

Day 6 HW KEY

Friday, April 24, 2015 9:43 AM

A series of horizontal blue lines for writing, with a vertical red margin line on the left side.

Directions: 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).

center: (0,0)

F=6

up/down $\Rightarrow y \oplus$

$$m = \pm \frac{\sqrt{11}}{5} \approx \pm \frac{3.3}{5}$$

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

a=5

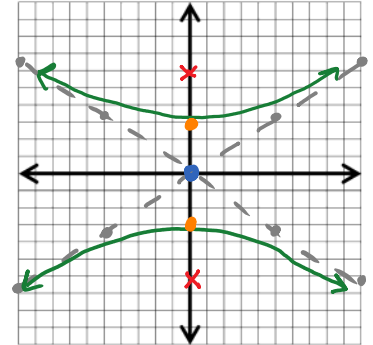
$$F = \sqrt{a^2 + b^2}$$

$$6 = \sqrt{25 + b^2}$$

$$36 = 25 + b^2$$

$$b^2 = 11$$

$$b = \sqrt{11}$$



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

center: (0,0)

F=8

left/right = $x \oplus$

$$8 = \sqrt{49 + b^2}$$

$$64 = 49 + b^2$$

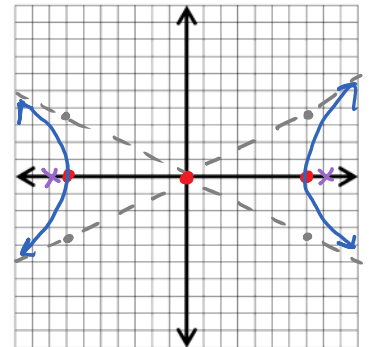
$$15 = b^2$$

$$\sqrt{15} = b$$

$$m = \pm \frac{\sqrt{15}}{7} \approx \pm \frac{3.87}{7}$$

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

↑
 vertices!
 a=7



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

center: (0,0)

F=6

left/right = $x \oplus$

a=4

$$6 = \sqrt{4^2 + b^2}$$

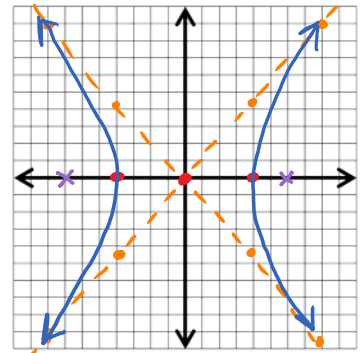
$$36 = 16 + b^2$$

$$20 = b^2$$

$$\sqrt{20} = b$$

$$m = \pm \frac{\sqrt{20}}{4} \approx \pm \frac{4.47}{4}$$

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



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

$2a = 4 \Rightarrow b = 2$

center: (-3,6)

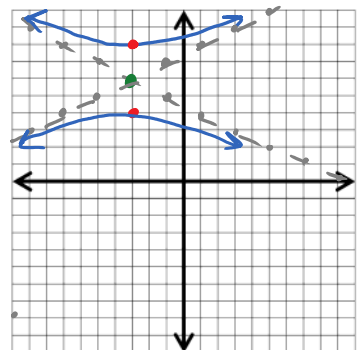
$y \oplus$ up/down

$2a = 8$

a=4

$$m = \pm \frac{b}{a} = \pm \frac{1}{2}$$

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



5. State the location of the center, the length of the semi-transverse, and semi-conjugate axis, and write in

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

center: $(-1, 3)$

semi-T: 5

semi-C: 3

$x = 3 \tan t - 1$

$y = 5 \sec t + 3$

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

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

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

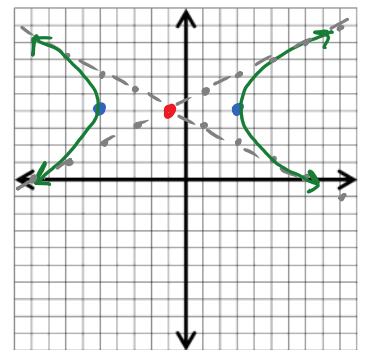
$\frac{4(x+1)^2}{64} - \frac{16(y-4)^2}{64} = \frac{64}{64}$

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

center: $(-1, 4)$

Left/right

$m = \pm \frac{2}{4} = \pm \frac{1}{2}$



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

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

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

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

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

center: $(-3, 2)$

up/down

$m = \pm \frac{5}{3}$

