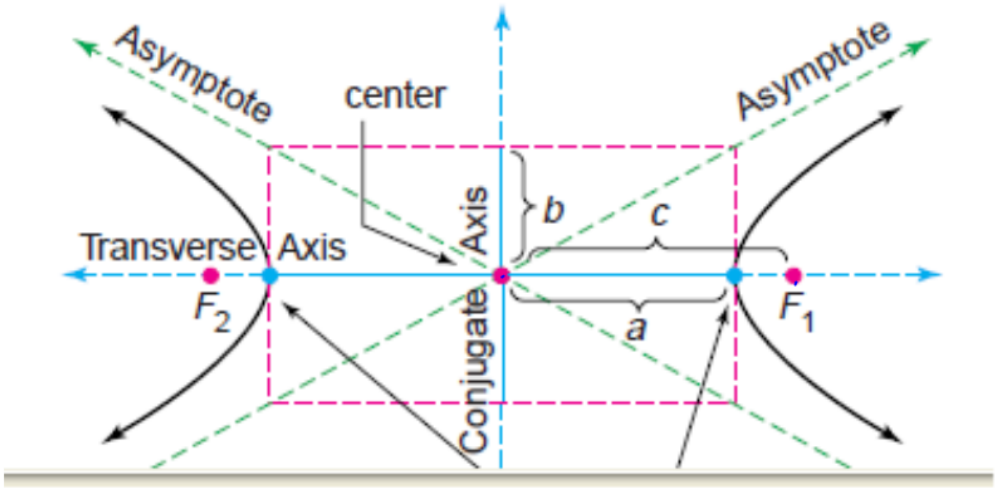


1 **Find the equation of the hyperbola with foci at (7, 1) and (−3, 1) whose transverse axis is 8 units long.**

$8 = 2a$

$4 = a$

$h = 2$

$k = 1$

center $(2, 1)$

$(-3, 1)$ $(7, 1)$

$c = 5$

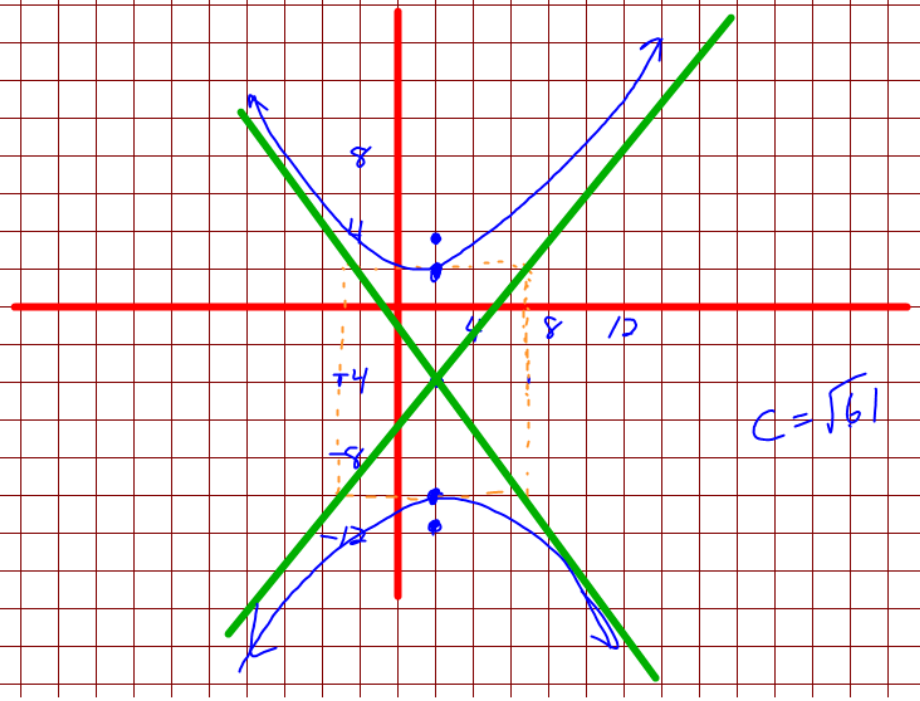
$\left(\frac{-3+7}{2}, \frac{1+1}{2}\right)$

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

$b^2 = 25 - 16$

$b^2 = 9$

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



$c = \sqrt{61}$

Find the coordinates of the center, foci, and vertices, and the equations of the asymptotes of the graph of $\frac{(y+4)^2}{36} - \frac{(x-2)^2}{25} = 1$. Then graph the equation.

$36 = a^2$ $\quad 25 = b^2$

$h = 2$.
$K = -4$
$a = 6$
$b = 5$
$c = \sqrt{61}$

$b^2 = c^2 - a^2$
$25 = c^2 - 36$
$61 = c^2$
$\sqrt{61} = c$

center $(2, -4)$

vertices $(2, 2)(2, -10)$

foci $(2, -4 \pm \sqrt{61})$

asymptotes $y + 4 = \pm \frac{6}{5}(x - 2)$