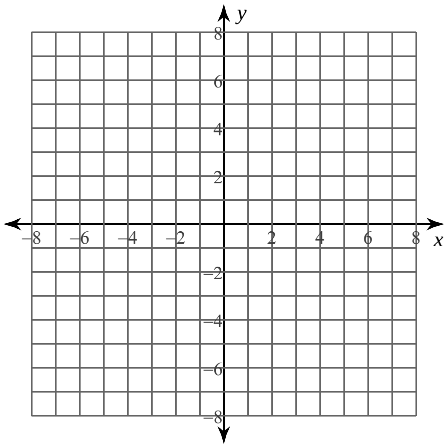
Name________________________________

Hyperbolas

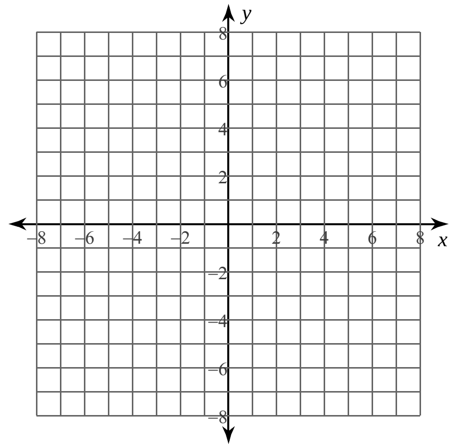
Date________________ Period____

Identify the vertices, foci, and asymptotes of each. Then sketch the graph.

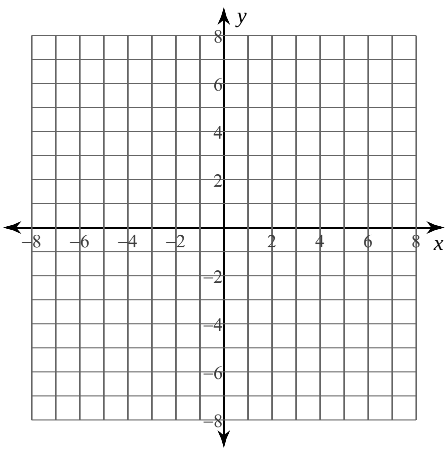
1) $\dfrac{x^2}{9} - \dfrac{y^2}{25} = 1$



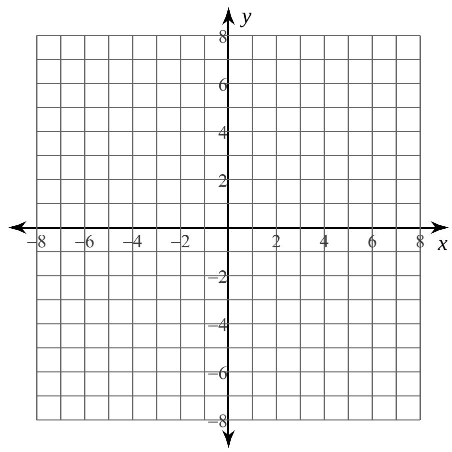
2) $(y + 4)^2 - (x - 3)^2 = 1$



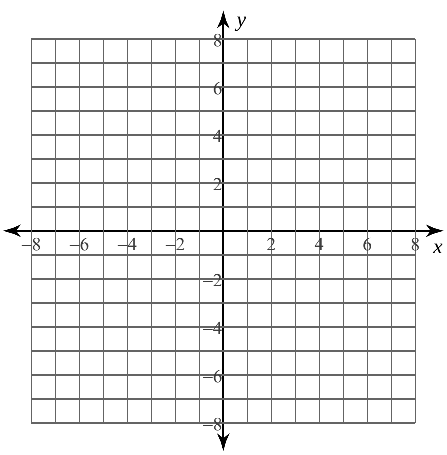
3) $\dfrac{y^2}{16} - (x + 4)^2 = 1$



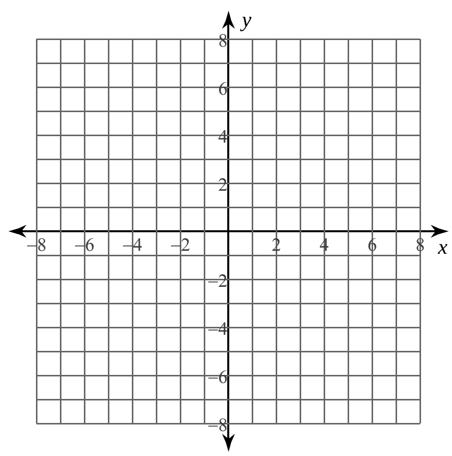
4) $\dfrac{y^2}{10} - \dfrac{(x - 1)^2}{10} = 1$



5) $9x^2 - 4y^2 - 18x + 16y - 43 = 0$



6) $-9x^2 - 32y = -16y^2 + 128$



Identify the vertices, foci, asymptotes, direction of opening, length of the transverse axis, length of the conjugate axis, length of the latus rectum, and eccentricity of each.

7) $x^2 - y^2 - 6x + 16y - 119 = 0$

8) $-4x^2 + y^2 + 8x - 20y - 4 = 0$

Use the information provided to write the standard form equation of each hyperbola.

9) Vertices: $(1 + 3\sqrt{15}, -7), (1 - 3\sqrt{15}, -7)$
Endpoints of Conjugate Axis: $(1, -7 + 5\sqrt{5})$
$(1, -7 - 5\sqrt{5})$

10) Vertices: $(19, 2), (1, 2)$
Foci: $(10 + \sqrt{130}, 2), (10 - \sqrt{130}, 2)$

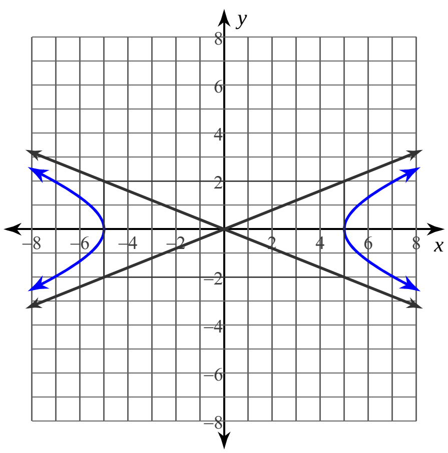
11) Vertices: $(-10, 1), (-10, -17)$
Perimeter of Central Rectangle = 76

12) Vertices: $(7, -2), (5, -2)$
Asymptotes: $y = 11x - 68$
$y = -11x + 64$

13) Center at $(10, -4)$
Transverse axis is vertical and 18 units long
Conjugate axis is 10 units long

14) Foci: $(6, 1 + 2\sqrt{58}), (6, 1 - 2\sqrt{58})$
Points on the hyperbola are 28 units closer to one focus than the other

15)



16) Center at $(-6, 9)$
Vertex at $(-18, 9)$
Eccentricity = $\frac{5}{4}$

Kuta Software - Infinite Precalculus

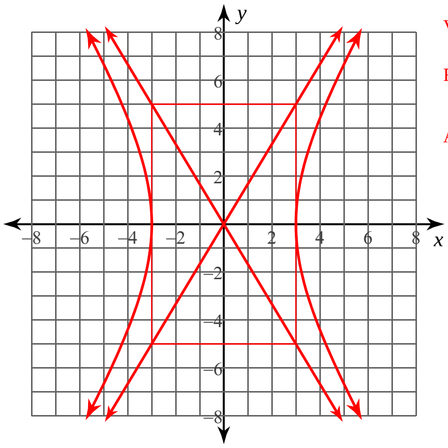
Name________________________________

Hyperbolas

Date________________ Period____

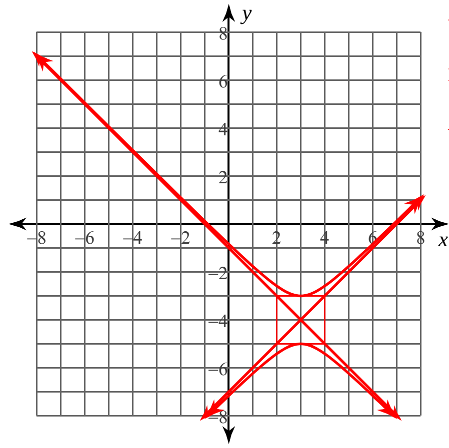
Identify the vertices, foci, and asymptotes of each. Then sketch the graph.

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



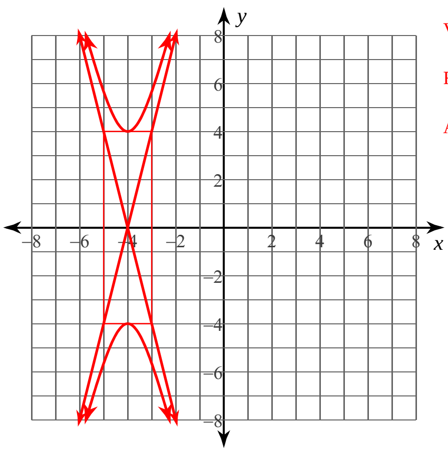
Vertices: $(3, 0)$, $(-3, 0)$
Foci: $(\sqrt{34}, 0)$, $(-\sqrt{34}, 0)$
Asym.: $y = \frac{5}{3}x$, $y = -\frac{5}{3}x$

2) $(y + 4)^2 - (x - 3)^2 = 1$



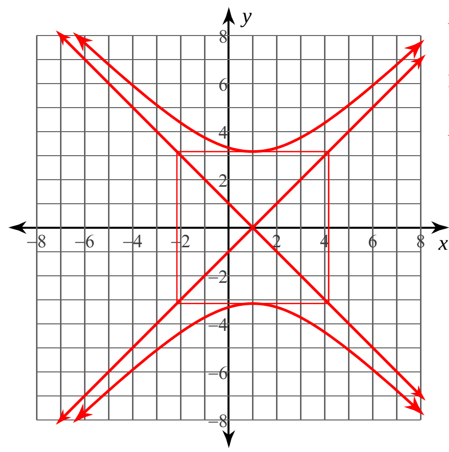
Vertices: $(3, -3)$, $(3, -5)$
Foci: $(3, -4 + \sqrt{2})$, $(3, -4 - \sqrt{2})$
Asym.: $y = x - 7$, $y = -x - 1$

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



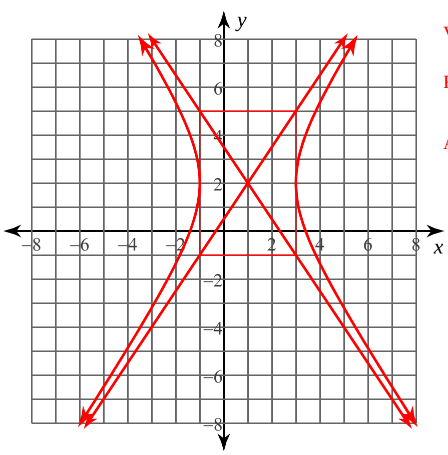
Vertices: $(-4, 4)$, $(-4, -4)$
Foci: $(-4, \sqrt{17})$, $(-4, -\sqrt{17})$
Asym.: $y = 4x + 16$, $y = -4x - 16$

4) $\frac{y^2}{10} - \frac{(x - 1)^2}{10} = 1$



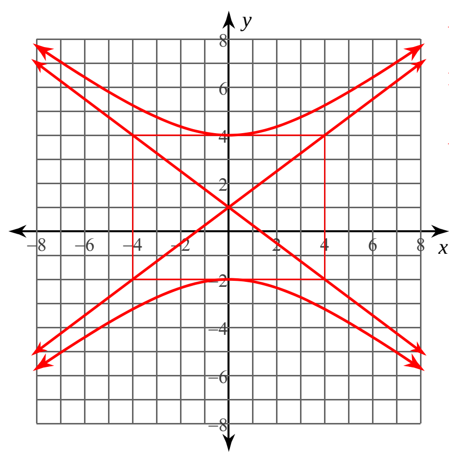
Vertices: $(1, \sqrt{10})$, $(1, -\sqrt{10})$
Foci: $(1, 2\sqrt{5})$, $(1, -2\sqrt{5})$
Asym.: $y = x - 1$, $y = -x + 1$

5) $9x^2 - 4y^2 - 18x + 16y - 43 = 0$



Vertices: $(3, 2)$, $(-1, 2)$
Foci: $(1 + \sqrt{13}, 2)$, $(1 - \sqrt{13}, 2)$
Asym.: $y = \frac{3}{2}x + \frac{1}{2}$, $y = -\frac{3}{2}x + \frac{7}{2}$

6) $-9x^2 - 32y = -16y^2 + 128$



Vertices: $(0, 4)$, $(0, -2)$
Foci: $(0, 6)$, $(0, -4)$
Asym.: $y = \frac{3}{4}x + 1$, $y = -\frac{3}{4}x + 1$

Identify the vertices, foci, asymptotes, direction of opening, length of the transverse axis, length of the conjugate axis, length of the latus rectum, and eccentricity of each.

7) $x^2 - y^2 - 6x + 16y - 119 = 0$

Vertices: $(11, 8)$, $(-5, 8)$
Foci: $(3 + 8\sqrt{2}, 8)$, $(3 - 8\sqrt{2}, 8)$
Asym.: $y = x + 5$
$y = -x + 11$
Opens left/right
Transverse Axis: 16 units
Conjugate Axis: 16 units
Latus Rectum: 16 units
Eccentricity: $\sqrt{2} \approx 1.414$

8) $-4x^2 + y^2 + 8x - 20y - 4 = 0$

Vertices: $(1, 20)$, $(1, 0)$
Foci: $(1, 10 + 5\sqrt{5})$, $(1, 10 - 5\sqrt{5})$
Asym.: $y = 2x + 8$
$y = -2x + 12$
Opens up/down
Transverse Axis: 20 units
Conjugate Axis: 10 units
Latus Rectum: 5 units
Eccentricity: $\dfrac{\sqrt{5}}{2} \approx 1.118$

Use the information provided to write the standard form equation of each hyperbola.

9) Vertices: $(1 + 3\sqrt{15}, -7)$, $(1 - 3\sqrt{15}, -7)$
Endpoints of Conjugate Axis: $(1, -7 + 5\sqrt{5})$
$(1, -7 - 5\sqrt{5})$

$$\frac{(x-1)^2}{135} - \frac{(y+7)^2}{125} = 1$$

10) Vertices: $(19, 2)$, $(1, 2)$
Foci: $(10 + \sqrt{130}, 2)$, $(10 - \sqrt{130}, 2)$

$$\frac{(x-10)^2}{81} - \frac{(y-2)^2}{49} = 1$$

11) Vertices: $(-10, 1)$, $(-10, -17)$
Perimeter of Central Rectangle = 76

$$\frac{(y+8)^2}{81} - \frac{(x+10)^2}{100} = 1$$

12) Vertices: $(7, -2)$, $(5, -2)$
Asymptotes: $y = 11x - 68$
$y = -11x + 64$

$$(x-6)^2 - \frac{(y+2)^2}{121} = 1$$

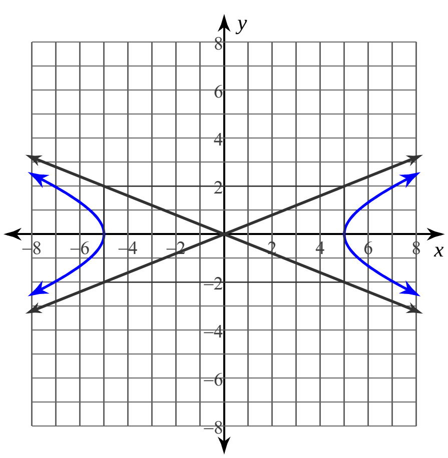
13) Center at $(10, -4)$
Transverse axis is vertical and 18 units long
Conjugate axis is 10 units long

$$\frac{(y+4)^2}{81} - \frac{(x-10)^2}{25} = 1$$

14) Foci: $(6, 1 + 2\sqrt{58})$, $(6, 1 - 2\sqrt{58})$
Points on the hyperbola are 28 units closer to one focus than the other

$$\frac{(y-1)^2}{196} - \frac{(x-6)^2}{36} = 1$$

15)



$$\frac{x^2}{25} - \frac{y^2}{4} = 1$$

16) Center at $(-6, 9)$
Vertex at $(-18, 9)$
Eccentricity $= \dfrac{5}{4}$

$$\frac{(x+6)^2}{144} - \frac{(y-9)^2}{81} = 1$$