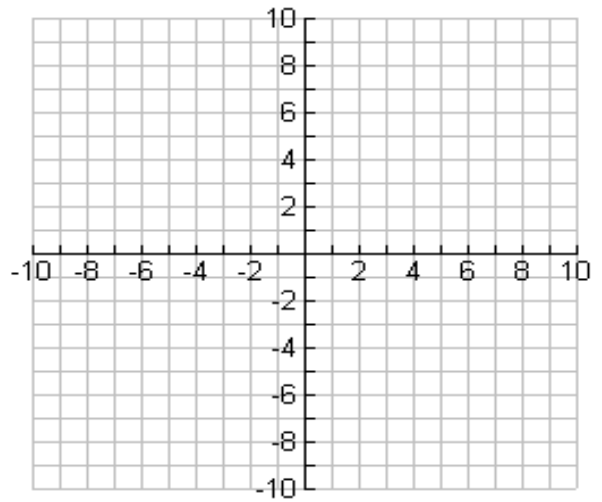
1. $y^2 + 12x = 2y - 13$

Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

AOS: _____ Focal Width: _____



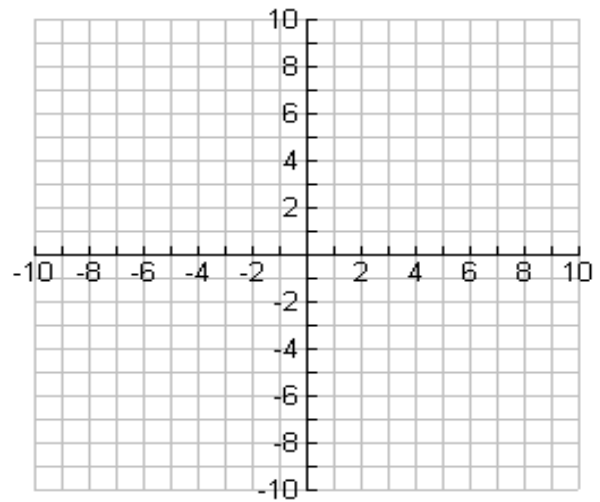
2. $x^2 + 10x + 25 = -8y + 24$

Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

AOS: _____ Focal Width: _____



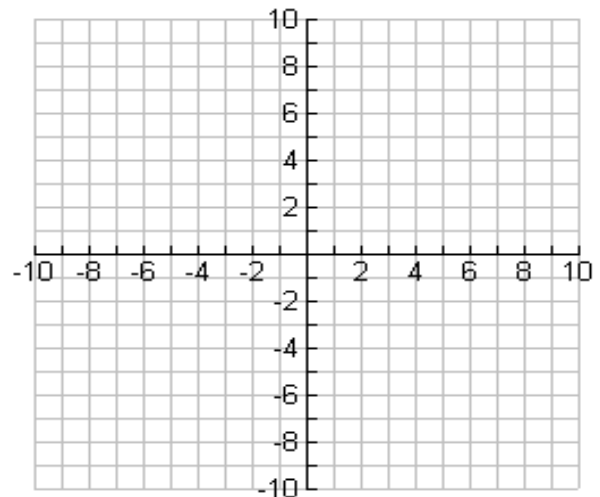
3. $3x^2 - 30y - 18x + 87 = 0$

Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

AOS: _____ Focal Width: _____

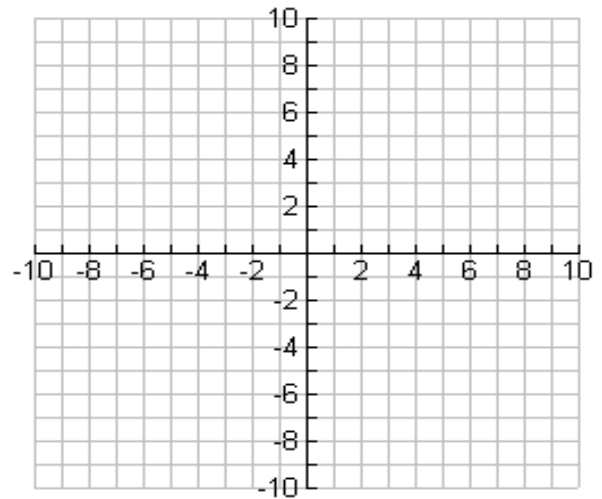


8.02 Practice:

Date: _____

Write the standard form of the equation and graph each parabola. Find the vertex, focus, focal width, axis of symmetry, and directrix.

1. $12x - 15 = 3y^2 + 6y$



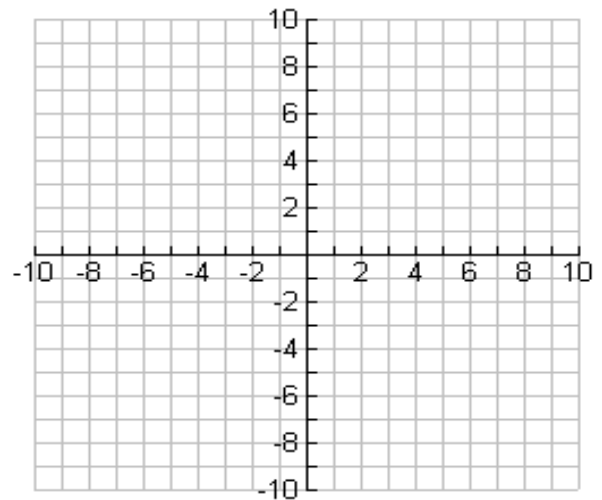
Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

AOS: _____ Focal Width: _____

2. $x^2 + 8x + 14y = -44$



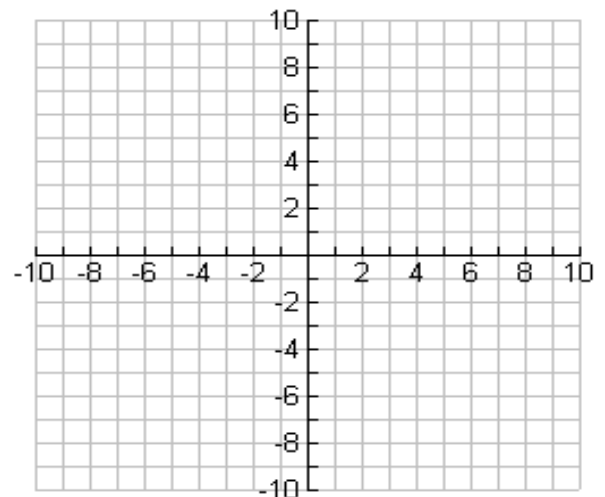
Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

AOS: _____ Focal Width: _____

3. $2y^2 - 4y + 12x + 50 = 0$



Standard Equation: _____

p = _____ Focus: _____

Vertex: _____ Directrix: _____

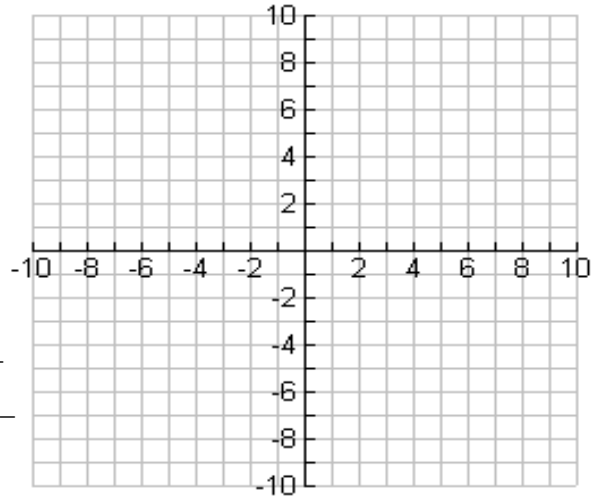
AOS: _____ Focal Width: _____

8.03 Parabolas - Day 3

Date: _____

Write the standard form of the equation of each parabola. Sketch the graph and fill in the blanks.

1. The vertex is at $(-5, 1)$, and the focus is at $(-1, 1)$.

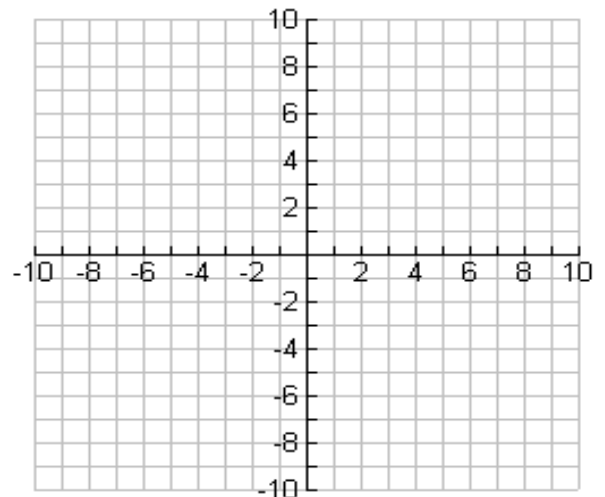


Equation: _____

Axis of Symmetry: _____ Directrix: _____

 $p =$ _____ Focal Width: _____

2. The equation of the axis of symmetry is $y = 2$, the focus is at $(0, 2)$, and $p = -3$.



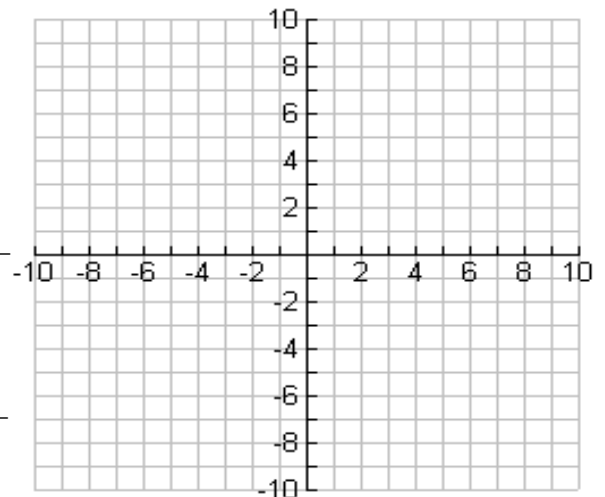
Equation: _____

Vertex: _____

Directrix: _____ Focal Width: _____

8.03 Practice

1. The parabola passes through the point at $(-3, 1)$, opens to the left and its vertex is at $(-2, -3)$.

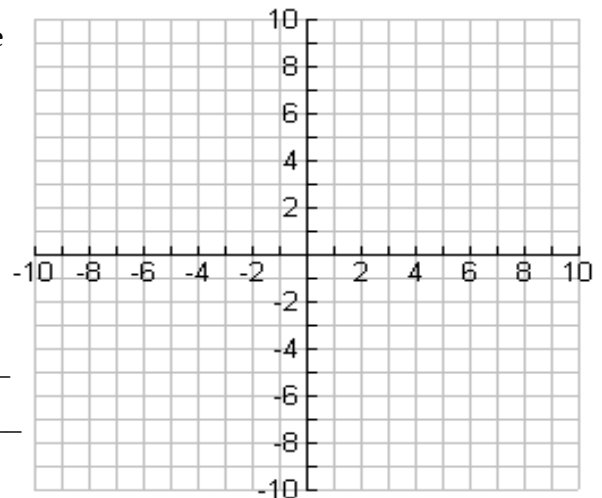


Equation: _____

Axis of Symmetry: _____ Directrix: _____

Focus: _____ $p =$ _____ Focal Width: _____

2. The focus is at $(3, 2)$, the distance from the focus to the vertex is 2 units, and the function has a minimum.

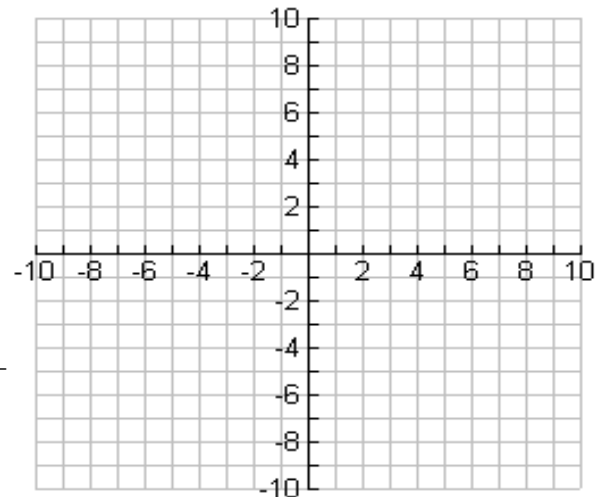
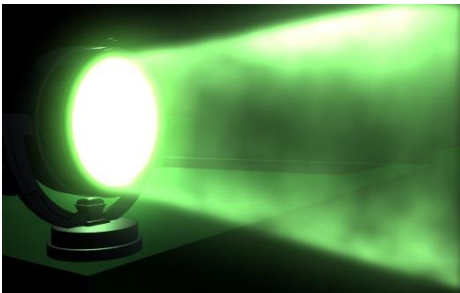


Equation: _____

Axis of Symmetry: _____ Directrix: _____

Vertex: _____ $p =$ _____ Focal Width: _____

3. In a searchlight, the bulb is placed at the focus of a parabolic mirror, causing the light rays from the bulb to bounce off the mirror as parallel rays. This provides a concentrated beam of light. Write the equation of the parabola if the focus is 3 feet from the vertex. Assume the vertex is at the origin and the parabola opens to the right.



Equation: _____

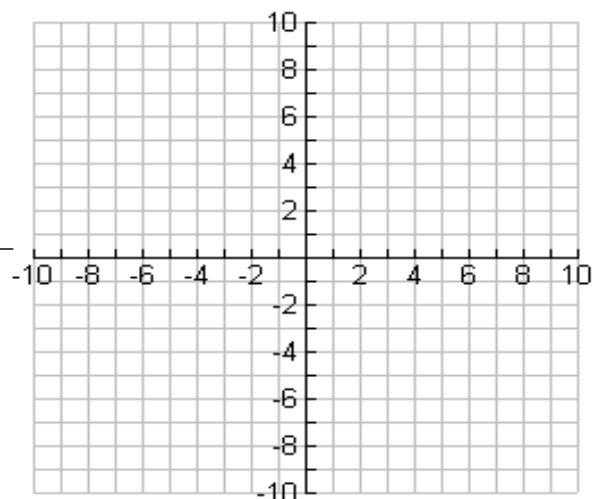
Axis of Symmetry: _____ Directrix: _____

Vertex: _____ Focus: _____

$p =$ _____ Focal Width: _____

4. The arch in Freedom Park has a parabolic shape. Its height is 25 feet and its base is 30 feet wide. Find an equation, which models this shape, using the x -axis to represent the ground.

Hint: Use 1 square = 2 feet and put the origin at the lower left corner of the graph.



Equation: _____

Axis of Symmetry: _____ Directrix: _____

Vertex: _____ Focus: _____

$p =$ _____ Focal Width: _____

8.04 Circles Day 1

Date: _____

Recall:

The Distance Formula - the distance between the points (x_1, y_1) and (x_2, y_2) is as follows:

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

The Midpoint Formula - the midpoint of the line segment joining (x_1, y_1) and (x_2, y_2) is as follows:

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Apply:

Given the two endpoints of the diameter of a circle, find the diameter's length.

1. $(1, 7), (5, 4)$

2. $(-4, 7), (0, -1)$

Given the two endpoints of the diameter of a circle, find the center of the circle.

3. $(1, 7), (5, 5)$

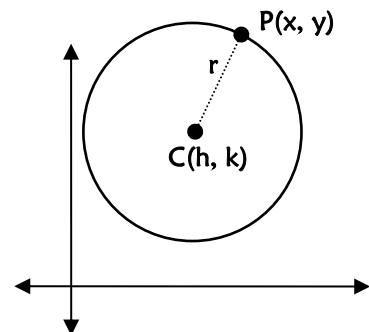
4. $(-8, 9), (2, -4)$

Circle: the set of all points (x, y) that are equidistant from a fixed point, called the center of the circle. The distance r between the center and any point (x, y) on the circle is called the radius.Suppose the center of this circle is translated from the origin to $C(h, k)$. Let's apply the distance formula to write the equation for the translated circle:

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

Step 1, fill in r , $P(x, y)$ and $C(h, k)$:

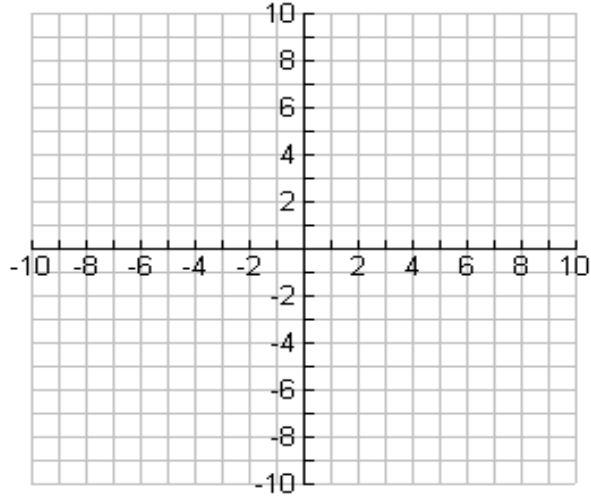
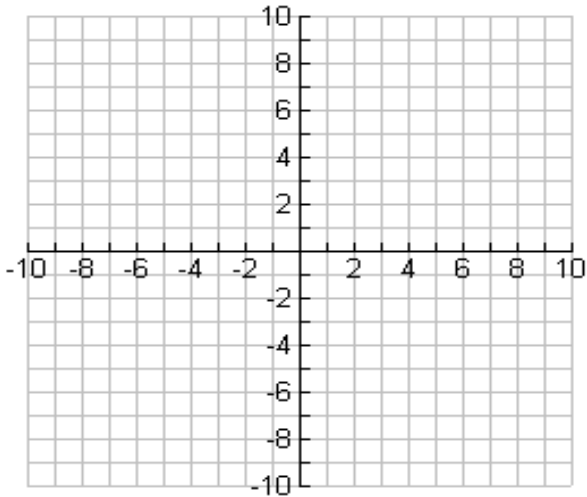
Step 2, square each side:

This is the **standard form of the equation of a circle with radius r and center at (h, k) .**

Given the standard form for the circle, identify the center and radius. Then graph.

5. $(x + 6)^2 + (y - 2)^2 = 9$

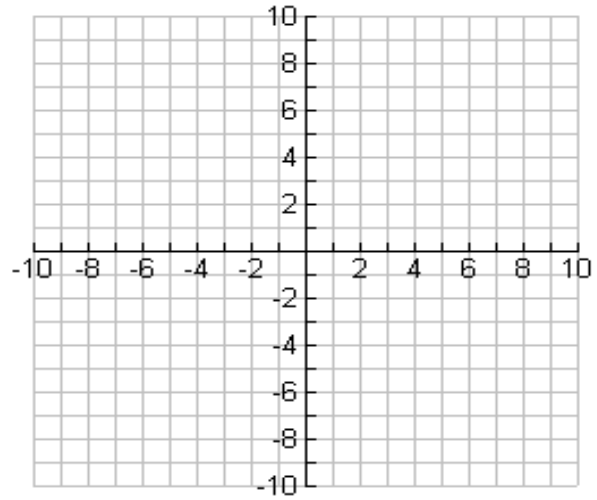
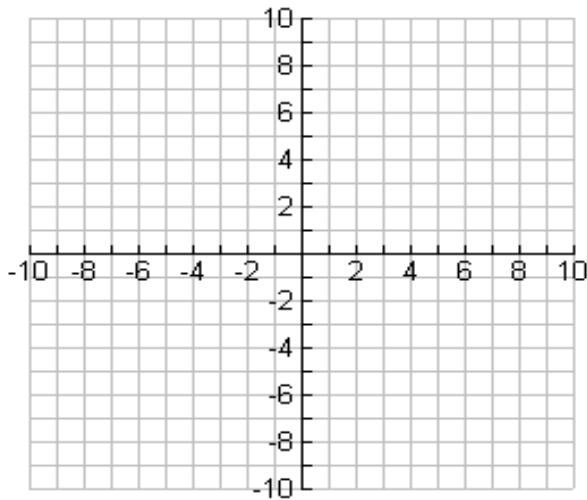
6. $(x + 4)^2 + y^2 = 30$



Write the standard form of the equation of each circle described and graph the equation.

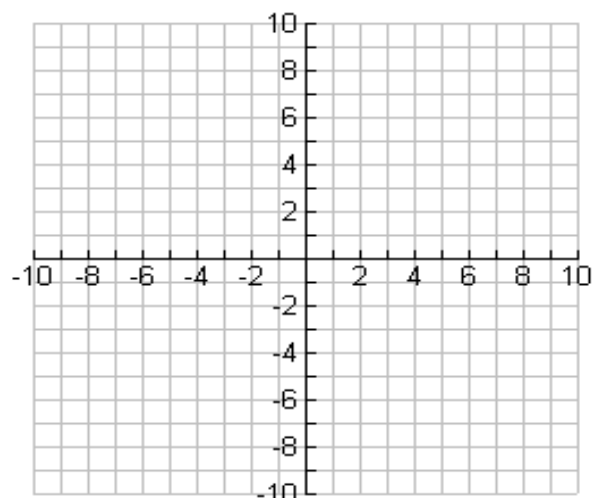
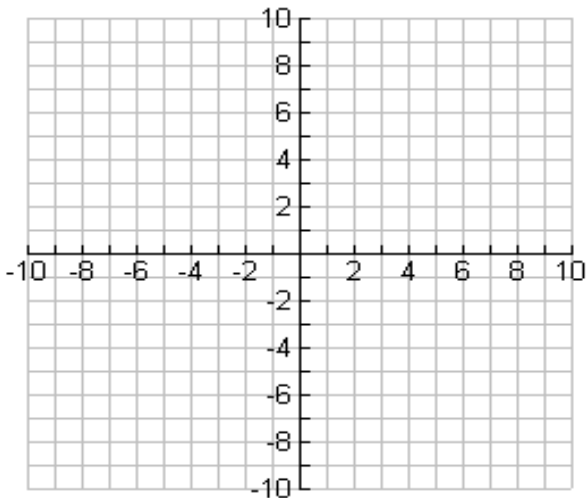
7. Center at $(1, 3)$ and radius = 6

8. Center at $(-2, 6)$ passing through $(1, 2)$



9. Center at $(-3, -2)$ and tangent to the line $y = 5$

10. The endpoints of the diameter are $(-2, 1)$ and $(6, 7)$

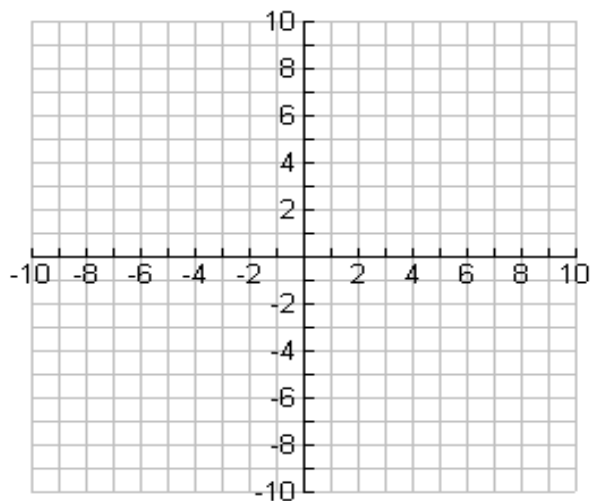
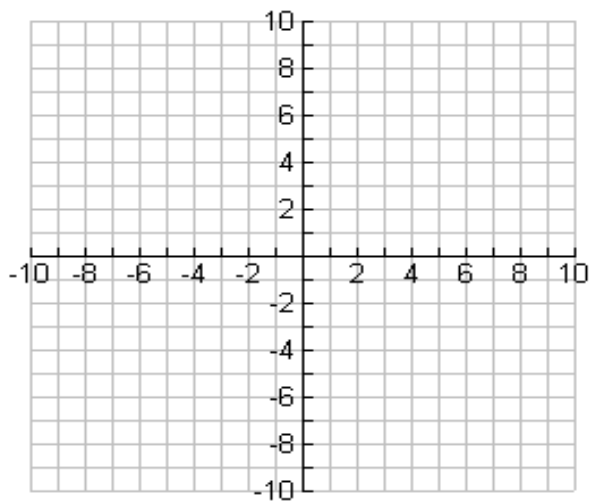


8.04 Practice

Given the standard form for the circle, identify the center and radius. Then graph.

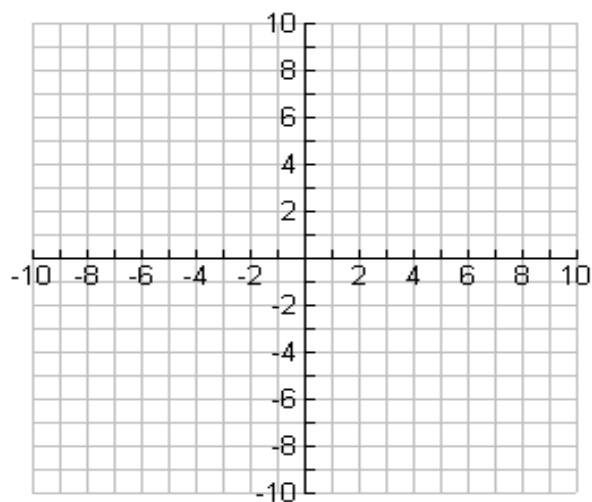
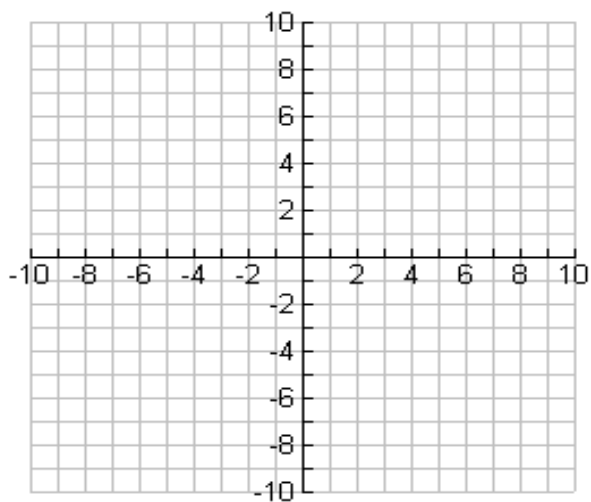
1. $x^2 + (y - 3)^2 = 9$

2. $(x + 1)^2 + (y + 5)^2 = 25$



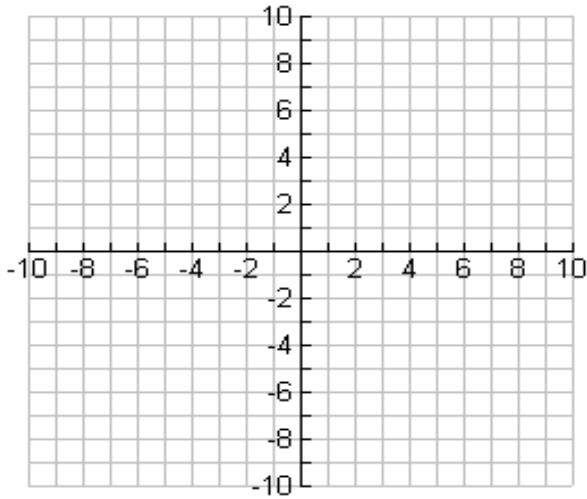
3. $(x + 2)^2 + y^2 = \frac{16}{9}$

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

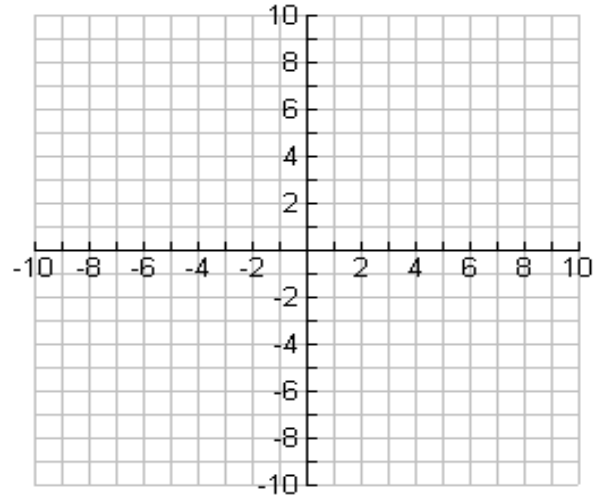


Write the standard form of the equation of each circle described and graph the equation.

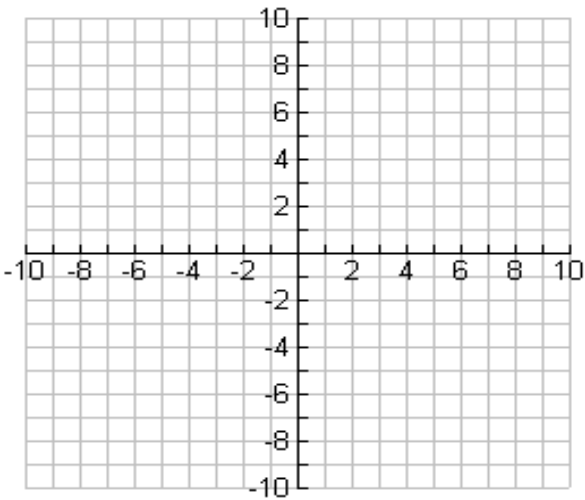
5. Center at $(-5, 0)$, radius $\frac{9}{2}$



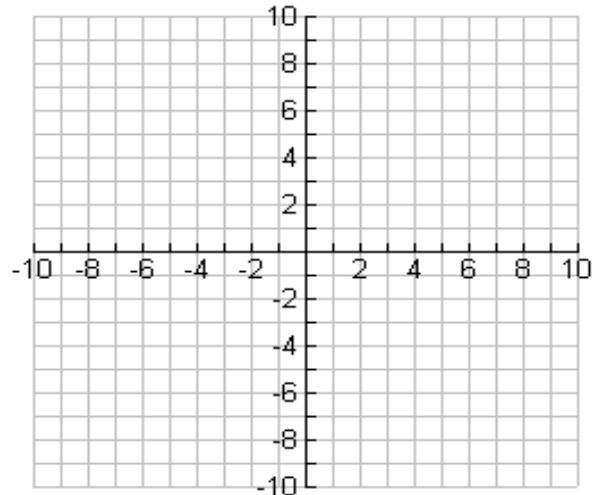
6. Center at $(3, -2)$ and tangent to the y-axis.



7. Center at $(6, 1)$ and tangent to the line $x = 2$.



8. Center at $(-5, 5)$ and tangent to both the x and y-axes.



Write the equation of the circle that satisfies each set of conditions.

9. The circle passes through the origin and has its center at $(-4, 3)$.
10. The circle passes through the point $(5, 6)$ and has its center at $(2, 3)$.
11. The endpoints of a diameter are at $(2, 3)$ and at $(-6, -5)$.

8.05 Circles Day 2 - Converting to Standard Form

Date: _____

What if the equation for the circle is not already in standard form? The following are ALL equations of circles. Can you identify the center and radius of each circle?

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

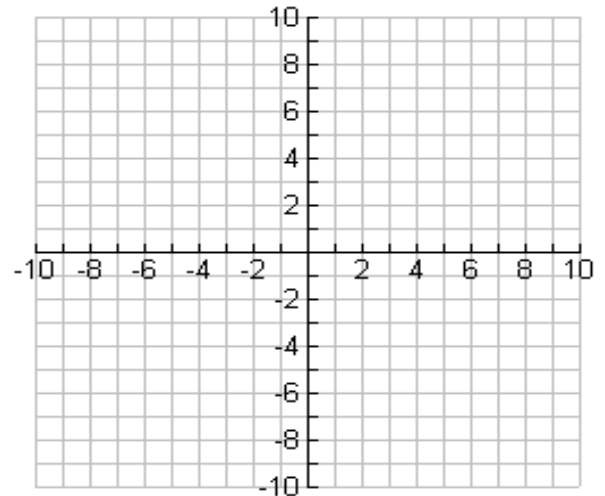
$$(x + 1)^2 + (y + 5)^2 = 20$$

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

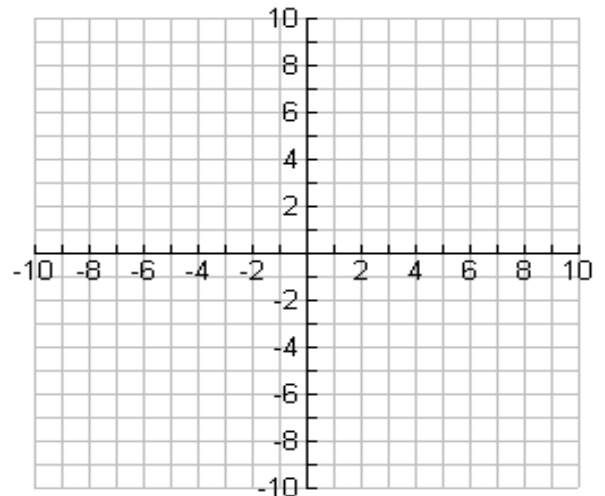
How can we determine the center and radius for the last equation?

Examples: Write the standard form of the equation of each circle and then graph the equation. Identify the center and radius.

1. $x^2 + y^2 + 10x - 4y - 7 = 0$



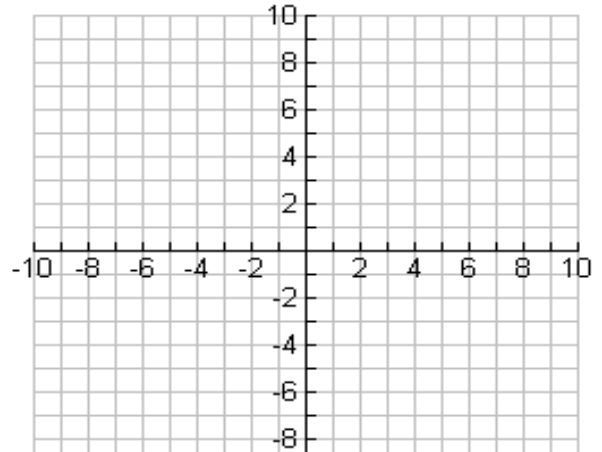
2. $4x^2 + 4y^2 - 8x + 32y - 170 = 2$



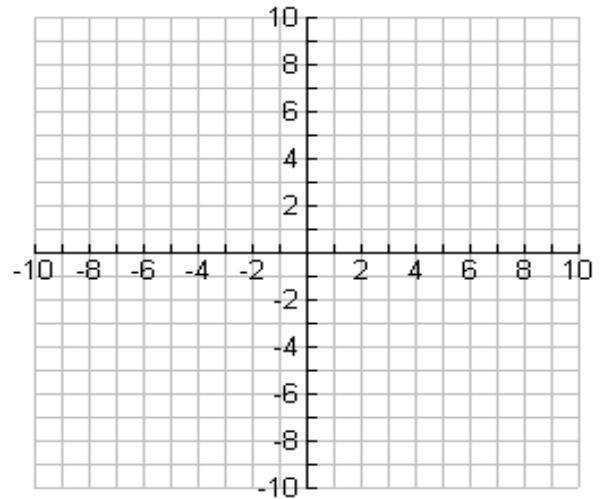
8.05 Circles Day 2 Practice

Write the standard form of the equation of each circle and then graph the equation. Identify the center and radius.

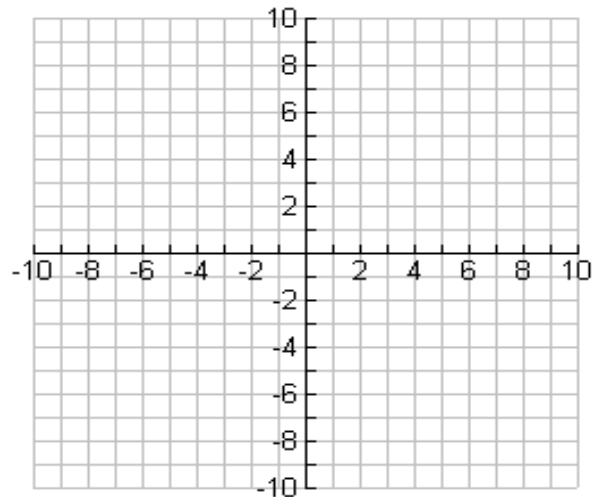
1. $x^2 + y^2 - 4x + 12y + 15 = 0$



2. $2x^2 + 2y^2 + 4x - 8y + 8 = 6$



3. $16x^2 + 16y^2 - 16x - 160y = 172$



4. $162 - 3x^2 = 3y^2 - 24y$

8.06 Parabolas and Circles Review

Date: _____

1. Identify the characteristics of the parabola. Graph and label all parts.

$$(y - 3)^2 = 12(x + 1)$$

p = _____

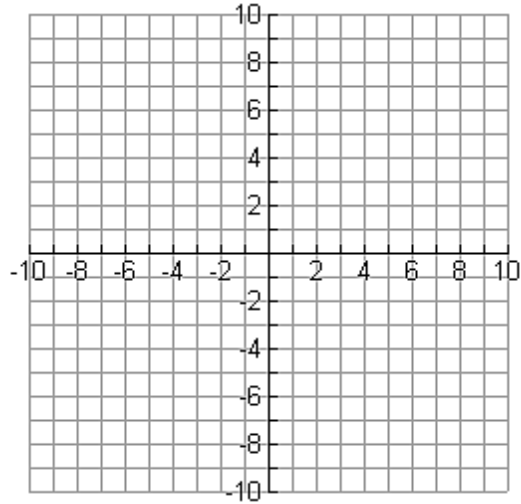
Vertex: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____

Focal Width: _____



2. Write the equation of the parabola $x^2 - 8y - 4x + 12 = 0$ in standard form. Identify the vertex, focus, directrix, axis of symmetry, and focal width. Graph the parabola and label all parts.

Standard Form: _____

p = _____

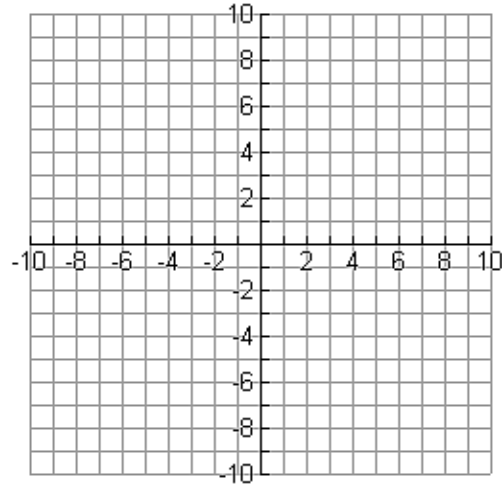
Vertex: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____

Focal Width: _____



3. Write the standard form of the equation for the parabola with a focus at (4,2) and directrix at $y = -8$. Identify its characteristics. Graph the parabola and label all parts.

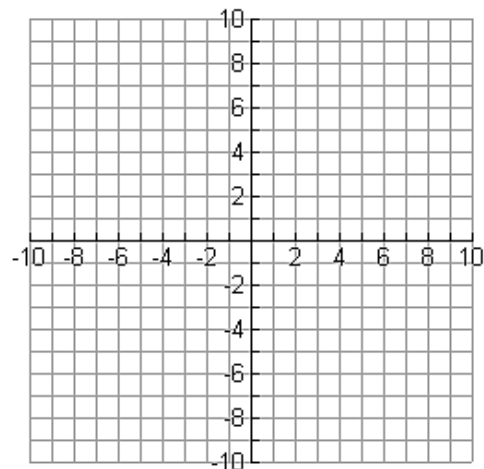
Standard Form: _____

p = _____

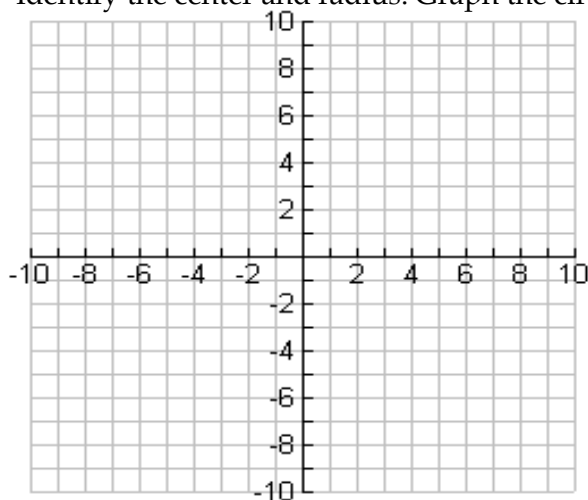
Vertex: _____

Directrix: _____

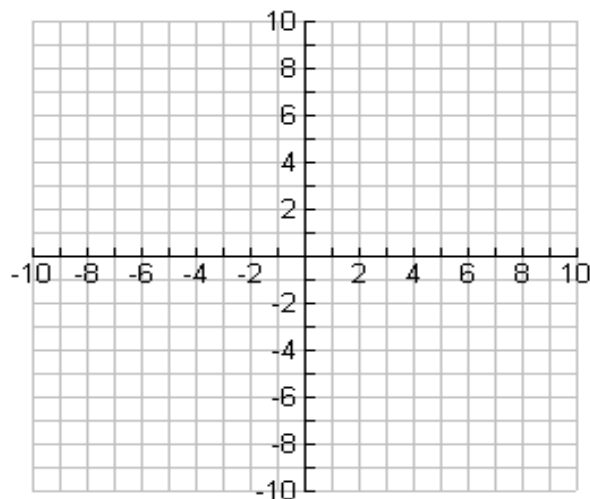
Axis of Symmetry: _____



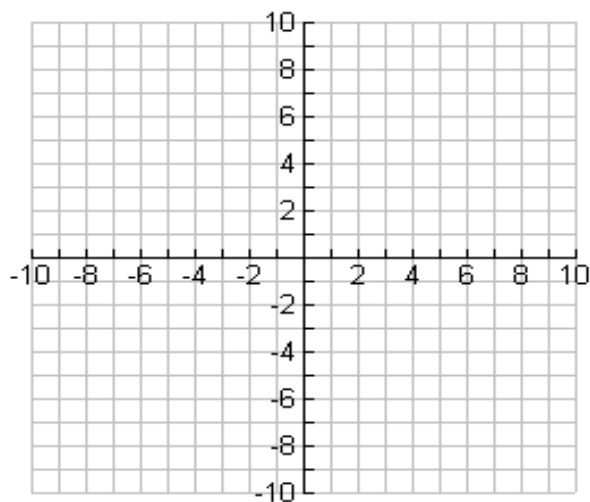
4. Use the equation $(x + 4)^2 + (y - 1)^2 = 4$ and Identify the center and radius. Graph the circle.



5. Write the equation of a circle with center $(0, 5)$ and radius $=\sqrt{15}$. Graph the circle.



6. Given a circle with center $(4,4)$, draw a circle that is tangent to $x = -2$, then write the equation of the circle.



7. Put the equation of the circle into standard form. Identify the center and radius.
 $x^2 + y^2 - 10x - 16y + 88 = 0$

8. Find the equation of a circle whose center is at $(5, -2)$ and contains the point $(-3, 1)$.

9. Find the equation of a circle whose diameter has endpoints at $(4, 9)$ and $(20, -11)$.

10. A furniture store advertises free delivery up to a 30-mile radius from the store. Which, if any, of these customers qualifies for free delivery?

Hannah lives 7 miles north and 29 miles east of the store.

Anna lives 16 miles west and 24 miles north of the store.

Nikki lives 28 miles west and 12 miles south of the store.

8.08 Ellipses - Day 1

Date: _____

Ellipse: A conic section where the sum of the distance from 2 fixed points (foci) is a constant.

Figure 1.

Center:

Vertices:

Co-vertices:

Foci:

Eccentricity:

Horizontal Major Axis	Vertical Major Axis
$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ where $a > b$	$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$ where $a > b$
Center: (h, k) Vertices: $(h \pm a, k)$ Co-vertices: $(h, k \pm b)$ Foci: $(h \pm c, k)$ Eccentricity = $\frac{c}{a}$ $a^2 - b^2 = c^2$	Center: (h, k) Vertices: $(h, k \pm a)$ Co-vertices: $(h \pm b, k)$ Foci: $(h, k \pm c)$ Eccentricity = $\frac{c}{a}$ $a^2 - b^2 = c^2$

Examples: Graph the ellipse. State the center, vertices, co-vertices, foci, and eccentricity.

1. $\frac{(x-3)^2}{4} + \frac{(y-1)^2}{1} = 1$

2. $\frac{x^2}{9} + \frac{(y+2)^2}{25} = 1$

Center: _____ Vertices: _____

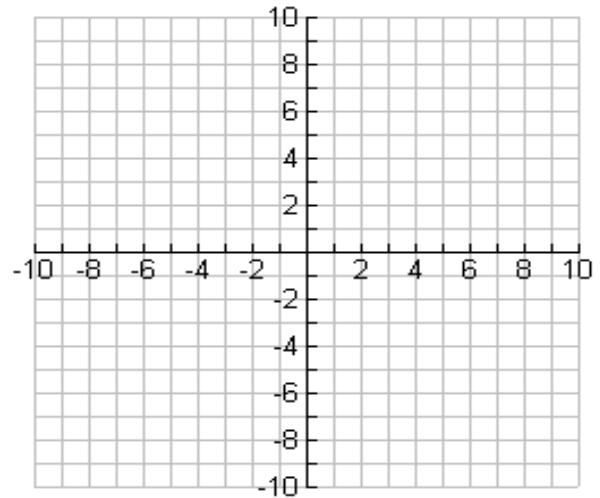
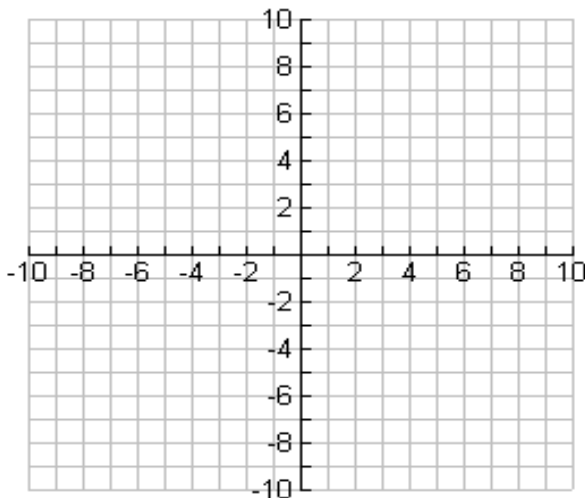
Center: _____ Vertices: _____

Co-Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity= _____

Foci: _____ Eccentricity= _____



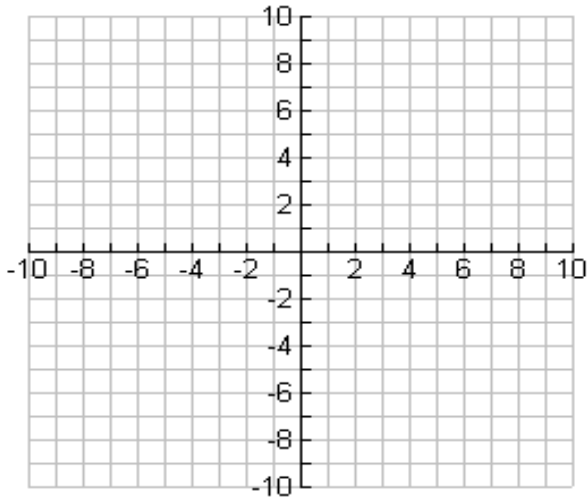
8.08 Practice: Graph the ellipse. State the center, vertices, co-vertices, foci and eccentricity.

1. $\frac{(x-3)^2}{81} + \frac{(y+5)^2}{25} = 1$

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity= _____

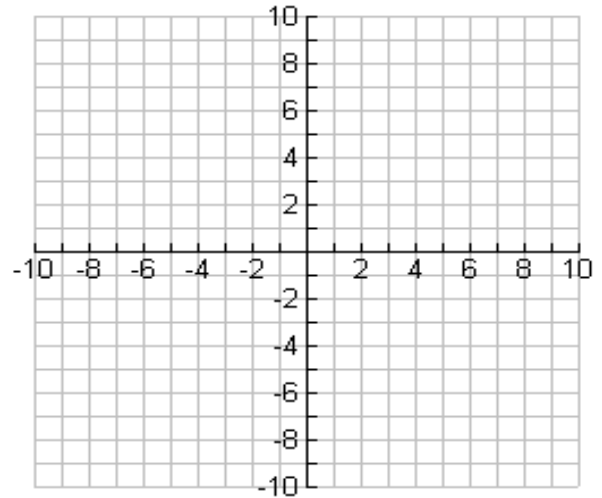


2. $\frac{(x+2)^2}{64} + \frac{(y-6)^2}{1} = 1$

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity= _____

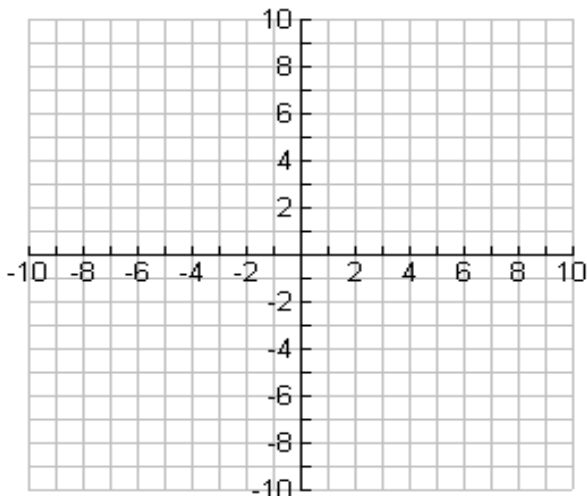


3. $\frac{x^2}{9} + \frac{y^2}{64} = 1$

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity= _____

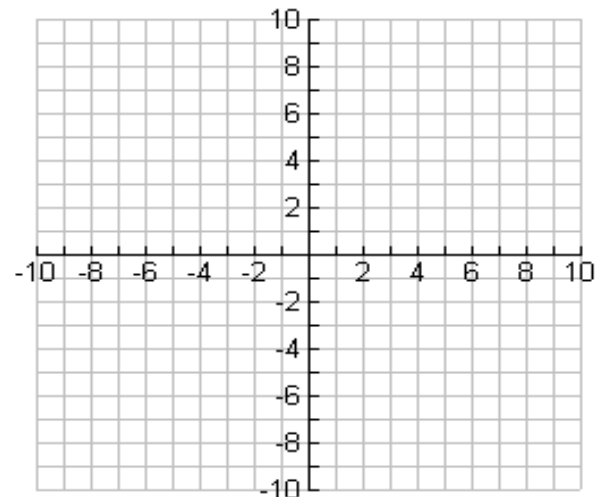


4. $\frac{(x+2)^2}{16} + \frac{(y+3)^2}{36} = 1$

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity= _____



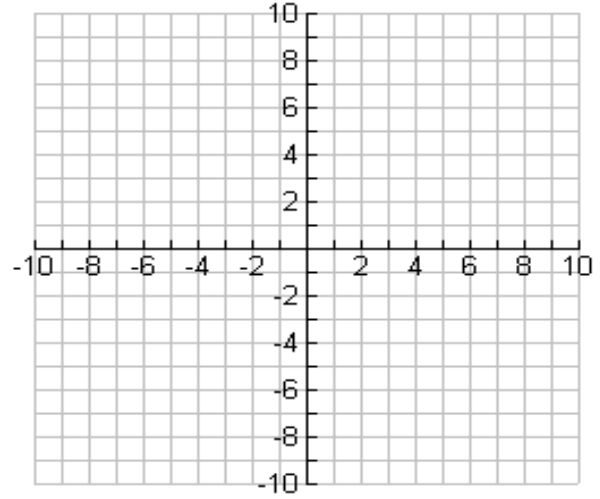
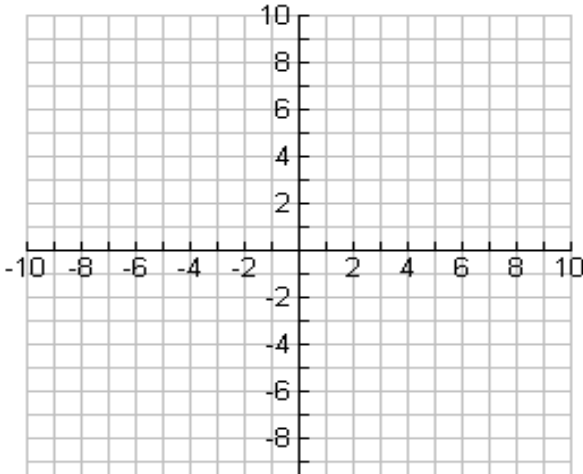
8.09 Ellipses - Day 2

Date: _____

Review: For each ellipse, identify the coordinates of the center, the vertices, and co-vertices. Then graph.

1. $\frac{(x+6)^2}{9} + \frac{(y-4)^2}{25} = 1$

2. $\frac{(x-1)^2}{81} + \frac{y^2}{64} = 1$



How would you identify the characteristics of the ellipse if the equation is not in standard form?

Write the standard form of the equation of each ellipse and then graph the equation. List the coordinates of the center, foci, and the major and minor axis vertices. State the eccentricity of the ellipse.

3. $3x^2 + y^2 + 18x - 2y + 4 = 0$

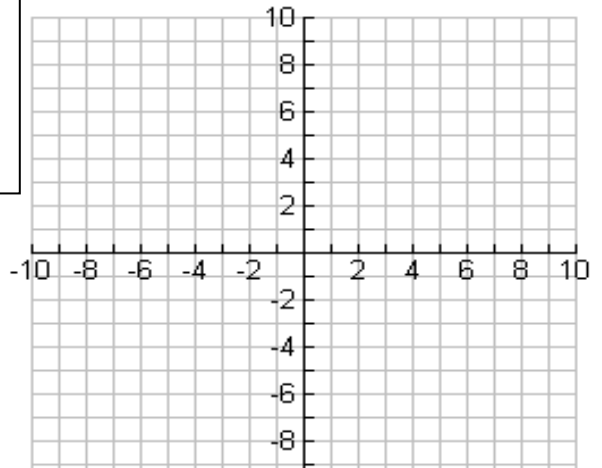
$a =$ _____
$b =$ _____
$c =$ _____

Standard Form: _____

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity = _____



8.09 Practice

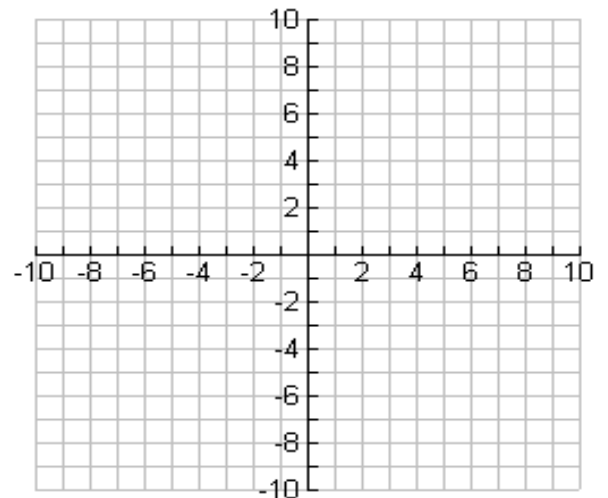
1. $4x^2 + 56x + 9y^2 + 108y = -484$

$a =$ _____
$b =$ _____
$c =$ _____

Standard Form: _____

Center: _____ Vertices: _____

Co-Vertices: _____



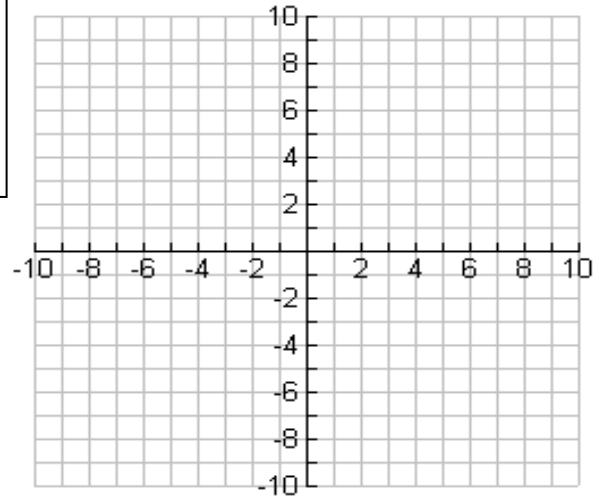
Foci: _____ Eccentricity = _____

2. $49x^2 + 16y^2 + 160y - 384 = 0$

$a =$ _____

$b =$ _____

$c =$ _____



Standard Form: _____

Center: _____ Vertices: _____

Co-Vertices: _____

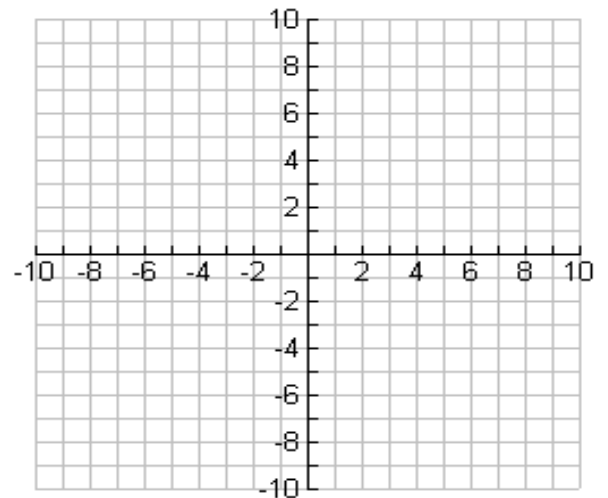
Foci: _____ Eccentricity = _____

3. $2x^2 + 18y^2 + 8x + 108y + 99 = 1$

$a =$ _____

$b =$ _____

$c =$ _____



Standard Form: _____

Center: _____ Vertices: _____

Co-Vertices: _____

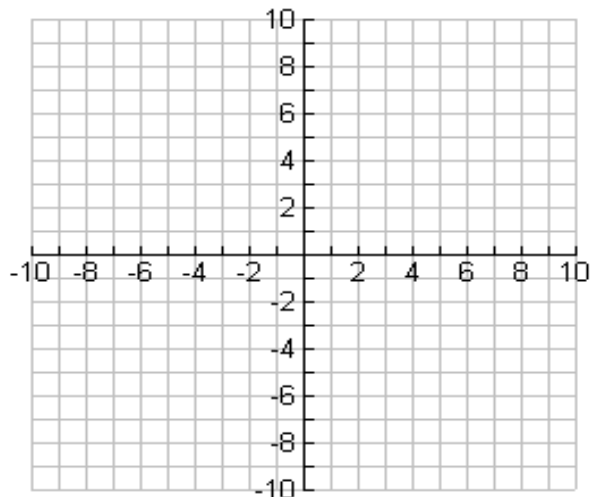
Foci: _____ Eccentricity = _____

4. $18y^2 + 12x^2 - 144y - 48x = -120$

$a =$ _____

$b =$ _____

$c =$ _____



Standard Form: _____

Center: _____ Vertices: _____

Co-Vertices: _____

Foci: _____ Eccentricity = _____

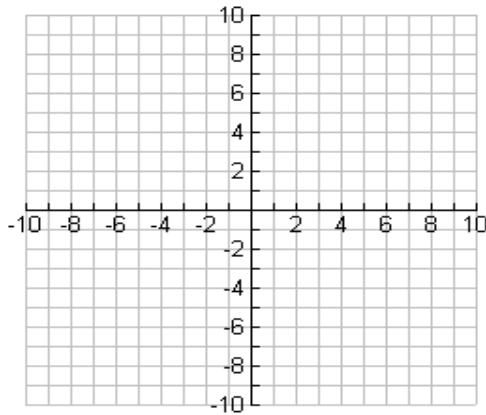
8.10 Ellipses - Day 3

Date: _____

Write the equation of the ellipse in standard form that meets each set of conditions. Calculate a , b , and c . Graph, then list the coordinates of the center, foci, vertices, and co-vertices.

1. The center is at $(-3, -1)$, the length of the horizontal semi-major axis is 7 units, and the length of the semi-minor axis is 5 units.

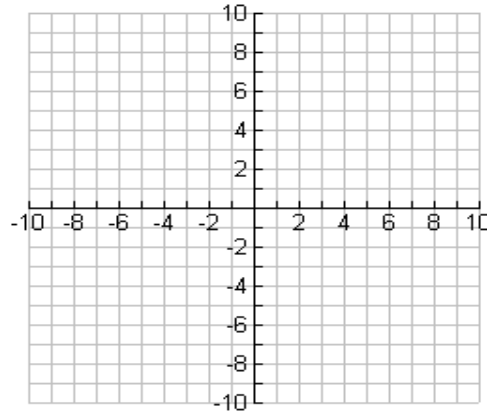
2. The foci are at $(-2, 0)$ and $(2, 0)$ and $a = 7$.



$a =$ _____

$b =$ _____

$c =$ _____



$a =$ _____

$b =$ _____

$c =$ _____

Standard Form: _____

Standard Form: _____

Vertices: _____ Co-Vertices: _____

Vertices: _____ Co-Vertices: _____

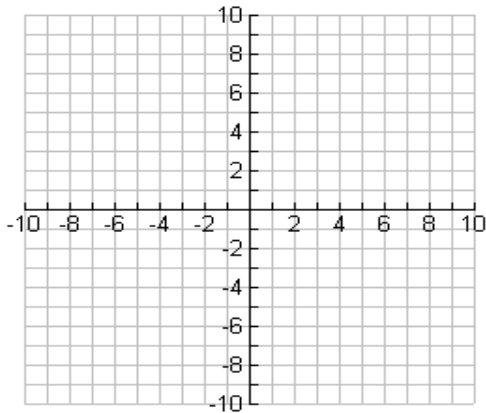
Foci: _____ Eccentricity: _____

Center: _____ Eccentricity: _____

8.09 Practice

1. The length of the semi-major axis is twice the length of the horizontal semi-minor axis, the center is at the origin, and $b = 3$.

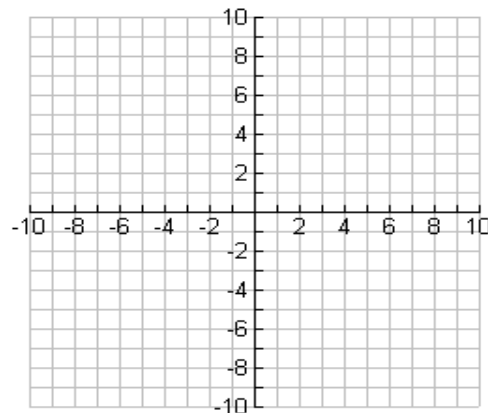
2. The semi-major axis has a length of 6 units and the foci are at $(-1, 1)$ and $(-1, -5)$.



$a =$ _____

$b =$ _____

$c =$ _____



$a =$ _____

$b =$ _____

$c =$ _____

Standard Form: _____

Standard Form: _____

Vertices: _____ Co-Vertices: _____

Vertices: _____ Co-Vertices: _____

Foci: _____ Eccentricity: _____

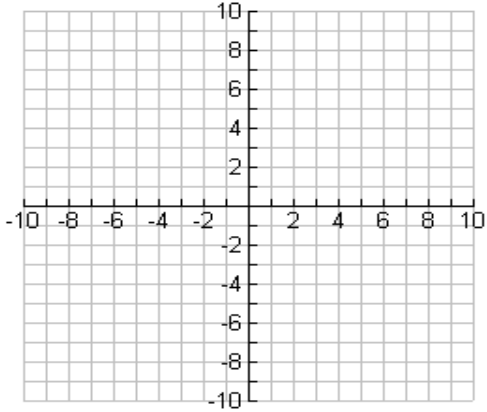
Center: _____ Eccentricity: _____

3. The endpoints of the major axis are $(-11, 5)$ and $(7, 5)$. The endpoints of the minor axis are at $(-2, 9)$ and $(-2, 1)$.

$a =$ _____

$b =$ _____

$c =$ _____

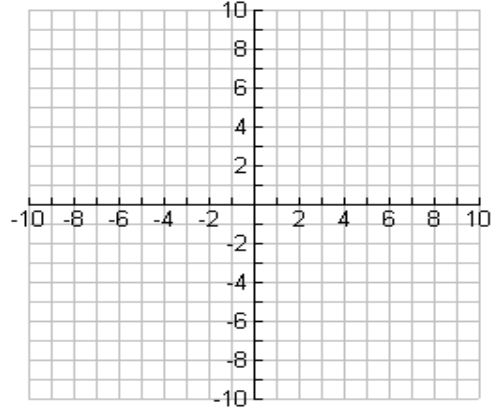


4. The ellipse is tangent to the x-axis and the y-axis and the center is $(4, -7)$.

$a =$ _____

$b =$ _____

$c =$ _____



Standard Form: _____

Center: _____ Foci: _____

Eccentricity: _____

Standard Form: _____

Vertices: _____ Co-Vertices: _____

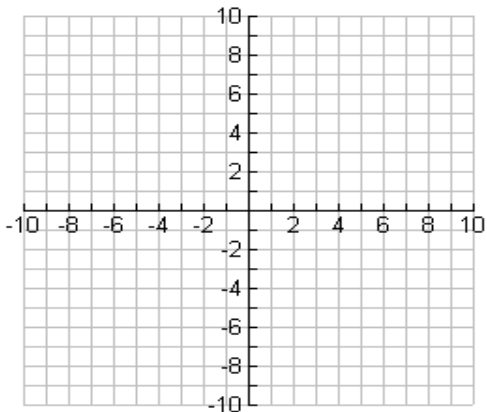
Foci: _____ Eccentricity: _____

5. The vertical major axis is 20 units, the center is at $(3, 0)$, and the eccentricity equals $\frac{3}{5}$.

$a =$ _____

$b =$ _____

$c =$ _____

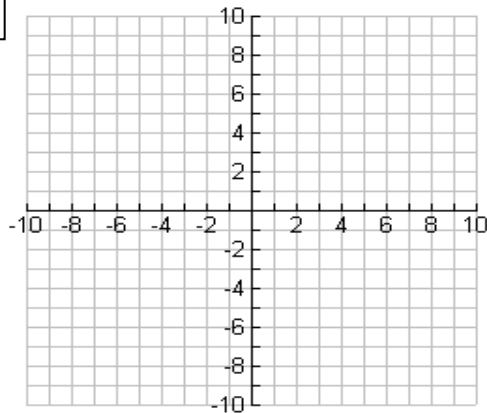


6. The foci are at $(-3, 2)$ and $(5, 2)$ and the eccentricity equals 0.5

$a =$ _____

$b =$ _____

$c =$ _____



Standard Form: _____

Vertices: _____ Co-Vertices: _____

Foci: _____

Standard Form: _____

Vertices: _____ Co-Vertices: _____

Center: _____

8.11 Hyperbolas - Day 1

Date: _____

Hyperbola: a conic section where the difference of the distance from 2 fixed points (foci) is a constant.

Figure 1:

Center: _____

Vertices: _____

Foci: _____

Asymptotes: _____

Horizontal Transverse Axis	Vertical Transverse Axis
$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$
Center: (h, k) Vertices: $(h \pm a, k)$ Foci: $(h \pm c, k)$ Eccentricity = $\frac{c}{a}$ $a^2 + b^2 = c^2$ Asymptotes: $y - k = \pm \frac{b}{a}(x - h)$	Center: (h, k) Vertices: $(h, k \pm a)$ Foci: $(h, k \pm c)$ Eccentricity = $\frac{c}{a}$ $a^2 + b^2 = c^2$ Asymptotes: $y - k = \pm \frac{a}{b}(x - h)$

Examples: Graph the Hyperbola. State the center, vertices, foci, eccentricity, and asymptotes.

1.
$$\frac{(x+1)^2}{16} - \frac{(y-1)^2}{9} = 1$$

2.
$$\frac{(y-3)^2}{4} - \frac{(x+5)^2}{25} = 1$$

Center: _____ Eccentricity: _____

Center: _____ Eccentricity: _____

Vertices: _____

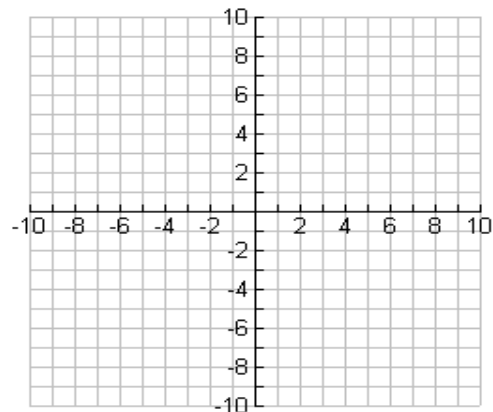
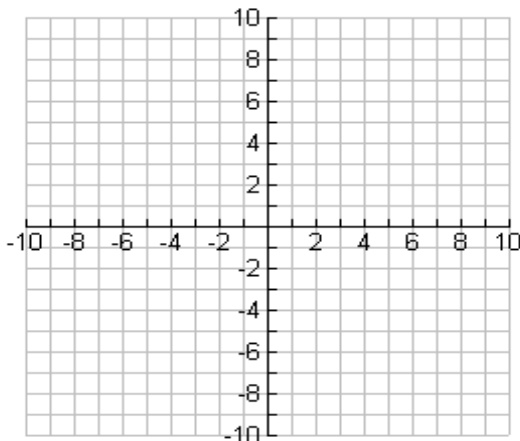
Vertices: _____

Foci: _____

Foci: _____

Asymptotes: _____

Asymptotes: _____



8.11 Practice: Graph the Hyperbola. State the center, vertices, foci, eccentricity, and asymptotes.

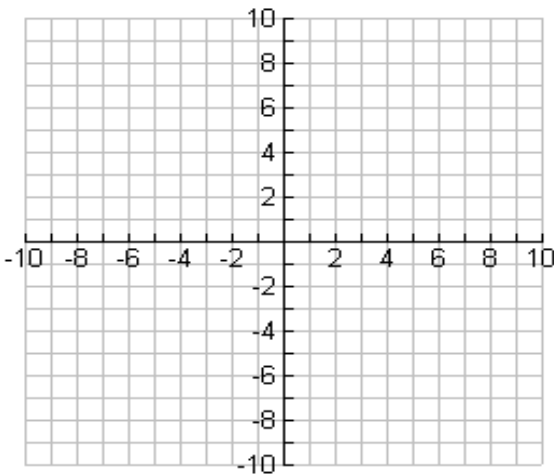
1. $\frac{(x-3)^2}{4} - \frac{(y+2)^2}{36} = 1$

Center: _____ Eccentricity: _____

Vertices: _____

Foci: _____

Asymptotes: _____



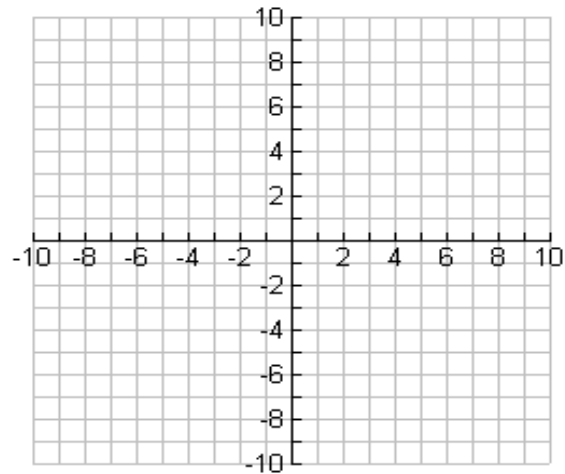
2. $\frac{(y+1)^2}{16} - (x+5)^2 = 1$

Center: _____ Eccentricity: _____

Vertices: _____

Foci: _____

Asymptotes: _____



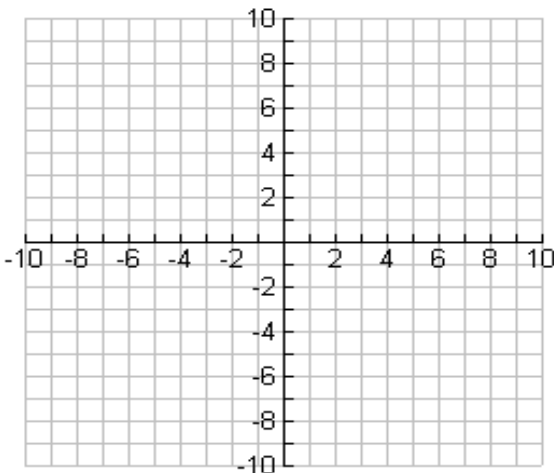
3. $\frac{x^2}{64} - \frac{y^2}{36} = 1$

Center: _____ Eccentricity: _____

Vertices: _____

Foci: _____

Asymptotes: _____



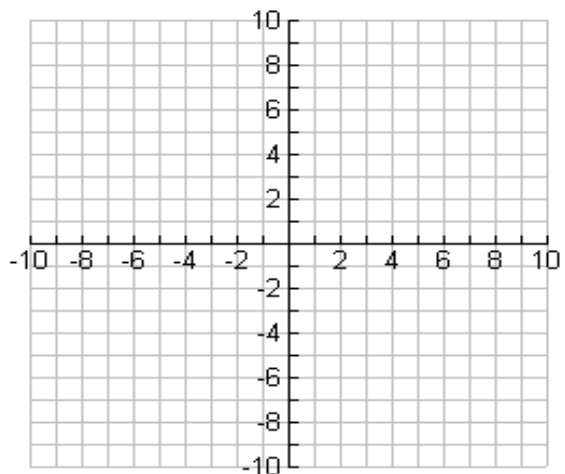
4. $\frac{(y-2)^2}{9} - \frac{(x-4)^2}{9} = 1$

Center: _____ Eccentricity: _____

Vertices: _____

Foci: _____

Asymptotes: _____



8.12 Hyperbolas - Day 2

Date: _____

Write the standard form of the equation of each hyperbola and list the coordinates of the center, vertices, foci and the equation of the asymptotes. Then graph the hyperbola.

3. $x^2 - 4y^2 + 6x - 8y - 11 = 0$

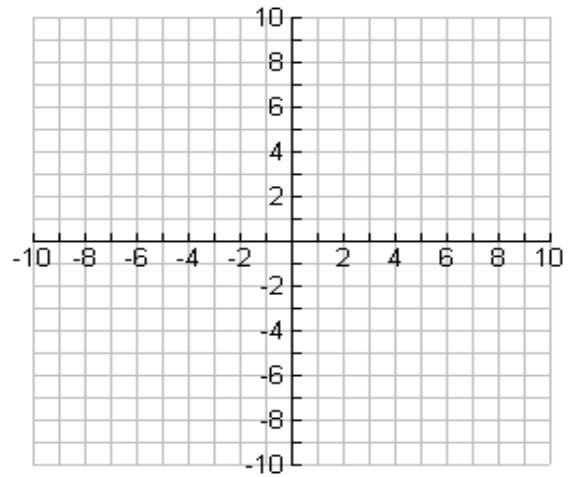
Standard Form: _____

Center: _____

Vertices: _____ Foci: _____

Asymptotes: _____

Eccentricity = _____



4. $-4x^2 + 9y^2 - 90y - 24x + 153 = 0$

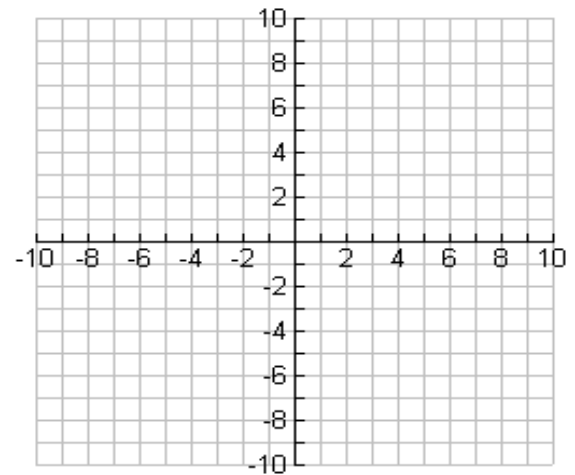
Standard Form: _____

Center: _____

Vertices: _____ Foci: _____

Asymptotes: _____

Eccentricity = _____



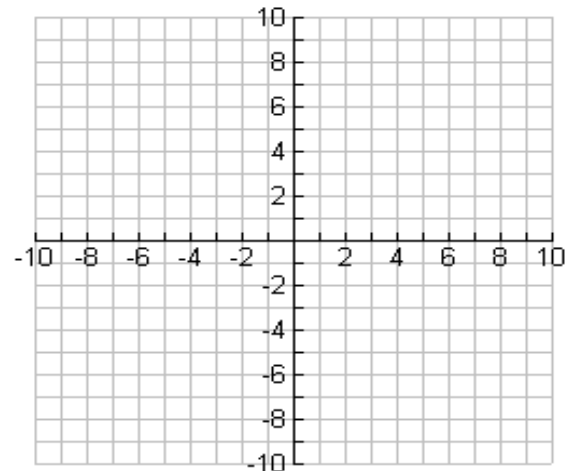
3. $36x^2 - 49y^2 - 72x - 294y - 2169 = 0$

Standard Form: _____

Center: _____

Vertices: _____ Foci: _____

Asymptotes: _____



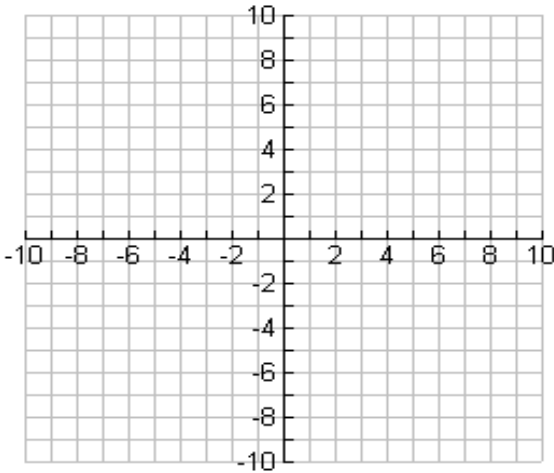
Eccentricity = _____

Write the equation of the hyperbola in standard form that meets each set of conditions. Use the grid if it helps.

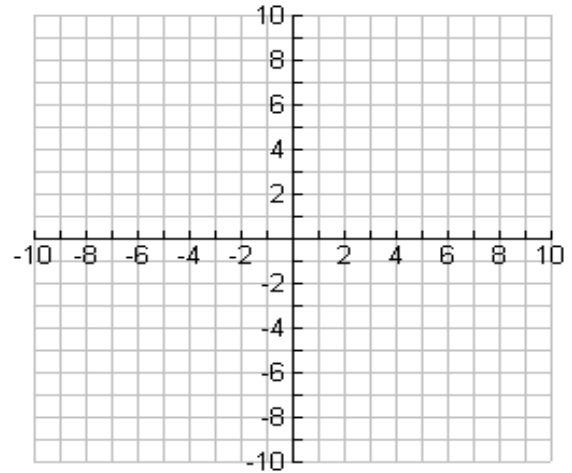
4. The center is at $(4, -2)$, $a = 2$, $b = 3$,
and the transverse axis is vertical.

5. The length of the transverse axis is 6 units
and the foci are at $(3, 2)$ and $(-7, 2)$.

Equation: _____



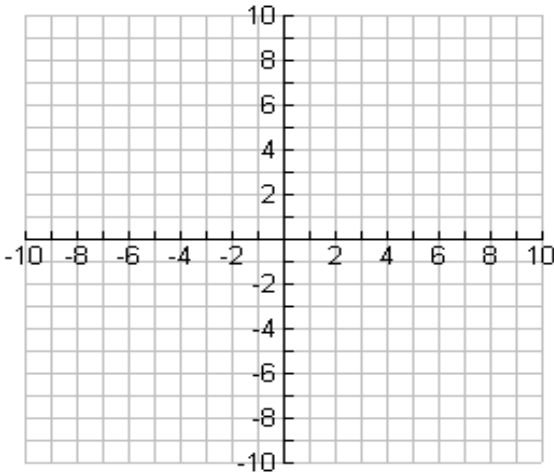
Equation: _____



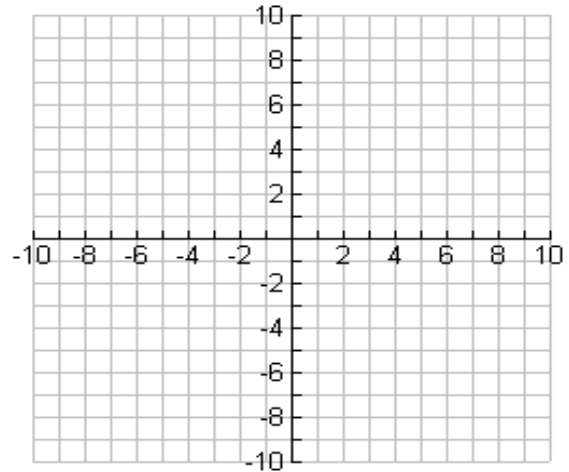
6. The length of the conjugate axis is 8 units
and the vertices are $(-3, 9)$ and $(-3, -5)$

7. The center is at $(0, 1)$, one focus is at $(10, 1)$
and the eccentricity is $\frac{5}{3}$

Equation: _____



Equation: _____



8.13 Ellipses and Hyperbolas Review

Date _____

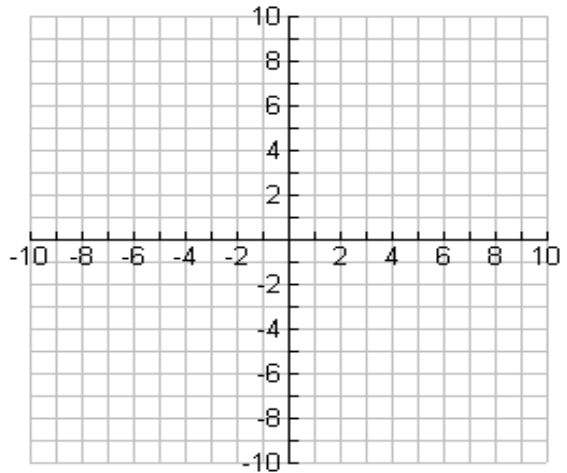
1. Write the equation of the ellipse in standard form. Graph the ellipse and identify requested parts.

$$9x^2 + 16y^2 + 72x - 160y + 400 = 0$$

Center: _____

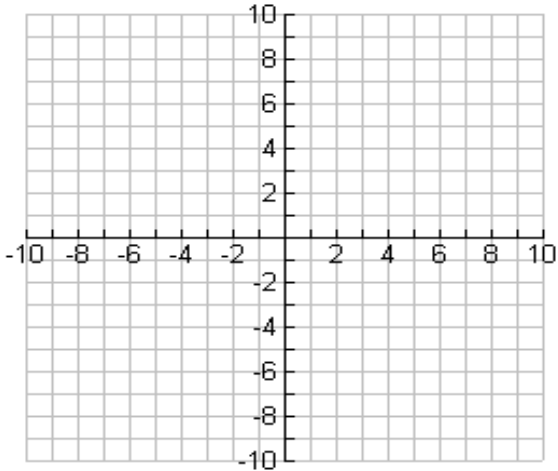
Foci: _____

Eccentricity = _____



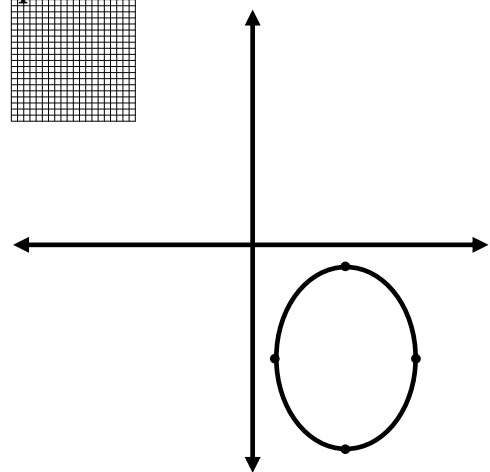
2. Write the equation of the ellipse in standard form which is tangent to the x-axis and the y-axis and the center is (-2, 5) then graph.

Equation: _____



3. Given the graph of the following ellipse, write the standard form of the ellipse equation.

Equation: _____



4. Identify the characteristics of the hyperbola. Then, graph the hyperbola and label all parts.

$$\frac{y^2}{4} - \frac{(x-2)^2}{49} = 1$$

a = _____ b = _____ c = _____

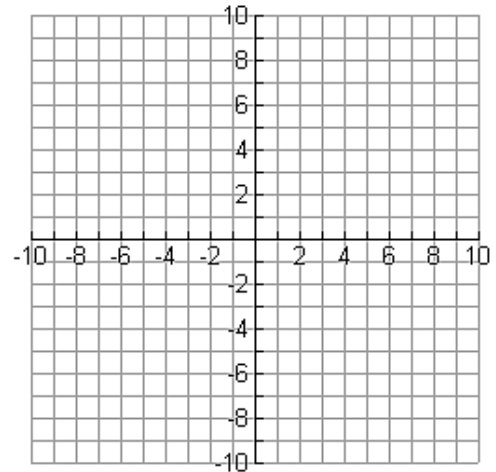
Center: _____

Vertices: _____

Foci: _____

Asymptotes: _____

Eccentricity: _____



5. Write the equation of the hyperbola $16x^2 - 9y^2 + 32x - 54y - 209 = 0$ in standard form. Identify the center, vertices, foci, asymptotes, and eccentricity. Graph the hyperbola and label all parts.

Standard Form: _____

a = _____ b = _____ c = _____

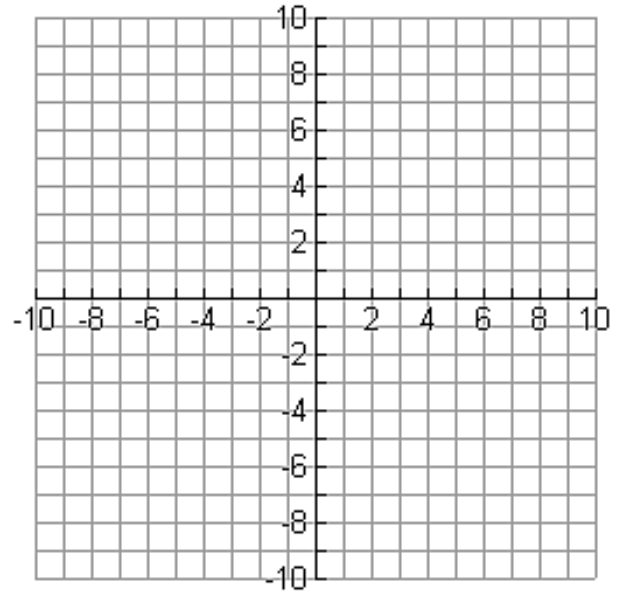
Center: _____

Vertices: _____

Foci: _____

Asymptotes: _____

Eccentricity: _____



6. Write the standard form of the equation for the hyperbola whose transverse axis has endpoints $P(-2, 1)$ and $Q(-8, 1)$ and whose conjugate axis is a length of 6. Identify its characteristics. Then, graph the hyperbola and label all parts.

$a =$ _____ $b =$ _____ $c =$ _____

Standard Form: _____

Center: _____

Vertices: _____

Foci: _____

Asymptotes: _____

Eccentricity: _____

