

Pre-Calc
HW – Hyperbolas- Day 2

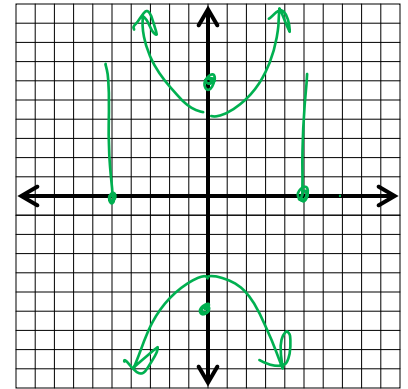
Name DiMarco

Write an equation in standard form for each hyperbola.

- 1) Foci at (0,6) and (0,-6); endpoints of conjugate axis (5,0) and (-5,0).

$$\begin{aligned} c &= 6 \\ c^2 &= a^2 + b^2 \\ 36 &= a^2 + 25 \\ \sqrt{11} &= a \end{aligned}$$

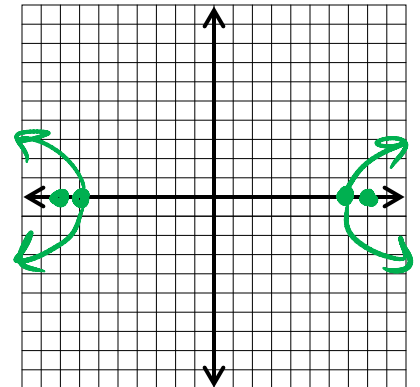
$$\frac{y^2}{11} - \frac{x^2}{25} = 1$$



- 2) Foci at (8,0) and (-8,0); endpoints of transverse axis (7,0) and (-7,0).

$$\begin{aligned} c &= 8 \\ 64 &= 49 + b^2 \\ b^2 &= 15 \end{aligned}$$

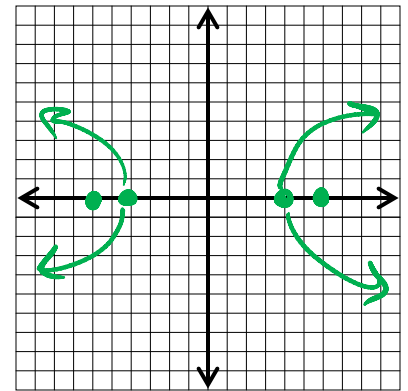
$$\frac{x^2}{49} - \frac{y^2}{15} = 1$$



- 3) Foci at (6,0) and (-6,0); transverse axis length = 8.

$$\begin{aligned} c &= 6 \\ 2a &= 8 \\ a &= 4 \\ 36 &= 16 + b^2 \\ b &= \sqrt{20} \end{aligned}$$

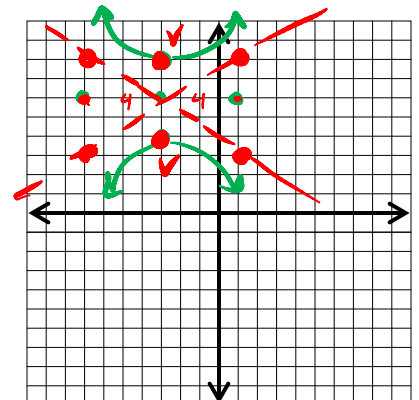
$$\frac{x^2}{16} - \frac{y^2}{20} = 1$$



- 4) The endpoints of the transverse axis are (-3, 4) and (-3, 8) and of the conjugate axis are (-7,6) and (1,6).

$$\begin{aligned} \text{center } &(-3, 6) \\ a &= 2 \\ b &= 4 \\ \text{opens } &\text{vert.} \end{aligned}$$

$$\frac{(y-6)^2}{4} - \frac{(x+3)^2}{16} = 1$$



5) State the location of the center, the length of the semi-transverse, and semi-conjugate axis, and

write in parametric form: $\frac{(y-3)^2}{25} - \frac{(x+1)^2}{9} = 1$

$$a = 5$$

$$b = 3$$

center $(-1, 3)$

$$\begin{aligned} x &= -1 + 3 \tan t \\ y &= 3 + 5 \sec t \end{aligned}$$

6) Put the equation into standard form: $4x^2 - 16y^2 + 8x + 128y - 316 = 0$

$$4x^2 + 8x - 16y^2 + 128y = 316$$

$$4(x^2 + 2x + 1) - 16(y^2 - 8y + 16) = 316 + 4 - 256$$

$$\frac{4(x+1)^2}{64} - \frac{16(y-4)^2}{64} = \frac{64}{64}$$

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

7) Put the equation into standard form: $9y^2 - 25x^2 - 36y - 150x - 414 = 0$

$$9y^2 - 36y - 25x^2 - 150x = 414$$

$$9(y^2 - 4y + 4) - 25(x^2 + 6x + 9) = 414 + 36 - 225$$

$$\frac{9(y-2)^2}{225} - \frac{25(x+3)^2}{225} = \frac{225}{225}$$

$$\frac{(y-2)^2}{25} - \frac{(x+3)^2}{9} = 1$$

$$-\frac{(x+3)^2}{9} + \frac{(y-2)^2}{25} = 1$$