

## Hyperbola Worksheet

**Graph each hyperbola. Identify the center, vertices, co-vertices, foci, asymptotes, and the latus rectum.**

1.  $x^2 - y^2 = 1$       2.  $y^2 - x^2 = 1$       3.  $\frac{y^2}{9} - \frac{x^2}{25} = 1$

4.  $\frac{x^2}{4} - \frac{y^2}{9} = 1$       5.  $x^2 - \frac{y^2}{4} = 1$       6.  $y^2 - \frac{x^2}{9} = 1$

7.  $\frac{y^2}{100} - \frac{x^2}{64} = 1$       8.  $\frac{y^2}{25} - \frac{x^2}{36} = 1$       9.  $4x^2 - 25y^2 = 100$

10.  $36y^2 - 4x^2 = 144$       11.  $\frac{(x-1)^2}{4} - \frac{(y+2)^2}{9} = 1$

12.  $\frac{(x+2)^2}{9} - \frac{(y-2)^2}{16} = 1$       13.  $\frac{y^2}{1} - \frac{(x+1)^2}{9} = 1$

**Write the standard equation for the hyperbola with the given characteristics.**

14. vertices:  $(-3, 0)$  and  $(3, 0)$ ; co-vertices:  $(0, -5)$  and  $(0, 5)$

15. vertices:  $(0, -2)$  and  $(0, 2)$ ; co-vertices:  $(-4, 0)$  and  $(4, 0)$

16. vertices:  $(0, -4)$  and  $(0, 4)$ ; foci:  $(0, -5)$  and  $(0, 5)$

17. vertices:  $(-5, 0)$  and  $(5, 0)$ ; foci  $(-7, 0)$  and  $(7, 0)$

18. vertices:  $(2, 5)$  and  $(6, 5)$ ; foci:  $(1, 5)$  and  $(7, 5)$

19. vertices:  $(0, 1)$  and  $(4, 1)$ ; foci:  $(-1, 1)$  and  $(5, 1)$

20. co-vertices:  $(0, -2)$  and  $(0, 2)$ ; foci:  $(-3, 0)$  and  $(3, 0)$

21. co-vertices:  $(-1, 0)$  and  $(1, 0)$ ; foci:  $(0, -2)$  and  $(0, 2)$
22. center:  $(2, 3)$ ; vertices:  $(-1, 3)$  and  $(5, 3)$ ; co-vertices:  $(2, -2)$  and  $(2, 8)$
23. center:  $(-1, -3)$ ; vertices:  $(-6, -3)$  and  $(4, -3)$ ; co-vertices  $(-1, -6)$  and  $(-1, 0)$

**Write the standard equation for each hyperbola. Identify all important information.**

24.  $4x^2 - 9y^2 - 8x + 54y = 113$
25.  $16x^2 - 25y^2 - 32x + 100y = 484$
26.  $4y^2 - 36x^2 - 72x + 8y = 176$
27.  $25y^2 - 16x^2 + 64x - 50y = 439$
28.  $y^2 - 9x^2 - 6y = 36 + 36x$
29.  $16x^2 - 9y^2 + 64x = 89 - 18y$

**Write the standard equations for both hyperbolas whose asymptotes contain the diagonals of rectangle ABCD and whose vertices lie on the sides of the given rectangle.**

30.  $A(-5, 4)$ ,  $B(5, 4)$ ,  $C(5, -4)$ ,  $D(-5, -4)$
31.  $A(-2, 6)$ ,  $B(2, 6)$ ,  $C(2, -6)$ ,  $D(-2, -6)$
32.  $A(1, 12)$ ,  $B(11, 12)$ ,  $C(11, 1)$ ,  $D(1, 1)$
33.  $A(0, 7)$ ,  $B(6, 7)$ ,  $C(6, 4)$ ,  $D(0, 4)$