1. Find the required information and graph the conic section:

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

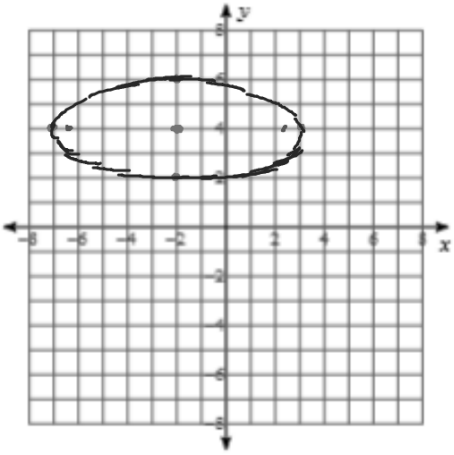
$a = 5$

$b = 2$

$c^2 = a^2 - b^2$

$= 25 - 4$

$c^2 = 21 \quad c = \sqrt{21}$



Classify the conic section: Ellipse **Center:** $(-2, 4)$

Vertices: $(3,4)$ $(-7,4)$ **Foci:** $(-2 \pm \sqrt{21}, 4)$

co-vertices

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

2. Find the required information and graph the conic section: $y = 2x^2 - 8x + 4$

$(x-h)^2 = 4p(y-k)$

$y - 4 = 2x^2 - 8x$

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

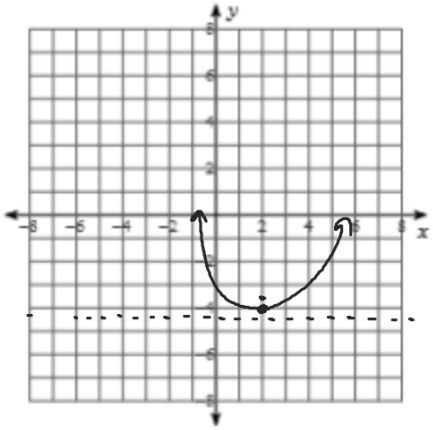
$2(x^2 - 4x + 4)$

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

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

$\frac{4p}{4} = \frac{\frac{1}{2}}{4}$ $\quad \frac{\frac{1}{2}}{4}$ $\quad \frac{1}{2} \cdot \frac{1}{4}$

$p = \frac{1}{8}$



Classify the conic section: Parabola **Vertex:** $(2, -4)$

Focus: $(2, -3\frac{7}{8})$ **Directrix:** $y = -4\frac{1}{8}$

3. Find the required information. Then graph the conic section.

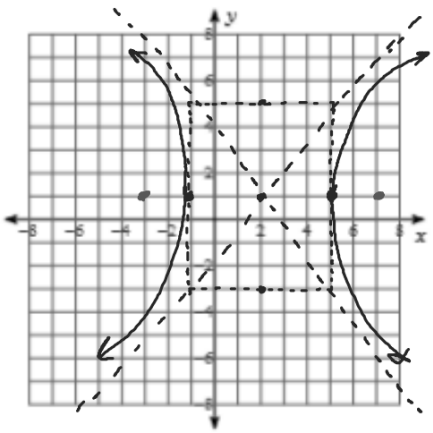
$$\frac{(x-2)^2}{9} - \frac{(y-1)^2}{16} = 1$$

$a = 3$

$b = 4$

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

$c = 5$



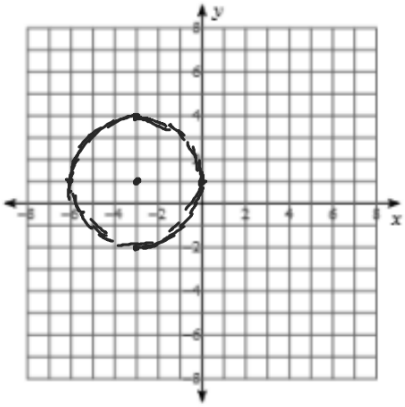
Classify the conic section: Hyperbola **Foci:** (7,1) (-3,1)

Vertices: (5,1) (-1,1) **Asymptotes:** _____ **Center:** (2,1)

co-vertices
(2,5) (2,-3)

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

5. Find the required information and graph: $(x+3)^2+(y-1)^2=9$



Classify the conic section: Circle **Center:** (-3,1) **Radius:** 3

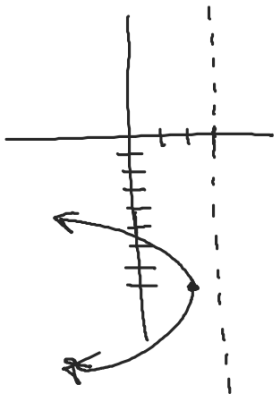
Write the equation of the parabola in vertex form that has a the following information:
Vertex: (2, -8) **Directrix:** $x = 3$

$(y-k)^2 = 4p(x-h)$

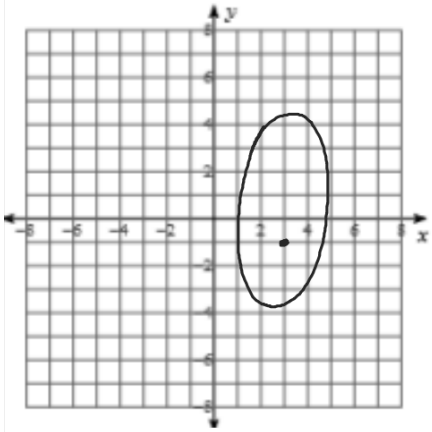
$(y+8)^2 = -4(x-2)$

$p = -1$

$4p = -4$



. Find the required information and graph: $7x^2 + 3y^2 - 42x + 6y - 39 = 0$



$7x^2 - 42x \quad + 3y^2 + 6y \quad = 39$

$7(x^2 - 6x + 9) + 3(y^2 + 2y + 1) = 39 + 63 + 3$

$\frac{7(x-3)^2}{105} + \frac{3(y+1)^2}{105} = \frac{105}{105}$

$\frac{(x-3)^2}{15} + \frac{(y+1)^2}{35} = 1$

$a = \sqrt{35}$

$b = \sqrt{15}$

$c = \sqrt{20}$

Classify the conic section: Ellipse **Center:** $(3, -1)$

Vertices: $(3, -1 \pm \sqrt{35})$ **Foci:** $(3, -1 \pm \sqrt{20})$

Co-vertices $(3 \pm \sqrt{15}, -1)$

8. Find the required information and graph the conic section:

$$4y^2 + x - 32y + 68 = 0$$

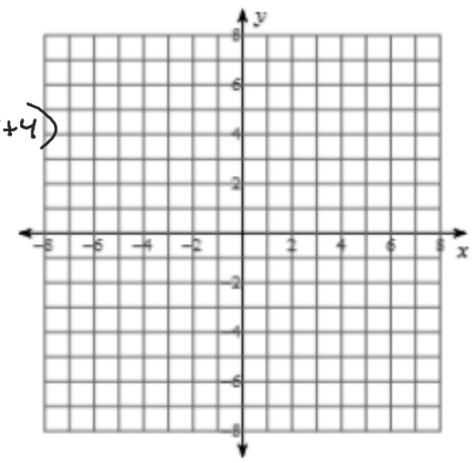
$4y^2 - 32y = -x - 68$

$4(y^2 - 8y + 16) = -x - 68 + 64$

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

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

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



Classify the conic section: Parabola **Vertex:** $(-4, 4)$

Focus: $(-4\frac{1}{16}, 4)$ **Directrix:** $y = -3\frac{15}{16}$

$4p = -\frac{1}{4}$

$p = \frac{-1}{16}$

$-4 + \frac{1}{16}$

$-3\frac{16}{16} + \frac{1}{16}$

10. Find the required information and graph:

$$2x^2 + 2y^2 + 2x + 14y + 17 = 0$$

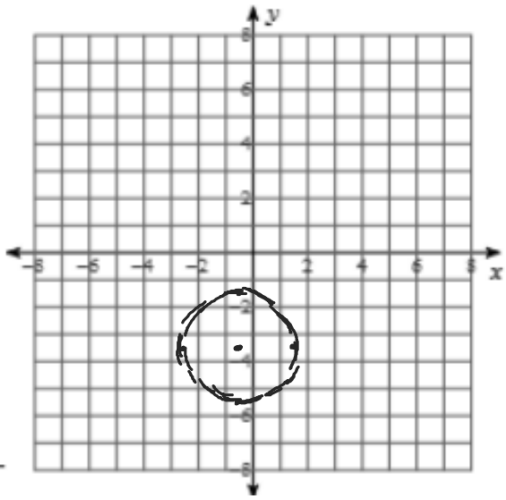
$$2\left(x^2 + x + \tfrac{1}{4}\right) + 2\left(y^2 + 7y + \tfrac{49}{4}\right) = -17 + \tfrac{1}{2} + \tfrac{49}{2}$$

$$-17 + \tfrac{50}{2}$$

$$-17 + 25$$

$$2\left(x + \tfrac{1}{2}\right)^2 + 2\left(y + \tfrac{7}{2}\right)^2 = 8$$

$$\left(x + \tfrac{1}{2}\right)^2 + \left(y + \tfrac{7}{2}\right)^2 = 4$$

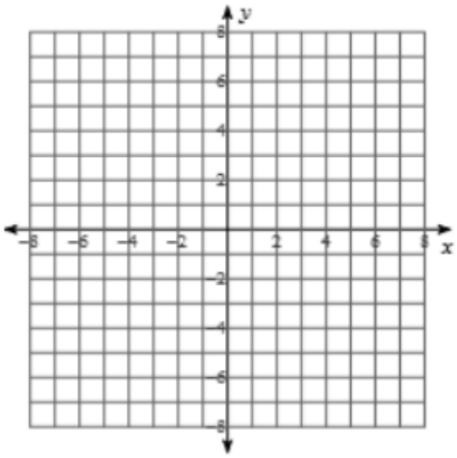


Classify the conic section: Circle **Center:** $\left(-\frac{1}{2}, -\frac{7}{2}\right)$

$(-.5, -3.5)$

11. Find the required information. Then graph the conic section.

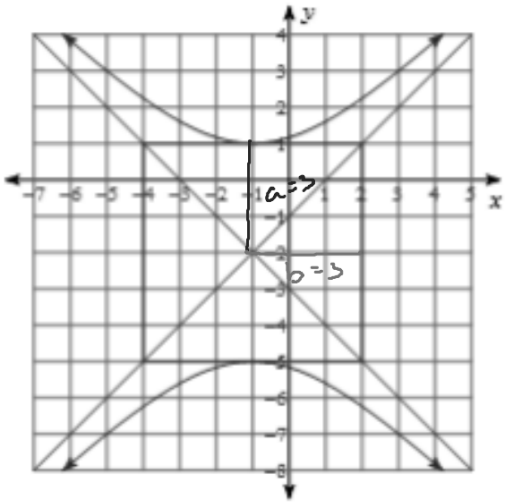
$$-9x^2 + 4y^2 - 18x + 16y - 29 = 0$$



Classify the conic section: _____ **Foci:** _____

Vertices: _____ **Asymptotes:** _____ **Center:** _____

Write the equation of the hyperbola shown.



Center $(-1,-2)$

$a = 3$

$b = 3$

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

13. Write the equation of the hyperbola in vertex form that has a the following information:

Vertices: (9, 12) and (9, -18)
Foci: $\left(9, -3 + \sqrt{229}\right)$ *and* $(9, -3 - \sqrt{229})$

Write the equation of the circle in standard form given the endpoints of the diameter: (-12, 10) and (-18, 12).

Center (midpt

$$\left(\frac{-12+(-18)}{2}, \frac{10+12}{2}\right)$$

$$(-15, 11)$$

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

$$\sqrt{(-15+12)^2+(11-10)^2}$$

$$\sqrt{(-3)^2+(1)^2}$$

$$\sqrt{9+1}$$

$$\sqrt{10}$$

$$(x+15)^2+(y-11)^2=10$$

Use the information provided to write the equation of the ellipse in standard form.

Center: (-9, -5) **Vertex:** (-9, -16) **Focus:** $(-9, -5 + 6\sqrt{2})$

t III: Find the equation for 16-20: { Hint: Graph to help find the equation }

Center (7, 3) Vertex (7, 9) Focus (7, -2)

Focus (12, 8) Directrix: $x = -2$