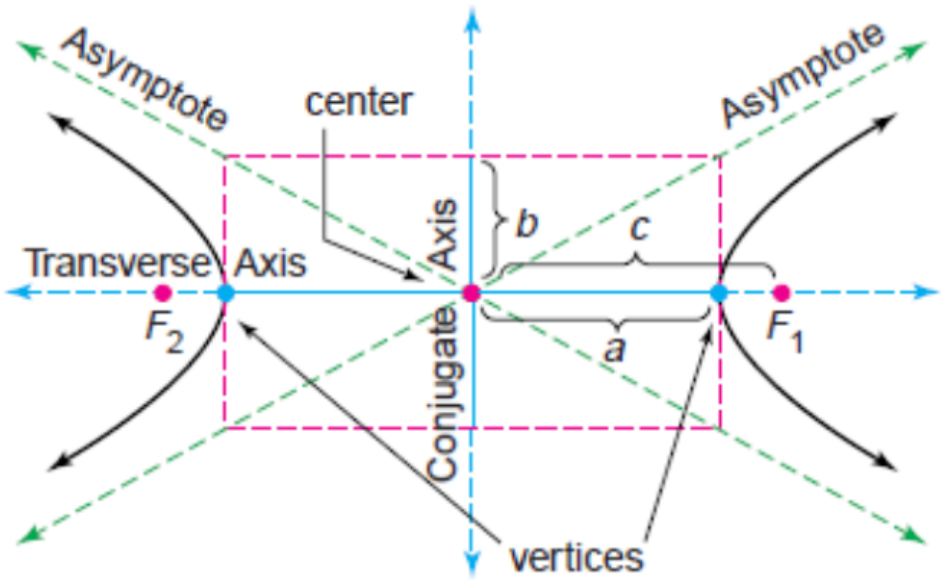


Find the equation of the hyperbola with foci at (7, 1) and (−3, 1) whose transverse axis is 8 units long.

F_1 $(-3,1)$ | $(2,1)$ | F_2 $(7,1)$

5

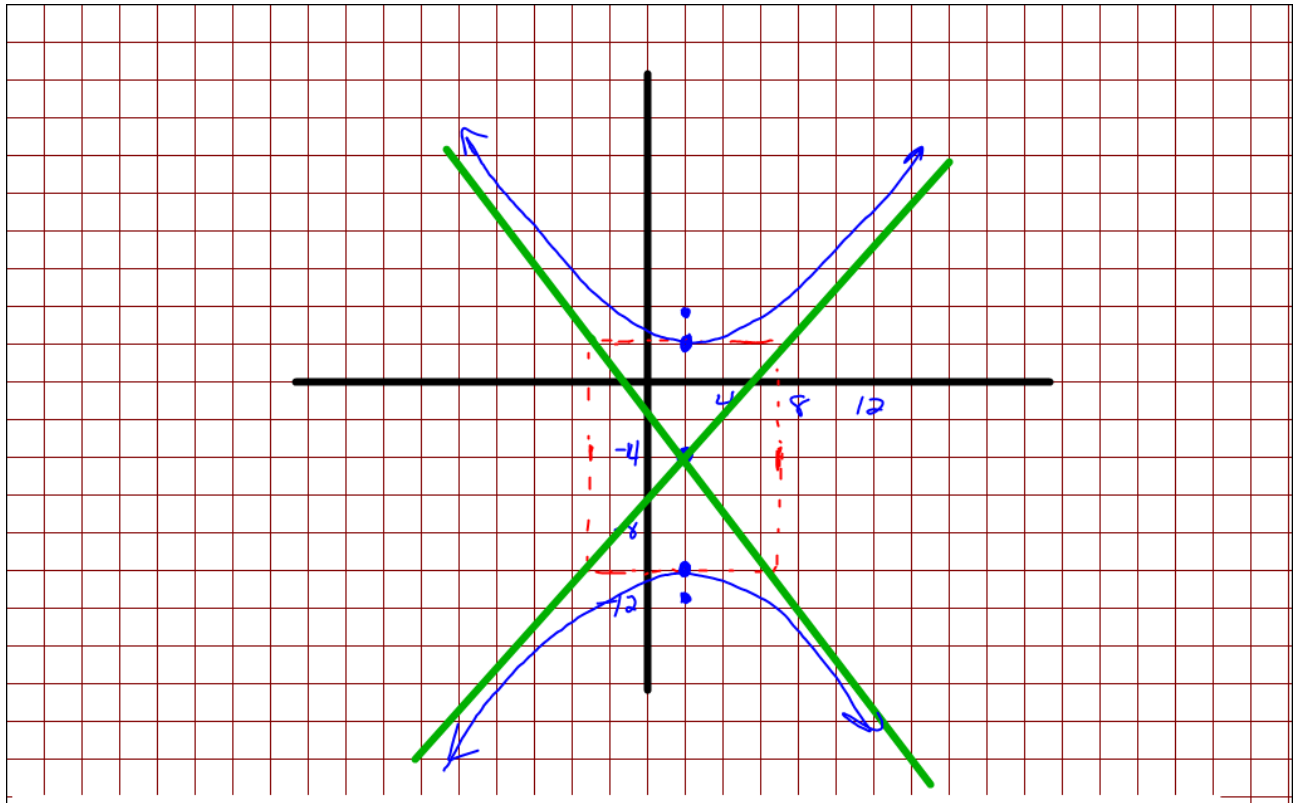
$$\left(\frac{-3+7}{2}, \frac{1+1}{2}\right)$$

$h = 2$
$k = 1$
$a = 4$
$b =$
$c = 5$

$2a = 8$
$a = 4$

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

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



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

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

$b^2=c^2+a^2$
$b^2+a^2=c^2$
$25+36=c^2$
$61=c^2$

center $(2,-4)$

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

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

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