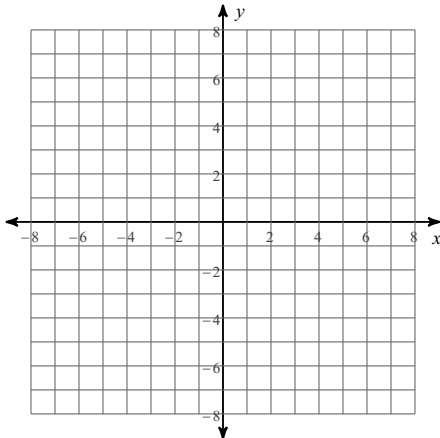


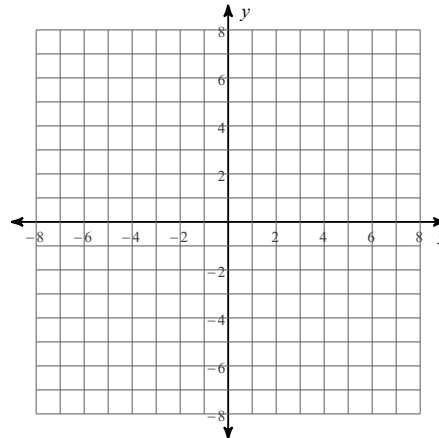
9.5 Graphing Hyperbolas

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

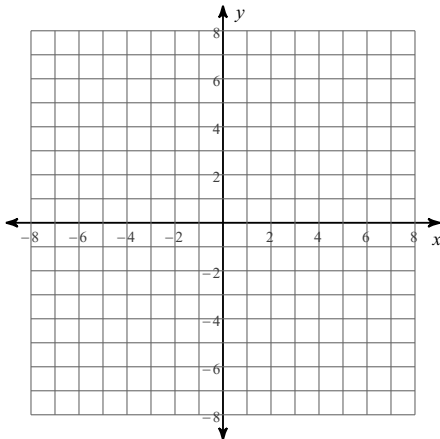
$$1) \frac{x^2}{25} - \frac{(y-1)^2}{16} = 1$$



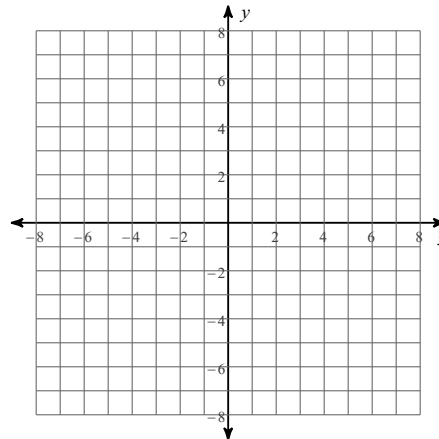
$$2) \frac{y^2}{25} - \frac{x^2}{4} = 1$$



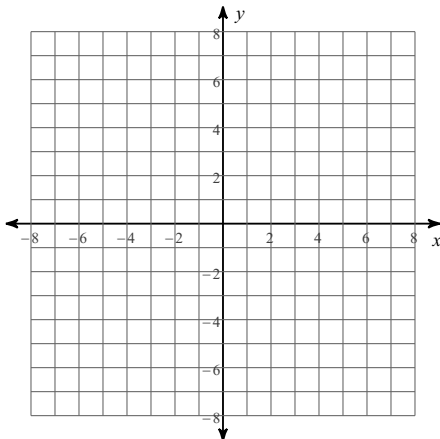
$$3) \frac{(x-2)^2}{4} - \frac{(y+2)^2}{9} = 1$$



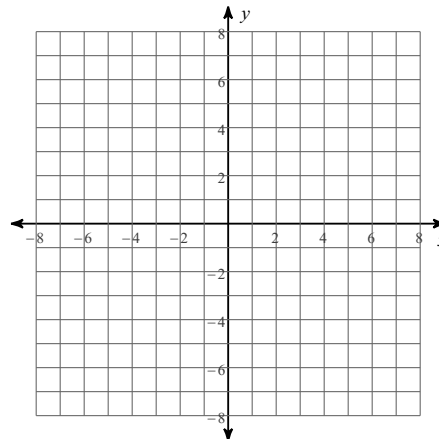
$$4) \frac{(y-2)^2}{9} - \frac{(x+1)^2}{9} = 1$$



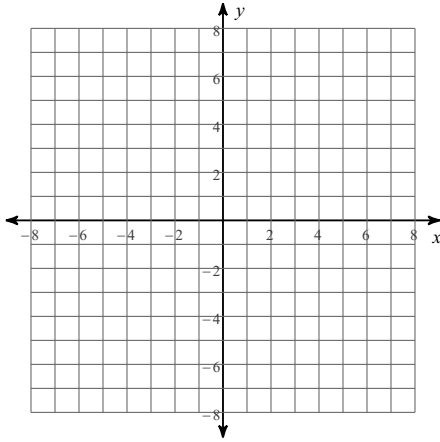
$$5) \frac{(y+1)^2}{16} - \frac{(x-1)^2}{16} = 1$$



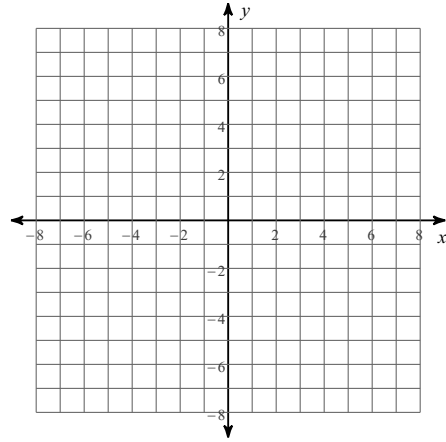
$$6) \frac{x^2}{25} - \frac{(y-1)^2}{15} = 1$$



7) $-9x^2 + 16y^2 - 18x - 32y - 137 = 0$



8) $4x^2 - 25y^2 - 50y - 125 = 0$



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

9) $x^2 - 25y^2 - 6x - 100y - 116 = 0$

10) $-4x^2 + 9y^2 - 72x - 144y + 108 = 0$

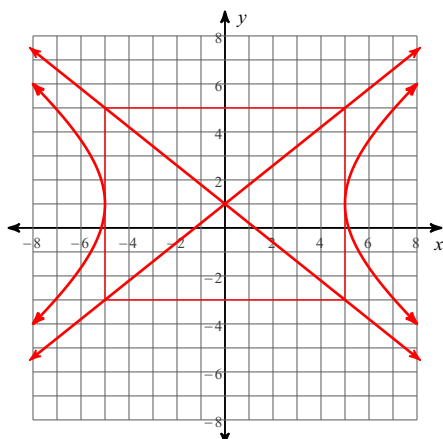
11) Vertices: $(25, -8), (-5, -8)$
 Foci: $(10 + 3\sqrt{41}, -8), (10 - 3\sqrt{41}, -8)$

12) Vertices: $(16, 2), (-2, 2)$
 Foci: $(7 + \sqrt{145}, 2), (7 - \sqrt{145}, 2)$

9.5 Graphing Hyperbolas

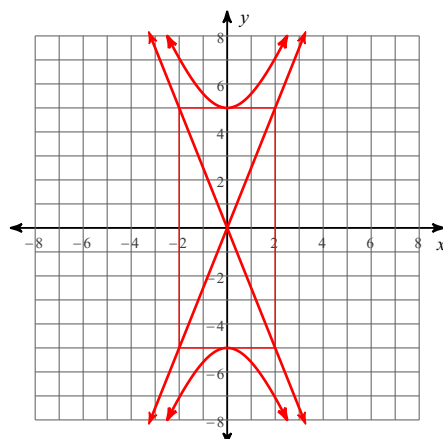
Identify the vertices and foci of each. Then sketch the graph.

1) $\frac{x^2}{25} - \frac{(y-1)^2}{16} = 1$



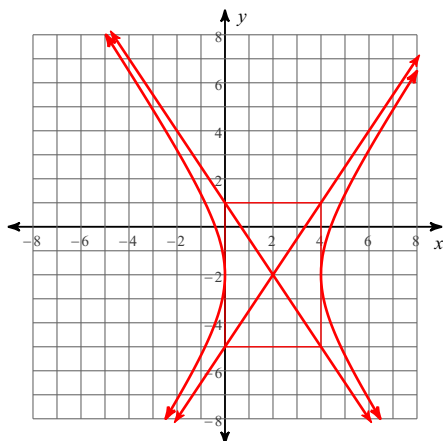
Vertices: (5, 1)
(-5, 1)
Foci: ($\sqrt{41}$, 1)
($-\sqrt{41}$, 1)
Asym.: $y = \frac{4}{5}x + 1$
 $y = -\frac{4}{5}x + 1$

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



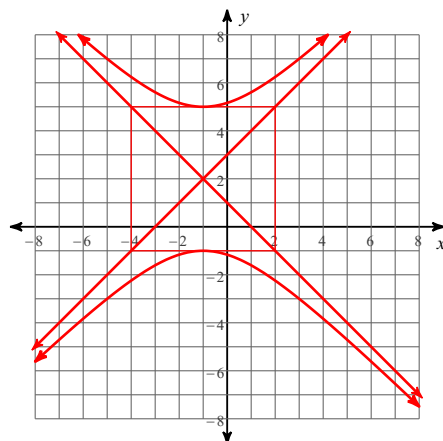
Vertices: (0, 5)
(0, -5)
Foci: (0, $\sqrt{29}$)
(0, $-\sqrt{29}$)
Asym.: $y = \frac{5}{2}x$
 $y = -\frac{5}{2}x$

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



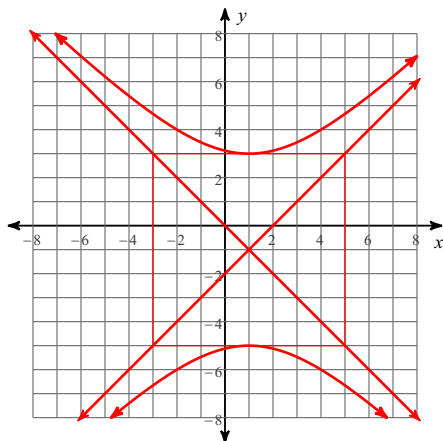
Vertices: (4, -2)
(0, -2)
Foci: (2 + $\sqrt{13}$, -2)
(2 - $\sqrt{13}$, -2)
Asym.: $y = \frac{3}{2}x - 5$
 $y = -\frac{3}{2}x + 1$

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



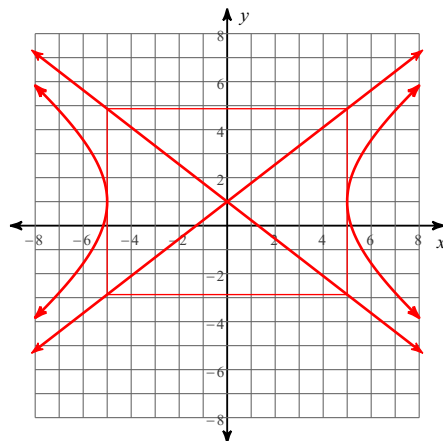
Vertices: (-1, 5)
(-1, -1)
Foci: (-1, 2 + $3\sqrt{2}$)
(-1, 2 - $3\sqrt{2}$)
Asym.: $y = x + 3$
 $y = -x + 1$

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



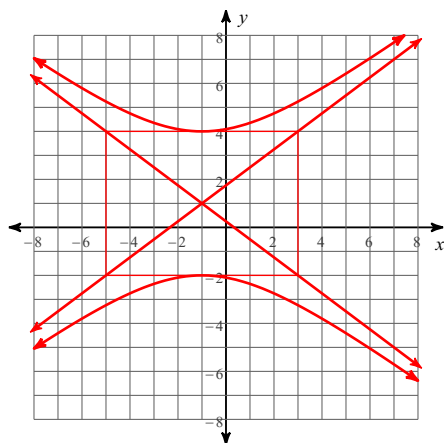
Vertices: (1, 3)
(1, -5)
Foci: (1, -1 + $4\sqrt{2}$)
(1, -1 - $4\sqrt{2}$)
Asym.: $y = x - 2$
 $y = -x$

6) $\frac{x^2}{25} - \frac{(y-1)^2}{15} = 1$



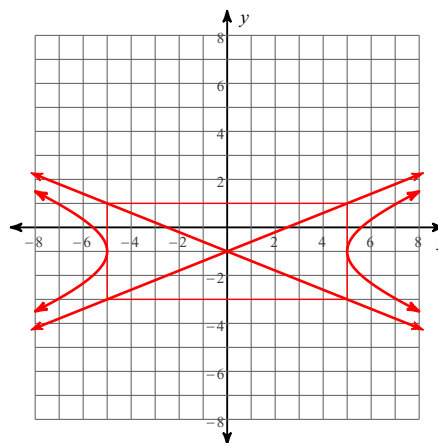
Vertices: (5, 1)
(-5, 1)
Foci: (2 $\sqrt{10}$, 1)
(-2 $\sqrt{10}$, 1)
Asym.: $y = \frac{x\sqrt{15}}{5} + 1$
 $y = -\frac{x\sqrt{15}}{5} + 1$

$$7) -9x^2 + 16y^2 - 18x - 32y - 137 = 0$$



Vertices: $(-1, 4)$
 $(-1, -2)$
 Foci: $(-1, 6)$
 $(-1, -4)$
 Asym.: $y = \frac{3}{4}x + \frac{7}{4}$
 $y = -\frac{3}{4}x + \frac{1}{4}$

$$8) 4x^2 - 25y^2 - 50y - 125 = 0$$



Vertices: $(5, -1)$
 $(-5, -1)$
 Foci: $(\sqrt{29}, -1)$
 $(-\sqrt{29}, -1)$
 Asym.: $y = \frac{2}{5}x - 1$
 $y = -\frac{2}{5}x - 1$

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

$$9) x^2 - 25y^2 - 6x - 100y - 116 = 0$$

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

$$10) -4x^2 + 9y^2 - 72x - 144y + 108 = 0$$

$$\frac{(y - 8)^2}{16} - \frac{(x + 9)^2}{36} = 1$$

11) Vertices: $(25, -8), (-5, -8)$
 Foci: $(10 + 3\sqrt{41}, -8), (10 - 3\sqrt{41}, -8)$

$$\frac{(x - 10)^2}{225} - \frac{(y + 8)^2}{144} = 1$$

12) Vertices: $(16, 2), (-2, 2)$
 Foci: $(7 + \sqrt{145}, 2), (7 - \sqrt{145}, 2)$

$$\frac{(x - 7)^2}{81} - \frac{(y - 2)^2}{64} = 1$$