

Day 5 HW KEY

Thursday, April 23, 2015 1:14 PM

Directions: (#1-6) find the vertices, foci, axes, and slopes of asymptotes and sketch a graph for each.

1. $\frac{4y^2 - 9x^2}{36} = \frac{36}{36} \Rightarrow \frac{y^2}{9} - \frac{x^2}{4} = 1$ (up/down)

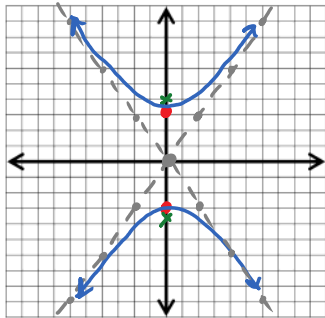
Vertices: $(0, 3)$, $(0, -3)$ $\pm b = \pm 3$

Foci: $(0, \sqrt{13})$, $(0, -\sqrt{13})$ $F = \sqrt{9+4} = \sqrt{13}$

Slope of Asymptotes: $\pm \frac{3}{2}$ $m = \pm \frac{b}{a} = \frac{3}{2}$

Length of Transverse Axis: 6 $2(3)$

Length of Conjugate Axis: 4 $2(2)$



2. $\frac{x^2 - y^2}{16} = \frac{16}{16} \Rightarrow \frac{x^2}{16} - \frac{y^2}{16} = 1$ (left/right)

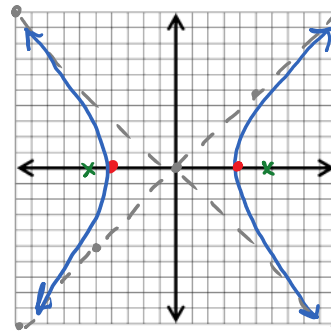
Vertices: $(4, 0)$, $(-4, 0)$

Foci: $(4\sqrt{2}, 0)$, $(-4\sqrt{2}, 0)$ $F = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$

Slope of Asymptotes: ± 1 $m = \pm \frac{4}{4} = 1$

Length of Transverse Axis: 8 $2(4)$

Length of Conjugate Axis: 8 $2(4)$



3. $4(x-1)^2 - (y-2)^2 + 1 = 5 \Rightarrow \frac{(x-1)^2}{1} - \frac{(y-2)^2}{4} = 1$

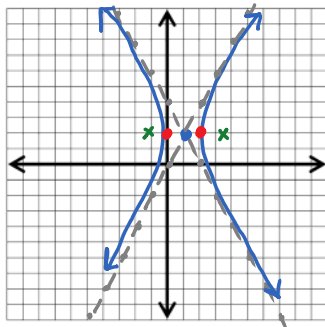
Vertices: $(0, 2)$, $(2, 2)$ (left/right)
Center: $(1, 2)$

Foci: $(1-\sqrt{5}, 2)$, $(1+\sqrt{5}, 2)$

Slope of Asymptotes: ± 2 $m = \pm \frac{2}{1}$

Length of Transverse Axis: 2 $2(1)$

Length of Conjugate Axis: 4 $2(2)$



$F = \sqrt{1+4} = \sqrt{5}$

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

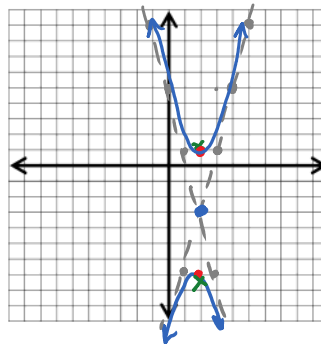
Vertices: $(2, 1)$, $(2, -7)$ (up/down)
Center: $(2, -3)$

Foci: $(2, -3+\sqrt{17})$, $(2, -3-\sqrt{17})$

Slope of Asymptotes: ± 4 $m = \pm \frac{4}{1}$

Length of Transverse Axis: 8 $2(4)$

Length of Conjugate Axis: 2 $2(1)$



$F = \sqrt{16+1} = \sqrt{17}$

5. $\frac{(y-4)^2}{4} - \frac{x^2}{36} = 1$ up/down (center: $(0, 4)$)

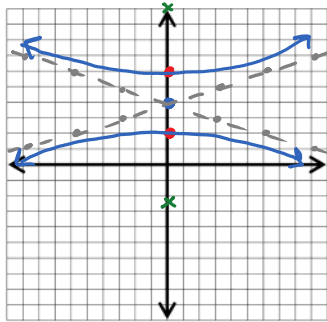
Vertices: $(0, 6)$, $(0, 2)$

Foci: $(0, 4+2\sqrt{10})$, $(0, 4-2\sqrt{10})$

Slope of Asymptotes: $\pm \frac{1}{3}$ $m = \pm \frac{2}{6} = \frac{1}{3}$

Length of Transverse Axis: 4 $2(2)$

Length of Conjugate Axis: 12 $2(6)$



$F = \sqrt{4+36} = \sqrt{40}$
 $= 2\sqrt{10}$

6. $\frac{(x-1)^2}{25} - \frac{y^2}{12} = 1$ left/right center: $(1, 0)$

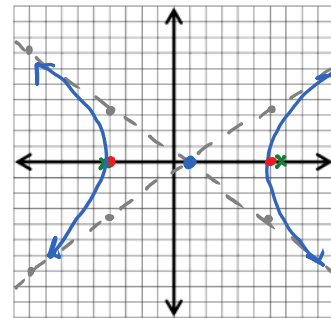
Vertices: $(-4, 0)$, $(6, 0)$

Foci: $(-4+\sqrt{37}, 0)$, $(-4-\sqrt{37}, 0)$

Slope of Asymptotes: $\pm \frac{3.5}{5}$ $m = \pm \frac{\sqrt{12}}{5} \approx \frac{3.5}{5}$

Length of Transverse Axis: 10 $2(5)$

Length of Conjugate Axis: $2\sqrt{12}$ $2(\sqrt{12})$



$F = \sqrt{25+12} = \sqrt{37}$

(#7-8) Eliminate the parameter: $1 + \tan^2 t = \sec^2 t \Rightarrow 1 = \sec^2 t - \tan^2 t$

7. $x = 3 \sec t \rightarrow \frac{x}{3} = \sec t$
 $y = 7 \tan t \rightarrow \frac{y}{7} = \tan t$

$(\frac{x}{3})^2 - (\frac{y}{7})^2 = 1$

$\frac{x^2}{9} - \frac{y^2}{49} = 1$

8. $x = -2 + 3 \tan t \rightarrow \tan t = \frac{x+2}{3}$
 $y = 4 + 7 \sec t \rightarrow \sec t = \frac{y-4}{7}$

$(\frac{y-4}{7})^2 - (\frac{x+2}{3})^2 = 1$

$\frac{(y-4)^2}{49} - \frac{(x+2)^2}{9} = 1$