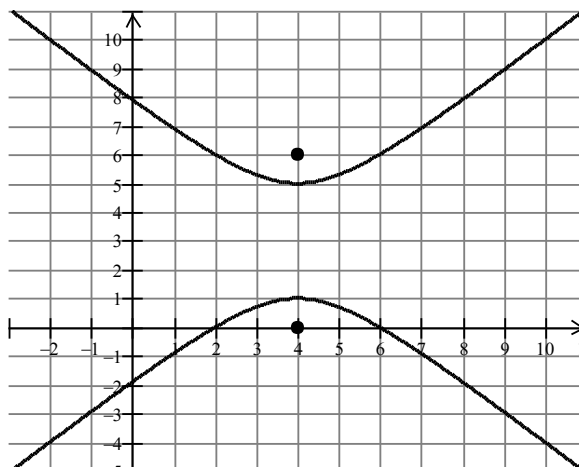


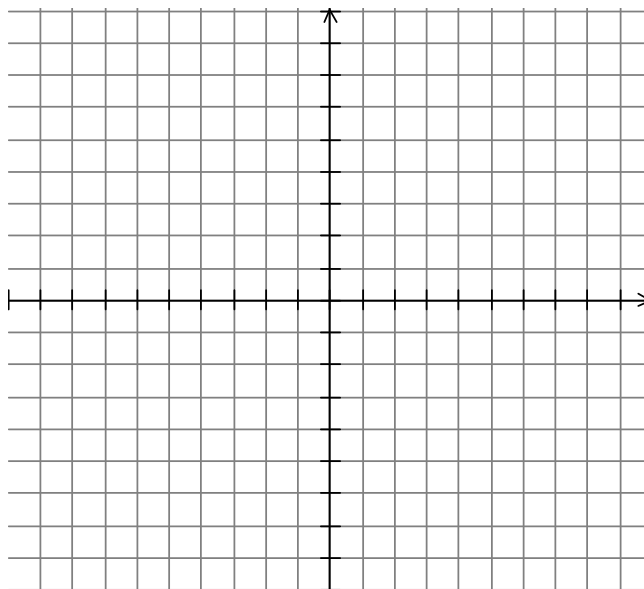
Show all work for credit. Also, give exact answers unless otherwise noted.

1. Find an equation of the given hyperbola with the given foci.



2. Find an equation of the hyperbola that has vertices $V(-1, -5)$ and $V'(5, -5)$, and that passes through the point $(8, -2)$.

3. Find the vertices and foci of the hyperbola given by the equation $4x^2 - 9y^2 + 24x + 18y - 9 = 0$. Sketch the graph and show the asymptotes and foci.



4. A parabolic arch has a center height of k feet. Prove that the height of the rectangle with the largest area that can fit under the arch is $\frac{2}{3}k$ feet.
5. A cruise ship is traveling a course that is 100 miles east of, and parallel to, a straight north/south shoreline. The ship sends out a distress signal, which is received by two Coast Guard stations Alpha and Beta, located 200 miles apart on the shore. By measuring the difference in signal reception times, officials determine that the ship is 160 miles closer to Beta than Alpha. Where is the ship?