Math 126 Unit 8 Review

Name Key

#1 – 4, write the standard form of the equation of each circle described. Then graph #4.

1. Center at (-2, 2) and radius $\sqrt{2}$

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

2. Center at (0, -4) and tangent to the x-axis

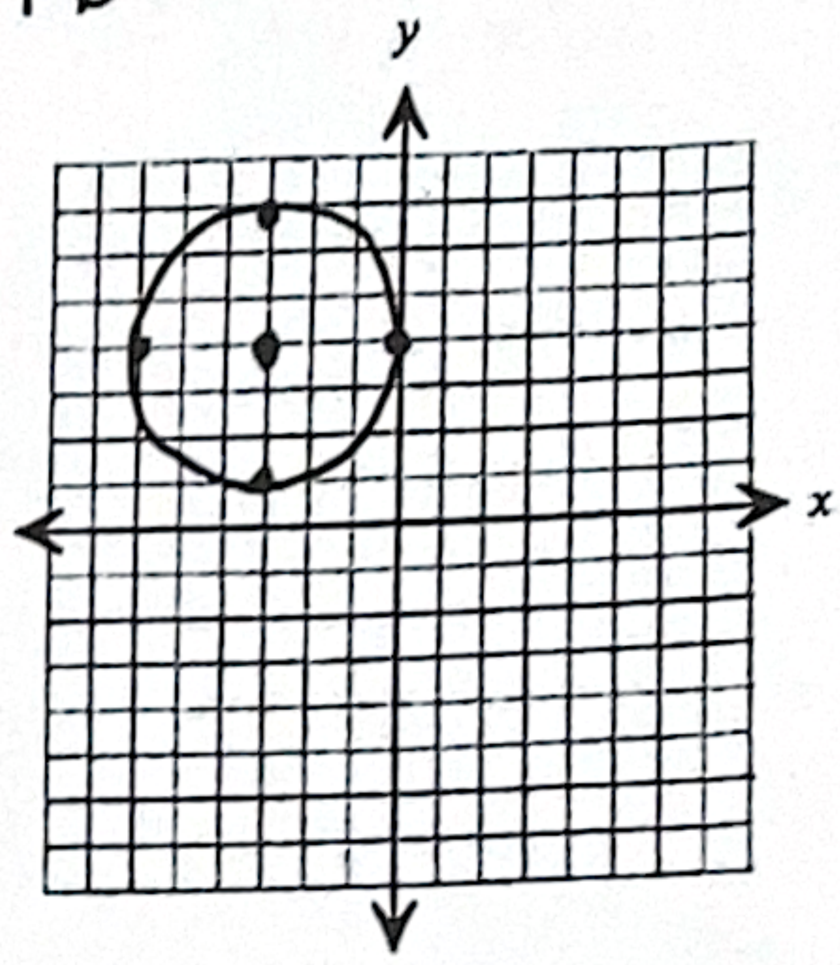
$x^2+(y+4)^2=16$

3. $y^2+2x+x^2=24y-120$

$(x+1)^2+(y-12)^2=25$

4. $x^2+y^2+6x-8y+16=0$

$(x+3)^2+(y-4)^2=9$



#5 – 6, identify the center, vertices, and foci of each ellipse. Then graph the equation.

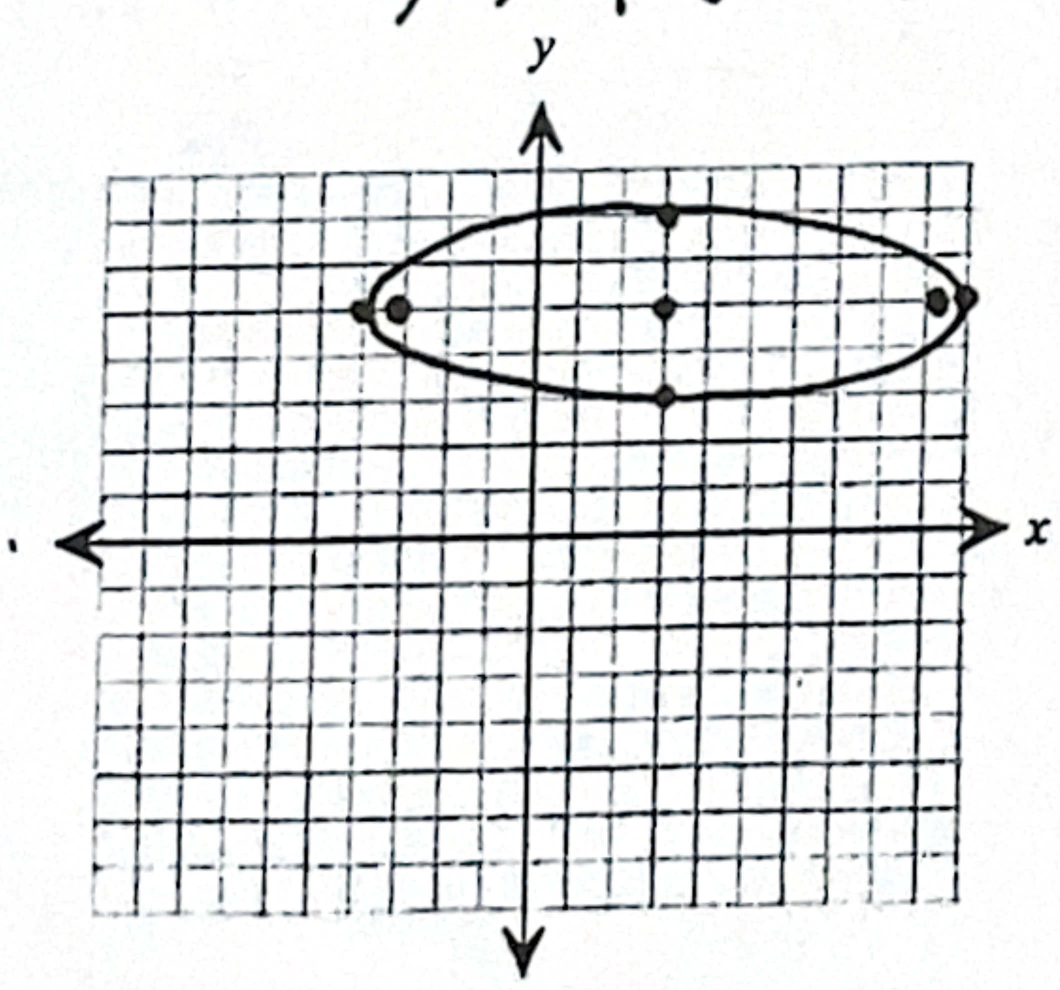
5. $\frac{(x-3)^2}{49}+\frac{(y-5)^2}{4}=1$

Center: (3,5)

Maj Vertices: (10,5) & (-4,5)

Min Vertices: (3,7) & (3,3)

Foci: (9.7,5) & (-3.7,5)



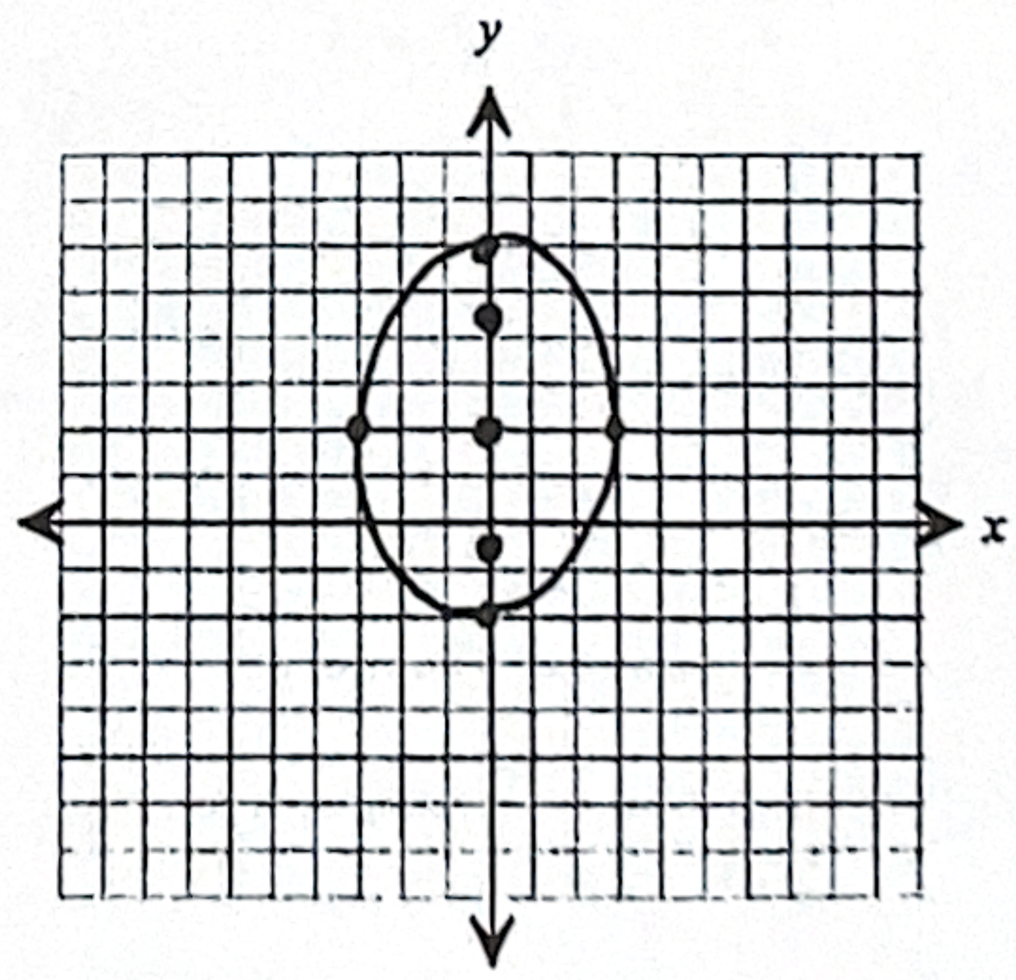
6. $\frac{x^2}{9}+\frac{(y-2)^2}{16}=1$

Center: (0,2)

Maj Vertices: (0,6) (0,-2)

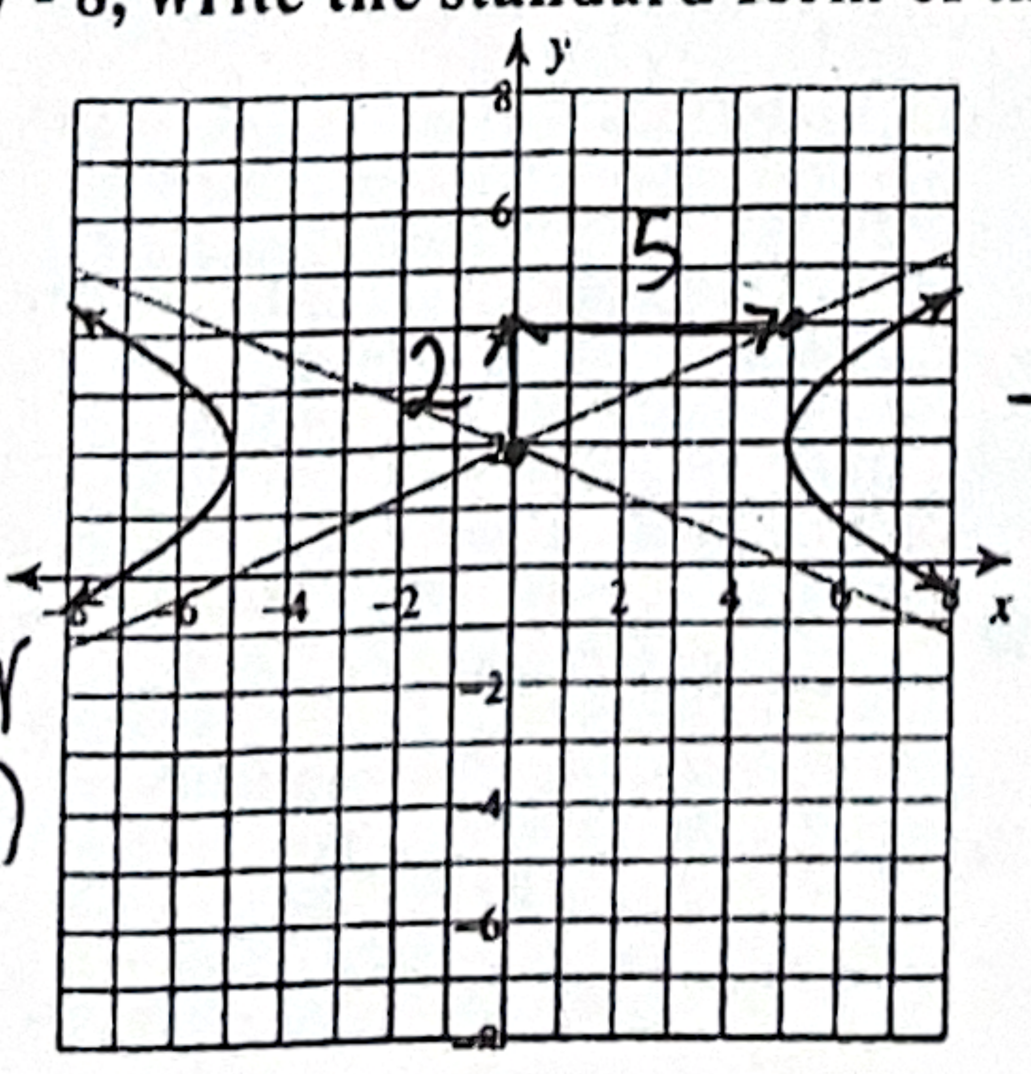
Min Vertices: (3,2) (-3,2)

Foci: (0,4.6) (0,-0.6)



#7 - 8, write the standard form of the equation of the hyperbola for each graph.

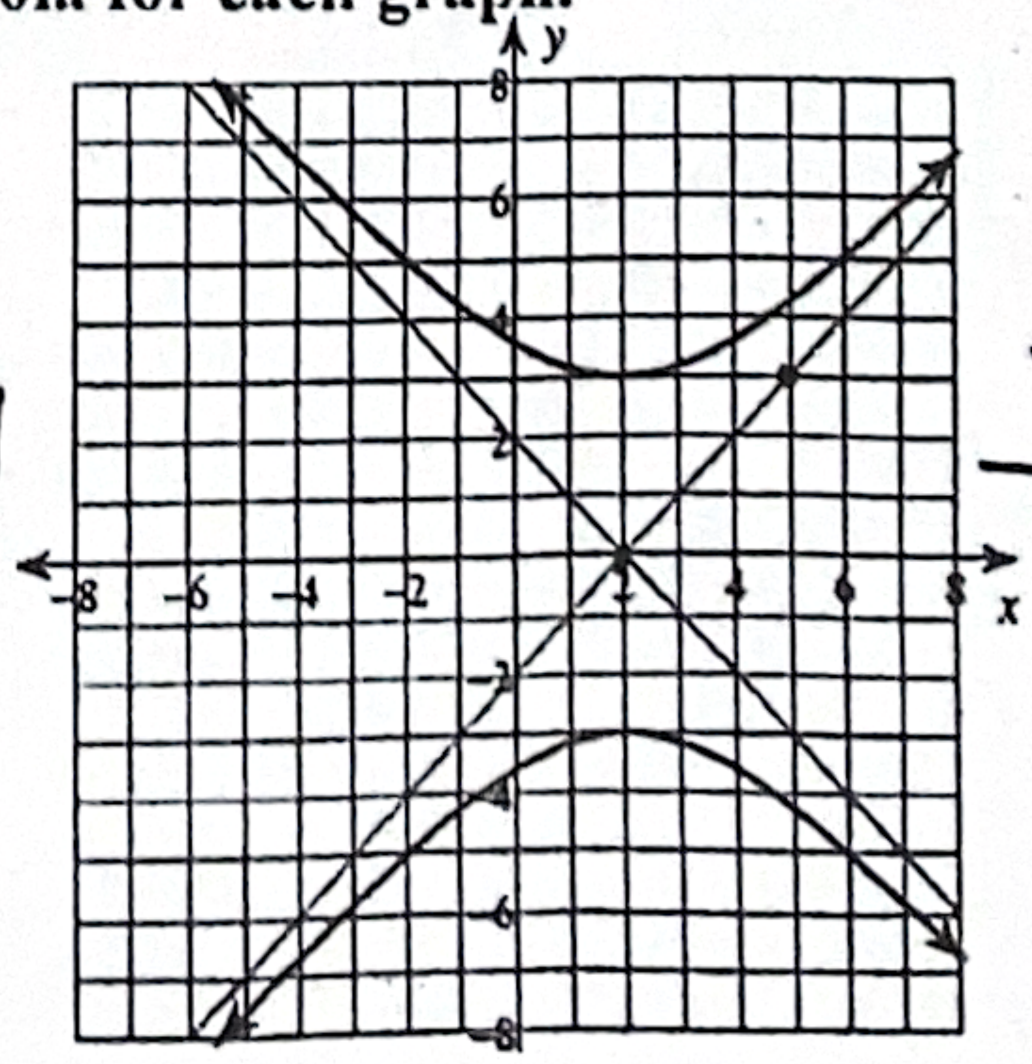
7.



center (0,2)

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

8.



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

#9 - 10, identify the center, vertices, and slope of the asymptotes for each hyperbola. Then graph each equation.

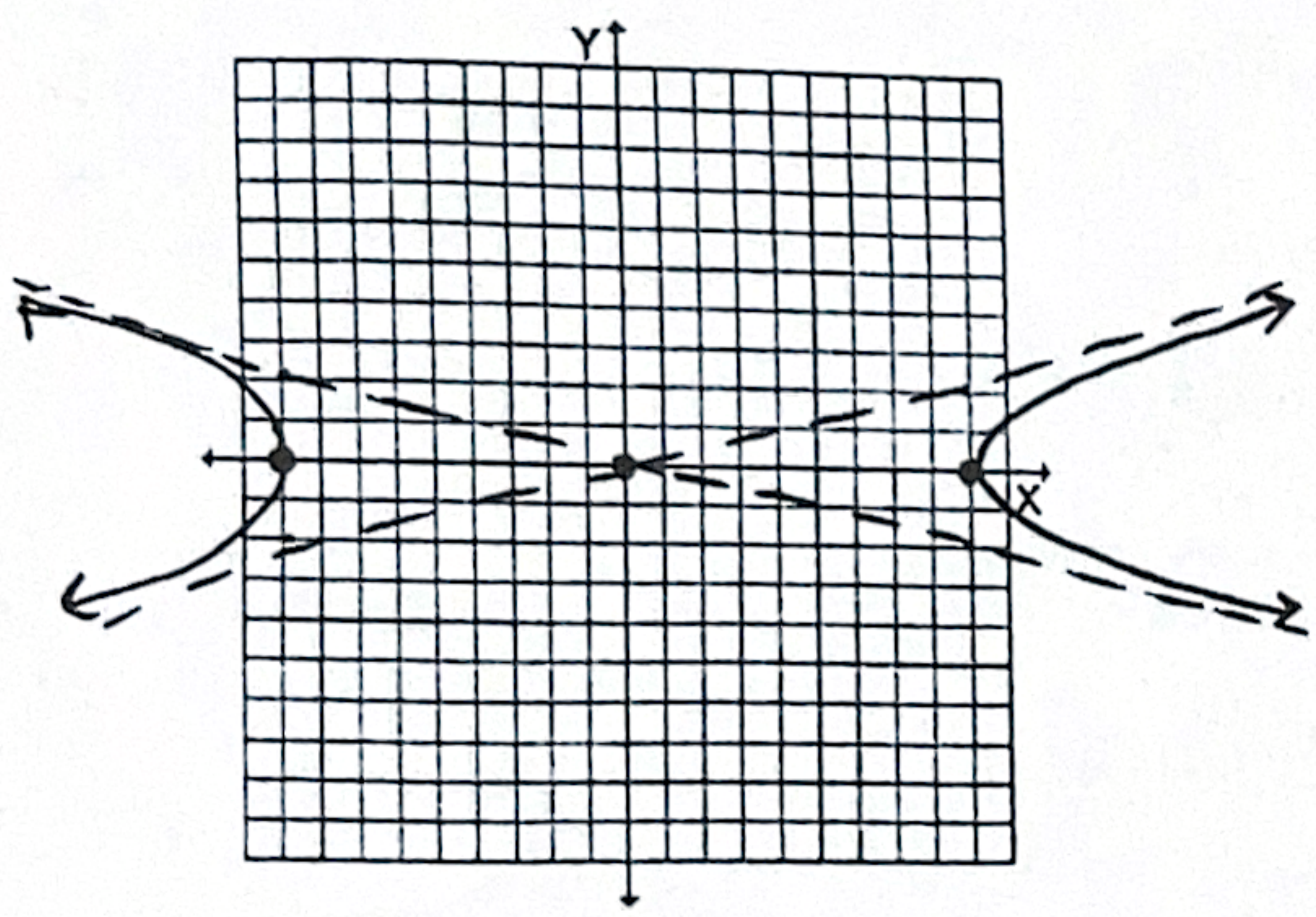
9. $\frac{x^2}{81} - \frac{y^2}{4} = 1$

Center: (0,0)

Vertices: (9,0) (-9,0)

Foci:

Slope: $\pm \frac{2}{9}$



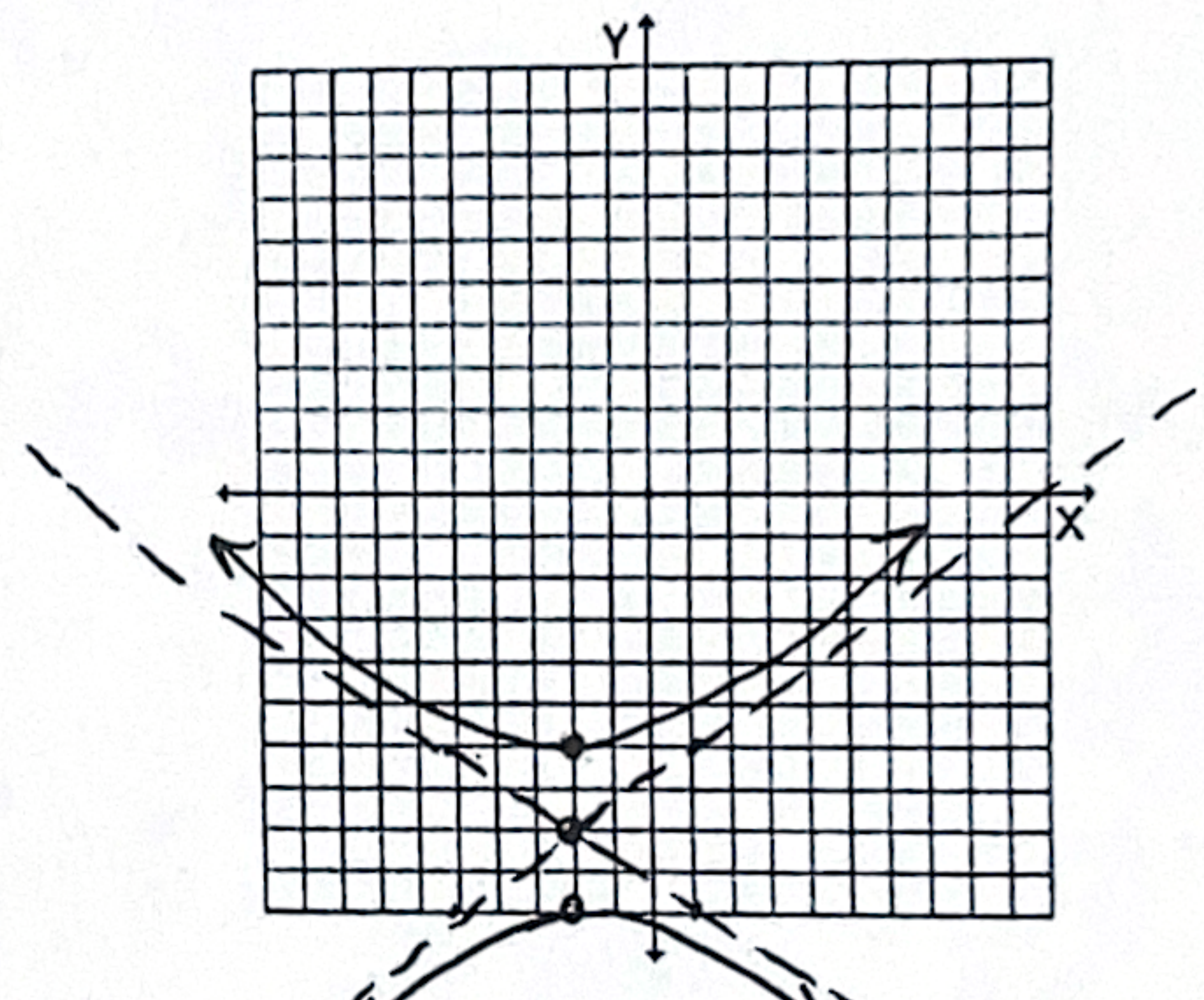
10. $\frac{(y+8)^2}{4} - \frac{(x+2)^2}{9} = 1$

Center: (-2,-8)

Vertices: (-2,-6) (-2,-10)

Foci:

Slope: $\pm \frac{2}{3}$



#11 – 12: For the equation of each parabola, find the coordinates of the vertex and focus, and the equations of the directrix and axis of symmetry. Then graph #16 & 17 (be sure to graph the focus and directrix)

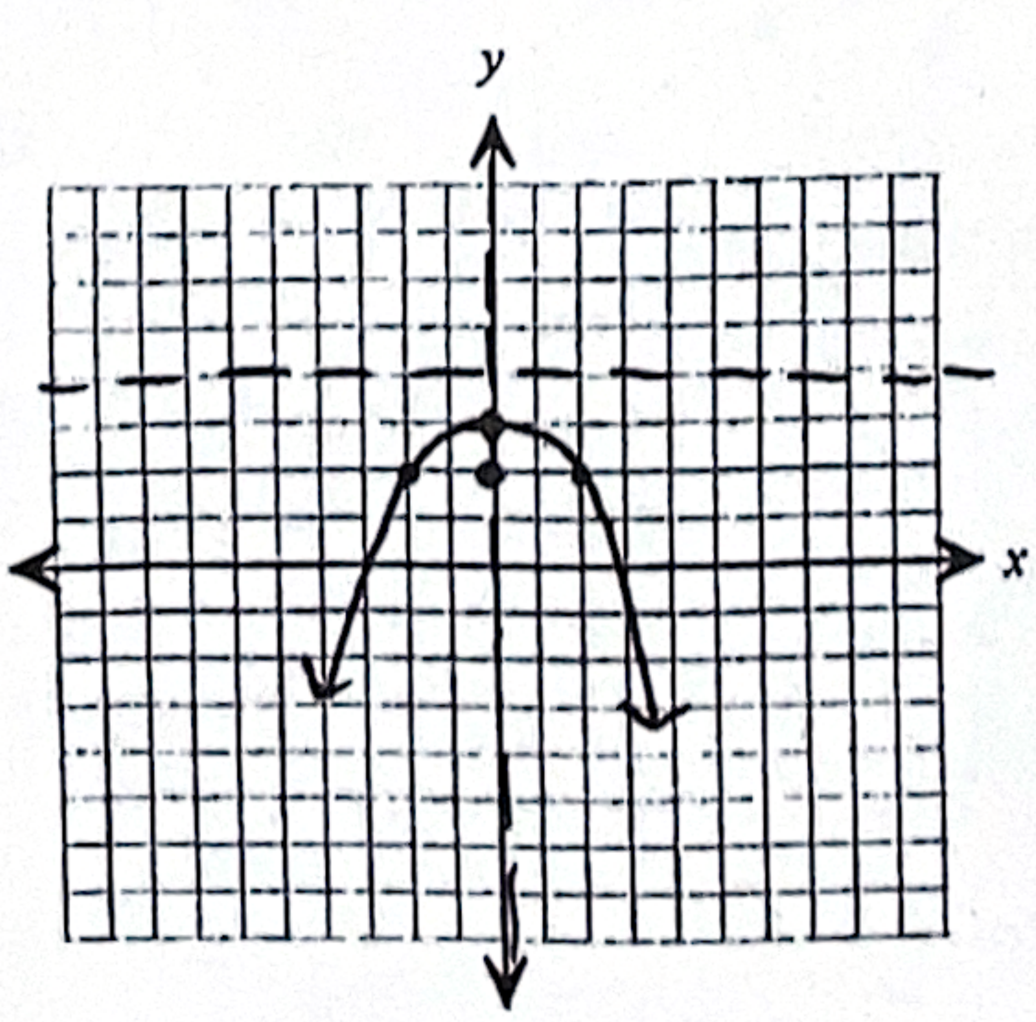
11. $x^2 = -4(y-3)$ p = -1

Vertex: (0,3)

Focus: (0,2)

Directrix: y=4

Axis: X=0



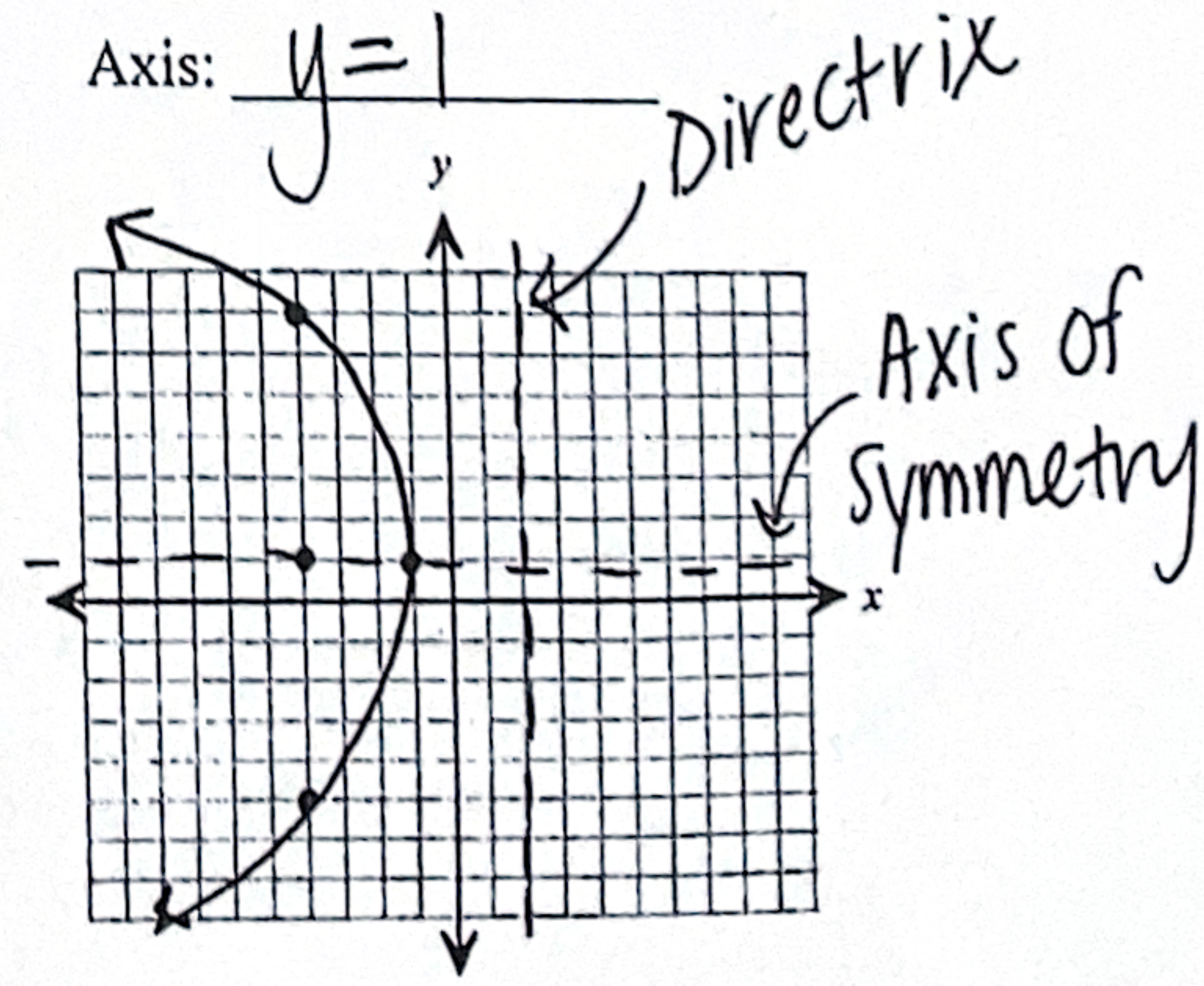
12. $x = -\frac{1}{12}(y-1)^2 - 1$ p = -3

Vertex: (-1,1)

Focus: (-4,1)

Directrix: X=2

Axis: y=1



already perfect square trinomial

13. $\underbrace{x^2 + 10x + 25}$ $= -8y + 24$

$(x+5)^2 = -8(y-3)$ show work

$p = -2$

$y = -\frac{1}{8}(x+5)^2 + 3$

Vertex: $(-5, 3)$

Focus: $(-5, 1)$

Directrix: $y = 5$

Axis: $x = -5$

$x^2 + 10x + 25$

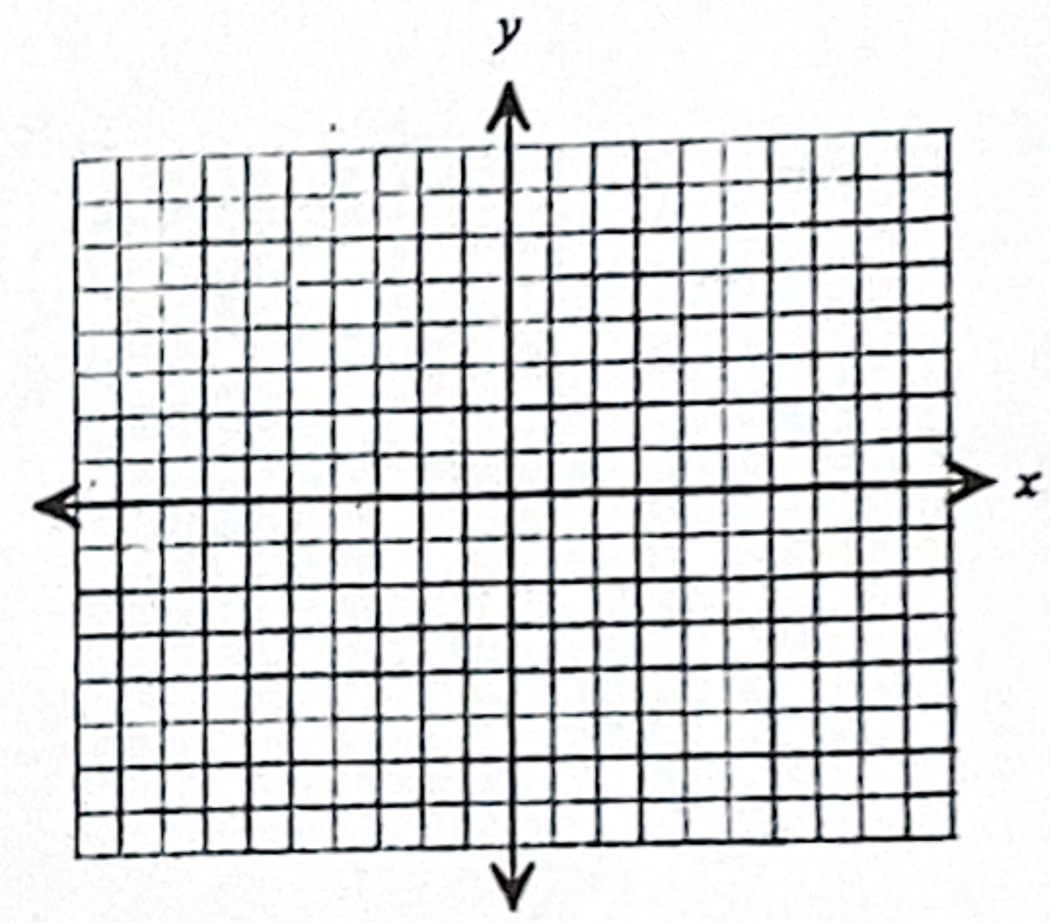
$(x+5)(x+5)$

$(x+5)^2$

#14 – 17: Write the equation of the conic section that meets each set of criteria:

14. An ellipse whose center is at the point (-5, 8), the length of its minor axis is 8 and the length of its horizontal axis is 14.

$$\frac{(x+5)^2}{49} + \frac{(y-8)^2}{16} = 1$$



$b = 3$

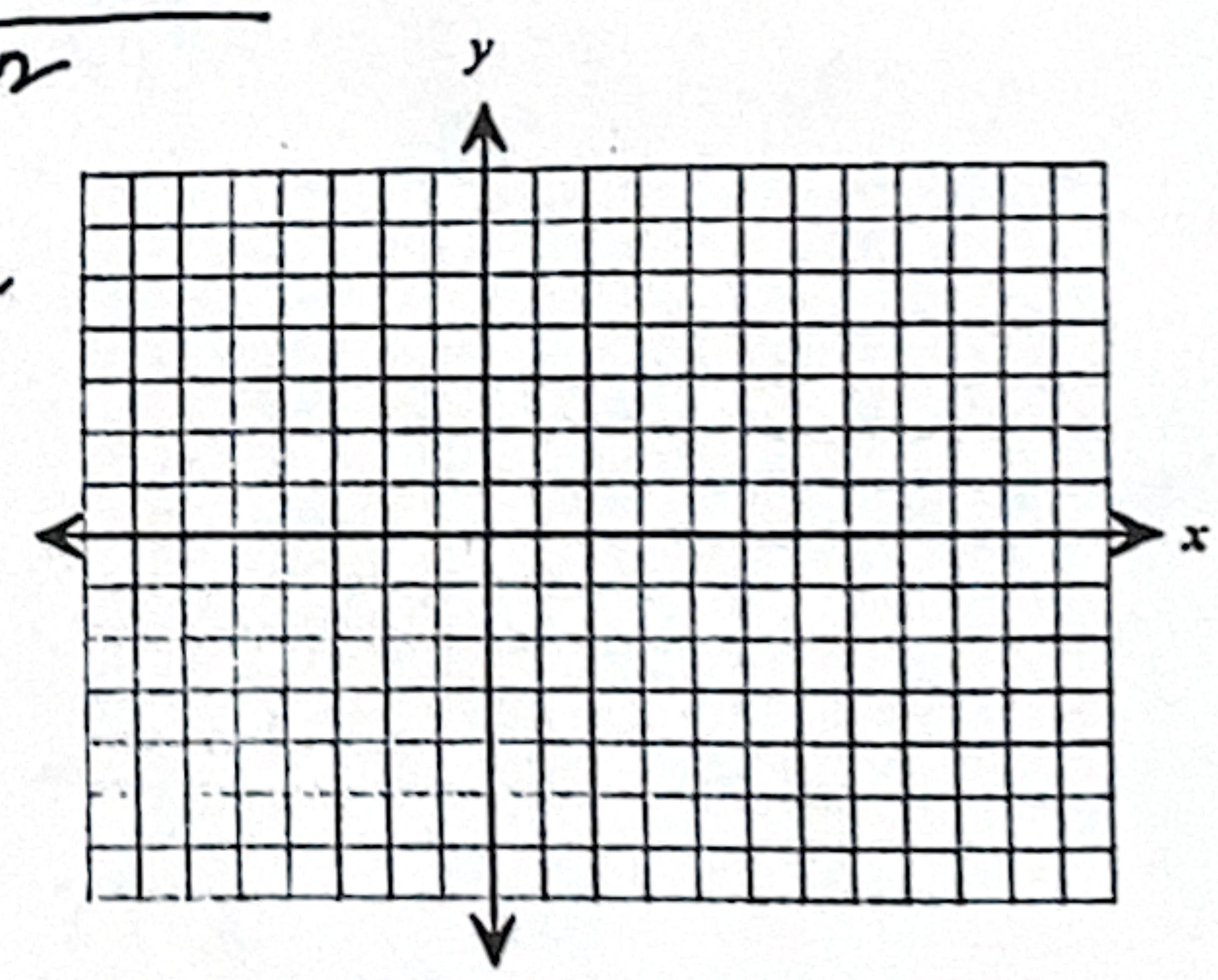
15. An ellipse whose center is at (3, 5), the length of the vertical minor axis is 6 and the foci are at the points (9, 5) and (-3, 5). $\rightarrow c = 6$

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

$\downarrow$

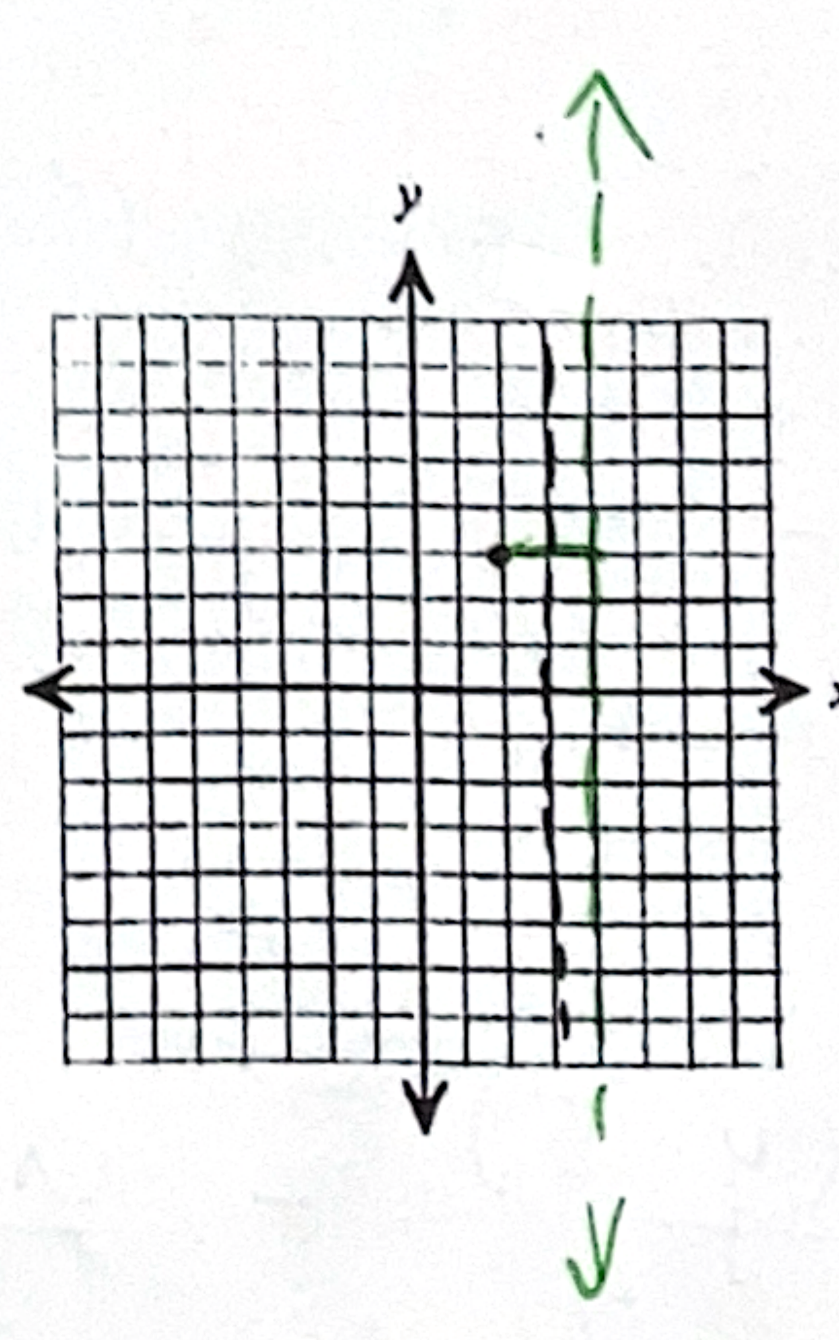
$a^2 = c^2 + b^2$

$$\frac{(x-3)^2}{45} + \frac{(y-5)^2}{9} = 1$$



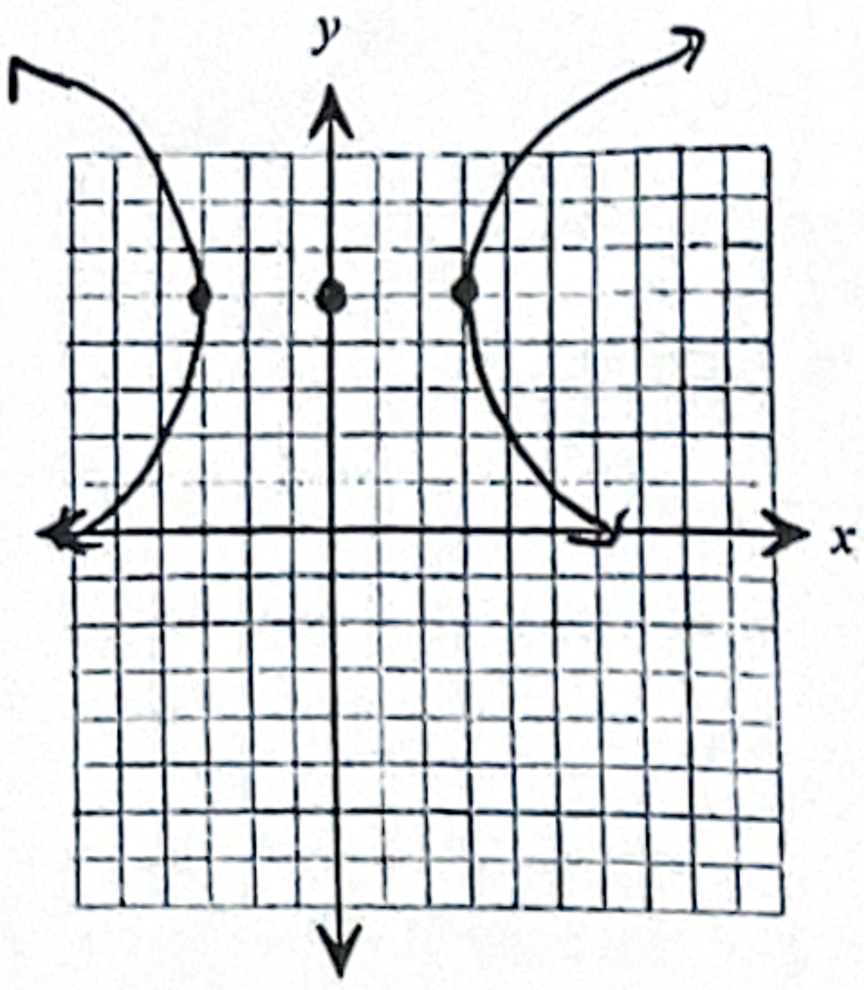
16. A parabola whose vertex is (2, 3) and whose directrix is the line $\boxed{x = 4.}$

$x = -\frac{1}{8}(y-3)^2 + 2$



$p = 2$

17. A hyperbola with center $(0, 5)$, vertex $(3, 5)$, and asymptotes $y = \pm\frac{4}{3}x$.



$$\frac{(x-0)^2}{9} - \frac{(y-5)^2}{16} = 1$$

#18 – 21: Determine the type of conic and write the conic in standard form.

18. $x^2 + y^2 + 6x - 10y = -30$ circle

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

19. $3x^2 - 30y - 18x + 87 = 0$ vertical parabola

$$y = -\frac{1}{10}(x-3)^2 + 2 \quad \text{or} \quad (x-3)^2 = 10(y-2)$$

20. $126y + 9y^2 - 8x - 131 = -4x^2$ Ellipse

$$\frac{(x-1)^2}{144} + \frac{(y+7)^2}{64} = 1$$

21. $4x^2 - 24x - 25y^2 + 250y - 489 = 0$ hyperbola

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

OR

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