

Unit 7 Review #1 - Conics

1. Write the equation of the hyperbola with center $(0, 0)$, vertical transverse axis of length 20 and conjugate axis length of 20.

$$\frac{y^2}{100} - \frac{x^2}{100} = 1$$

2. Write the equation for a parabola with vertex $(-4, -5)$ and focus $(-4, 2)$.

$$(x+4)^2 = 28(y+5)$$

3. Write the equation for a hyperbola with center at the origin, vertex at $(15, 0)$ and focus at $(17, 0)$.

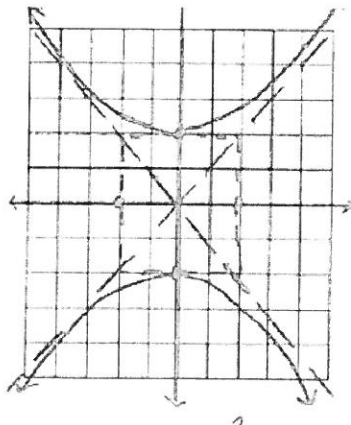
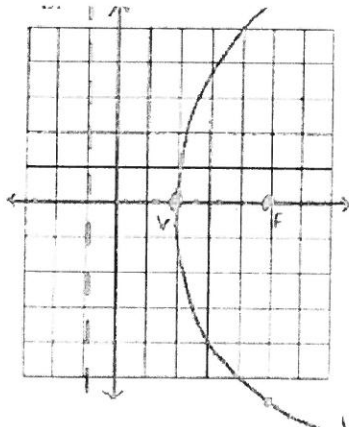
$$\frac{x^2}{225} - \frac{y^2}{64} = 1$$

4. Write the equation for a parabola with a focus at $(-2, 0)$ and a directrix at $x = 2$.

$$y^2 = -8x$$

5. Write an equation for each of the following conic sections.

$$y^2 = 12(x-2)$$



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

6. Graph each of the following equations.

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

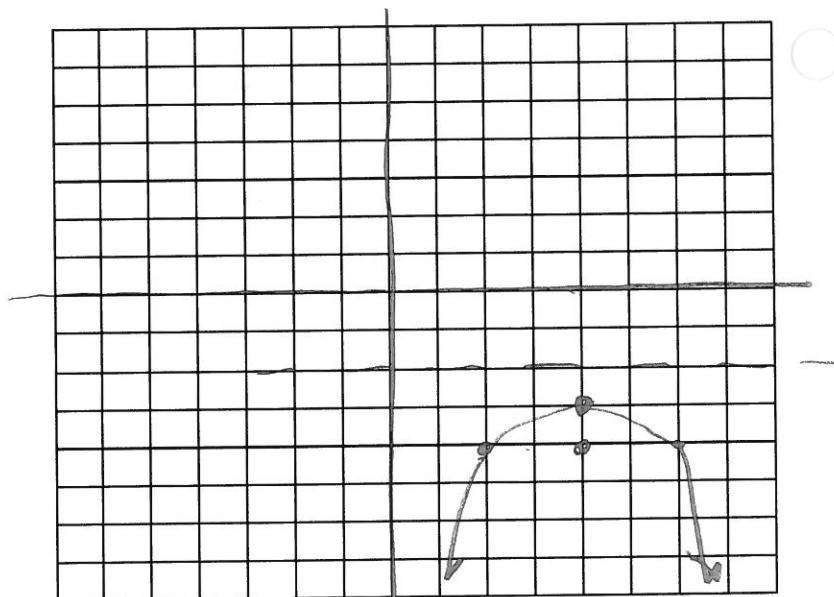
Vertex: $(4, -3)$

Opens: down

Focus: $(4, -4)$

Focal Width: 4

Equation of Directrix: $y = -2$



b. $\frac{y^2}{4} - \frac{x^2}{25} = 1$

Center: $(0, 0)$

Transverse Axis: 4

Conjugate Axis: 10

Calculate c:

$$c^2 = 29$$

$$c = \sqrt{29} = 5.4$$

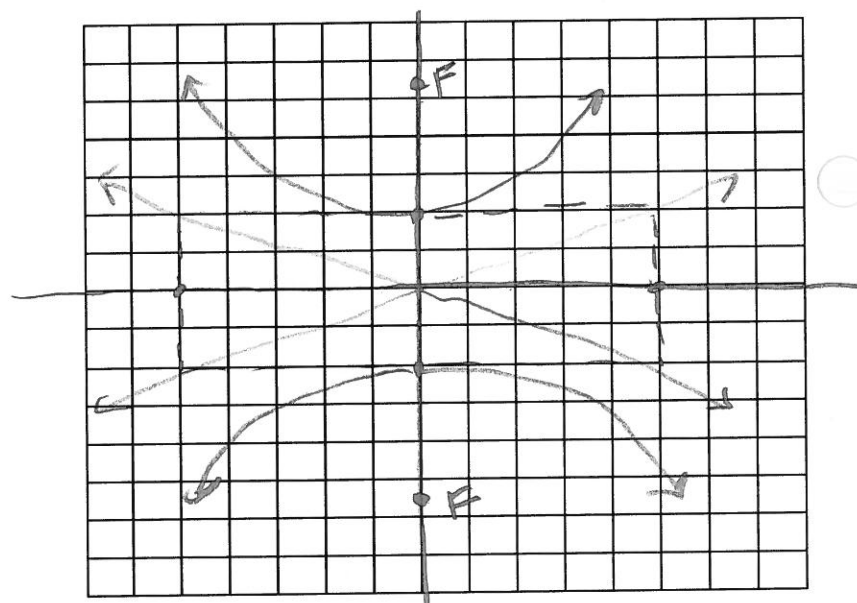
Slopes of Asymptotes:

$$\pm \frac{2}{5}$$

Vertices: $(0, 2)$ $(0, -2)$

Covertices: $(5, 0)$ $(-5, 0)$

Foci: $(0, 5.4)$ $(0, -5.4)$



$$c. \frac{(x+5)^2}{9} + \frac{(y-2)^2}{25} = 1$$

Orientation: vertical

Center: $(-5, 2)$

Major Axis Length: 10

Minor Axis Length: 6

Calculate c:

$$c^2 = 25 - 9 = 16$$

$$c = 4$$

Vertices:

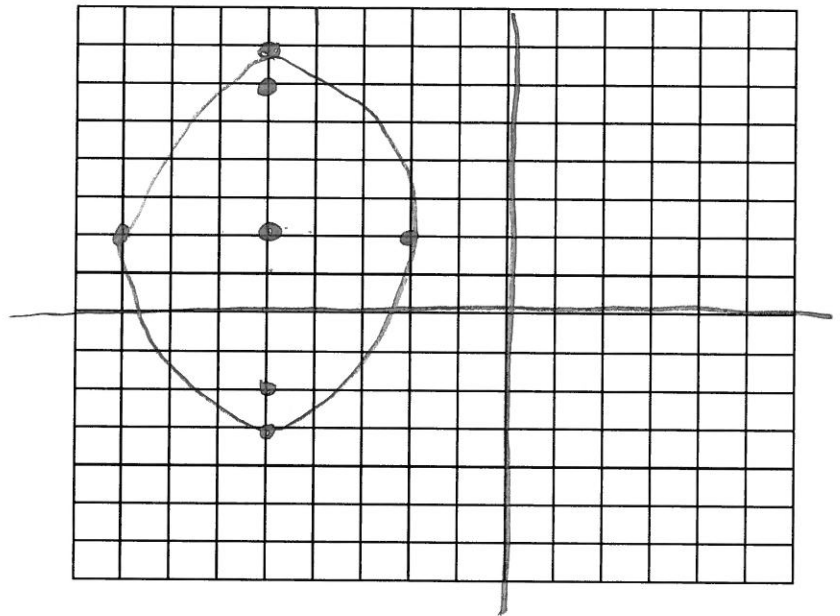
$(-5, 7)$ $(-5, -3)$

Covertices:

$(-8, 2)$ $(-2, 2)$

Foci:

$(-5, 6)$ $(-5, -2)$



$$d. x^2 + 6x + y^2 - 2y + 6 = 0$$

Complete the Square!

$$x^2 + 6x + 9 + y^2 - 2y + 1 = -6 + 9 + 1$$

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

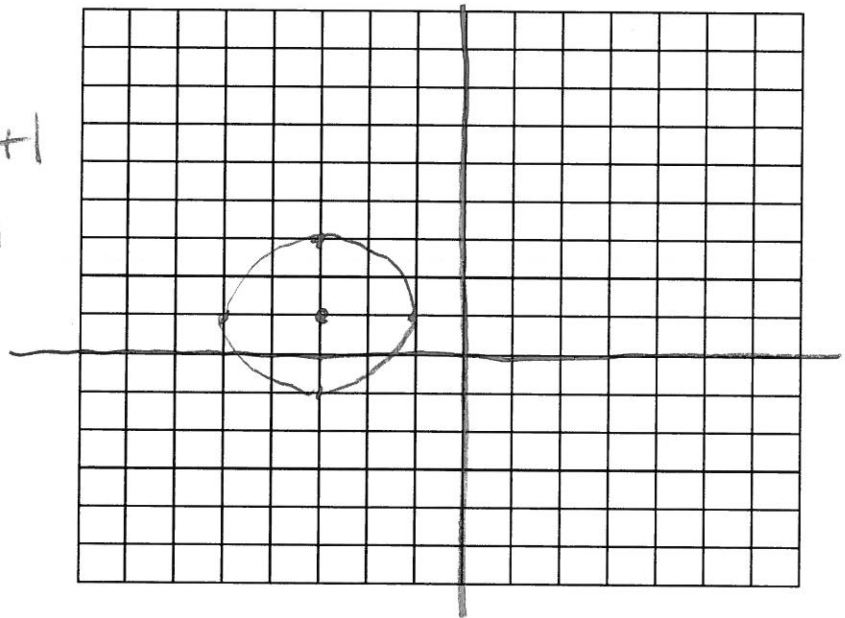
$$(x+3)^2 + (y-1)^2 = 4$$

Center:

$(-3, 1)$

Radius:

2



e. $x^2 - 4x + y^2 + 2y - 11 = 0$

Complete the Square!

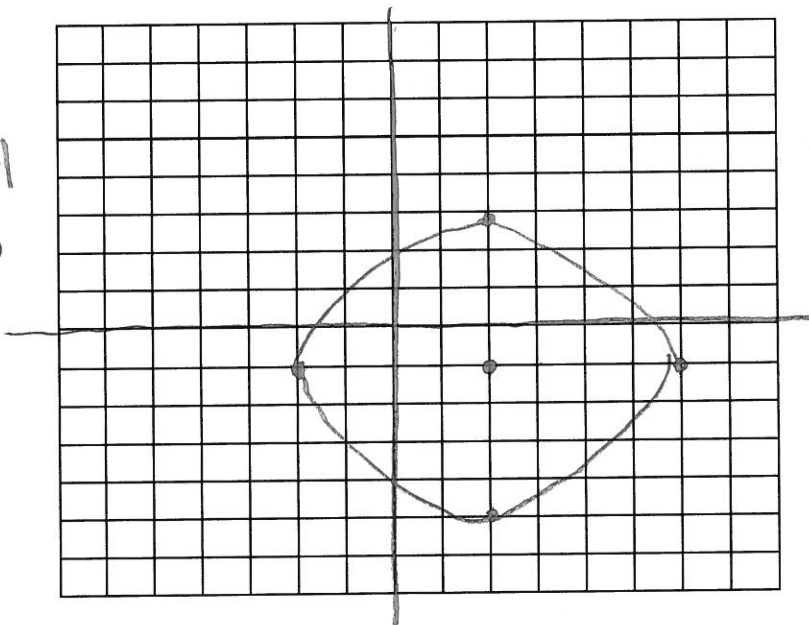
$$x^2 - 4x + 4 + y^2 + 2y + 1 = 11 + 4 + 1$$

$$(x-2)(x-2) + (y+1)(y+1) = 16$$

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

Center: $(2, -1)$

Radius: 4



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

Orientation: horizontal

Center: $(0, 3)$

Major Axis Length: 8

Minor Axis Length: 4

Calculate c:

$$c^2 = 16 - 4 = 12$$

$$c = \sqrt{12} = 3.5$$

Vertices:

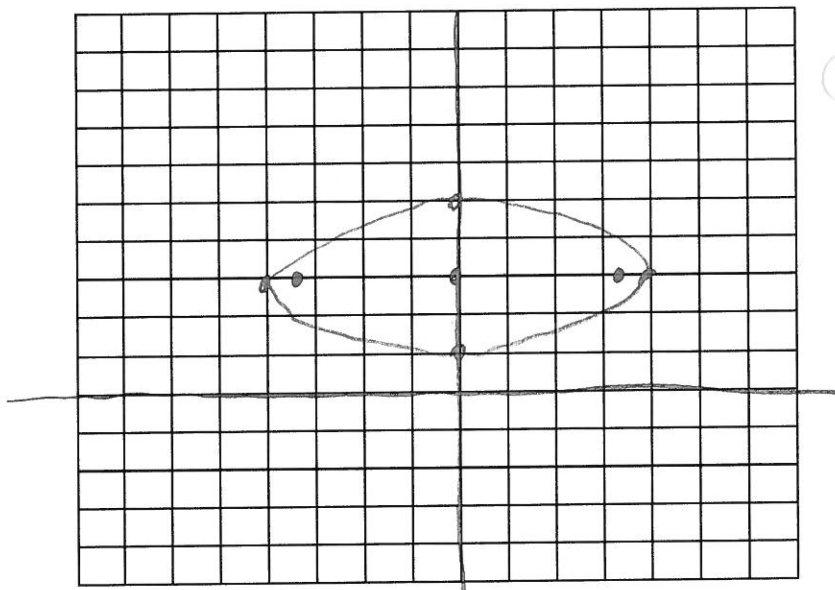
$(4, 3)$ $(-4, 3)$

Covertices:

$(0, 5)$ $(0, 1)$

Foci:

$(\pm 3.5, 3)$



7. Write the equation for the following circle described.

a. Center is $(4, -2)$ and radius is $\sqrt{6}$.

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

b. Center at $(7, -3)$ and passes through $(2, 4)$.

$$(x-7)^2 + (y+3)^2 = 74$$

c. The points $(0, -5)$ and $(2, -7)$ are endpoints of the diameter.

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

8. Write the equation for an ellipse with center $(4, 1)$ vertical major axis length of 8 and minor axis length of 2.

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

9. Write the equation for an ellipse with center $(-1, 8)$, horizontal major axis length 14 and minor axis length 12.

$$\frac{(x+1)^2}{49} + \frac{(y-8)^2}{36} = 1$$

