12-6A Lesson Master

SKILLS Objective B

In 1–3, write an equation for a hyperbola satisfying the given conditions.

1. The vertices are (3, 0) and (-3, 0) and the asymptotes are \( y = \pm \frac{2}{3}x \).

2. The vertices are (-12, 0) and (12, 0) and the foci are (-15, 0) and (15, 0).

3. The vertices are (5, 0) and (-5, 0) and the point (10, 3) is on the hyperbola.

PROPERTIES Objective E

In 4 and 5, an equation for a hyperbola is given. Name a. its vertices, b. its asymptotes, and c. its foci.

4. \( \frac{x^2}{6^2} - \frac{y^2}{3^2} = 1 \)
   
   a. __________________________
   
   b. __________________________
   
   c. __________________________

5. \( \frac{x^2}{121} - \frac{y^2}{25} = 1 \)
   
   a. __________________________
   
   b. __________________________
   
   c. __________________________

PROPERTIES Objective F

In 6–8, given points \( G \) and \( H \) and a line \( \ell \), determine whether the figure described is a hyperbola, an ellipse, or a parabola.

6. The set of all points \( P \) where \( PG + PH \) is constant. __________________________

7. The set of all points \( P \) where \( PG - PH \) is constant. __________________________

8. The set of all points \( P \) where the distance from \( P \) to \( \ell \) is equal to the distance \( PG \). __________________________
REPRESENTATIONS  Objective I

11. Write an equation for the hyperbola graphed below.

\[ \frac{x^2}{25} - \frac{y^2}{16} = 1 \]

12. Graph the hyperbola \( \frac{x^2}{25} - \frac{y^2}{16} = 1 \) below. Label the vertices and asymptotes on your graph.

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REPRESENTATIONS  Objective L

In 13 and 14, graph the hyperbola described and its asymptotes below each question.

13. The vertices are (3, 0) and (-3, 0) the asymptotes are \( y = \pm \frac{4}{3} x \).

14. The focal constant is 10 and the foci are (6, 0) and (-6, 0).