

Find the coordinates of the vertices and the foci for the following Hyperbolas.

1.  $\frac{x^2}{4} - \frac{y^2}{9} = 1$

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

3.  $4x^2 - 25y^2 = 100$

4.  $4y^2 - x^2 = 16$

Write an equation for a hyperbola that satisfies each set of conditions.

5. Center at (0, 0), vertex at (4, 0), focus at (5,0)

6. Center at (0, 0), vertex at (-5, 0), focus at (-8,0)

7. Center at (0, 0), focus at (0, 5), co-vertex at (-4, 0)

8. Center at (0, 0), focus at (0, -6), length of conjugate axis is 10 units.

9. Center at (0, 0), vertex at (6, 0), equations of asymptotes:  $y = \pm \frac{2}{3} x$

10. Center at (0,0), vertex at (0, -4), equations of asymptotes:  $y = \pm \frac{2}{5} x$

11. Center at (0, 0), focus at (5, 0), equations of asymptotes:  $y = \pm \frac{1}{2} x$

12. Center at (0,0), focus at (0, 10), equations of asymptotes:  $y = \pm 3 x$

Find the coordinates of the foci, the lengths of transverse and conjugate axes, and the equations of the asymptotes for the hyperbola with the given equation. Then Graph the hyperbola.

13.  $\frac{x^2}{36} - \frac{y^2}{16} = 1$

14.  $\frac{y^2}{16} - \frac{x^2}{4} = 1$

15.  $9x^2 - 25y^2 = 225.$