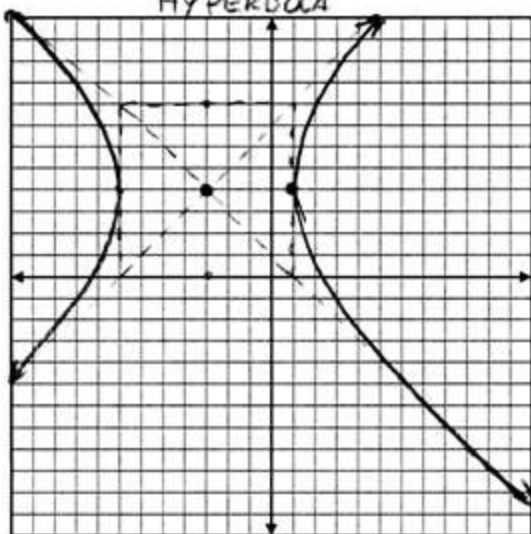


9.1 TO 9.5 EXTRA PRACTICE

Graph the following. Write the coordinates of all vertices, co-vertices, foci, and centers (where appropriate).

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

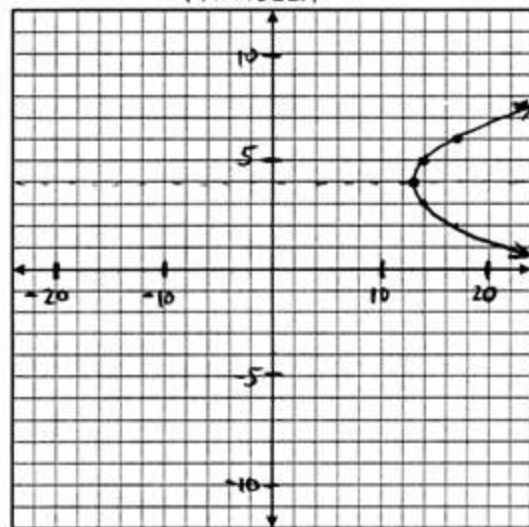
HYPERBOLA



CENTER
 $(-3, 4)$
VERTICES
 $(-7, 4)$ $(1, 4)$
CO-VERTICES
 $(-3, 8)$ $(-3, 0)$
FOCI
 $(-3 + 4\sqrt{2}, 4)$
 $(-3 - 4\sqrt{2}, 4)$

2. $(x+3) - (y-4)^2 = 16 \rightarrow x = (y-4)^2 + 13$

PARABOLA



VERTEX
 $(13, 4)$

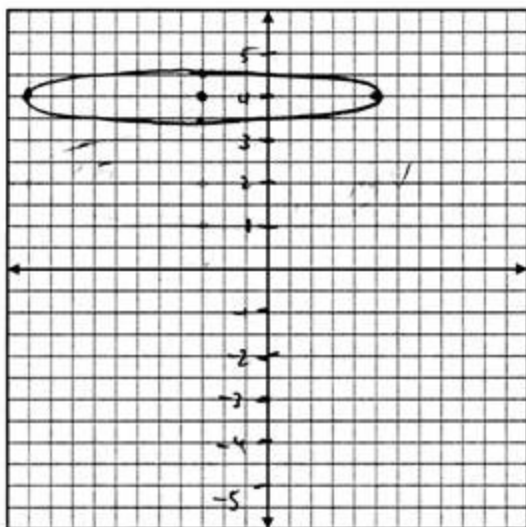
FOCUS
 $(13.25, 4)$

f too hard to see with scale

x	y
14	5
17	6

3. $(x+3)^2 = 16 - 64(y-4)^2$

$\rightarrow \frac{(x+3)^2}{64} + \frac{(y-4)^2}{(1/4)} = 1$ ELLIPSE



CENTER $(-3, 4)$

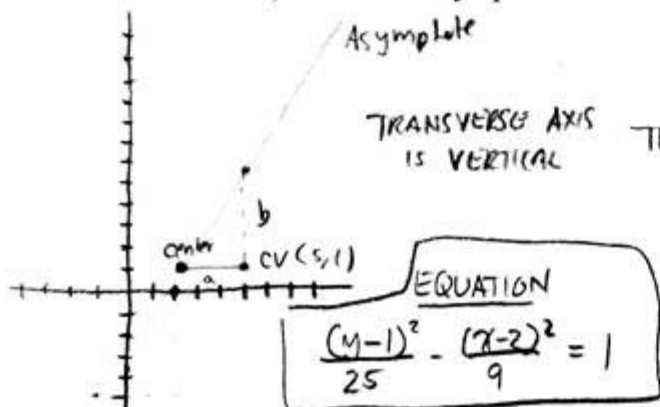
VERTICES $(-11, 4)$ $(5, 4)$

CO-VERTICES $(-3, 4.5)$ $(-3, 3.5)$

FOCI $(-3 + \sqrt{64.25}, 4)$

$(-3 - \sqrt{64.25}, 4)$

4. Write the equation of the hyperbola with a co-vertex at (5, 1), a vertical transverse axis, and has an asymptote with the equation $y = \frac{5}{3}x - \frac{7}{3}$



Asymptote Passes through (5, 6)

TRANSVERSE AXIS IS VERTICAL

The center must have y-coordinate 1

$$1 = \frac{5}{3}x - \frac{7}{3}$$

$$\frac{10}{3} = \frac{5}{3}x$$

$$x = 2$$

→ center (2, 1) ⇒ a = 3

Slope of Asymptote = $\pm \frac{b}{a} = \frac{5}{3} \Rightarrow \frac{b}{3} = \frac{5}{3} \Rightarrow b = 5$

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

5. Write the equation of the ellipse that has a horizontal axis with endpoints at (-7, -4) and (-1, -4) and has a focus at (-4, -4).

Horizontal Axis : (-7, -4) to (-1, -4) → center is at midpoint

CENTER (-4, -4) = FOCUS

Since Center = Focus ⇒ CIRCLE

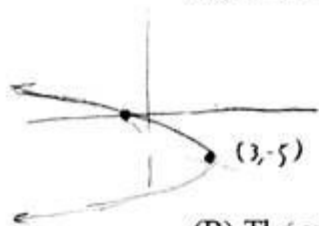
$$r = 3$$

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

You could also have $\left\{ \frac{(x+4)^2}{9} + \frac{(y+4)^2}{9} = 1 \right\}$

6. Write the equation of the parabola that has the vertex at (3, -5) and passes through (-1, 0) if...

(A) The axis of symmetry is horizontal.



$$x = a(y-k)^2 + h$$

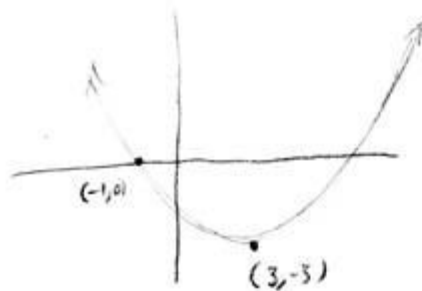
$$x = a(y+5)^2 + 3$$

$$-1 = a(0+5)^2 + 3$$

$$-1 = 25a + 3 \rightarrow a = -\frac{4}{25}$$

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

(B) The axis of symmetry is vertical.



$$y = a(x-h)^2 + k$$

$$y = a(x-3)^2 - 5$$

$$0 = a(1-3)^2 - 5$$

$$0 = 4a - 5$$

$$a = \frac{5}{4}$$

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