

## Conics- Hyperbolas

Write each of the following in standard form. State whether the hyperbola opens left and right, or up and down.

1.  $9x^2 - 4y^2 - 36x + 24y + 36 = 0$

2.  $-9x^2 + y^2 + 18x + 4y - 41 = 0$

3.  $x^2 - 4y^2 + 40y - 116 = 0$

4.  $9x^2 - 2y^2 + 72x - 24y + 54 = 0$

5.  $-x^2 + 4y^2 - 16x - 40y + 4 = 0$

6.  $-9x^2 + 25y^2 + 126x + 100y - 566 = 0$

7.  $25x^2 - 36y^2 + 150x - 675 = 0$

8.  $-25x^2 + 4y^2 - 50x - 48y + 19 = 0$

Graph each of the following. Label all vertices and foci.

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

10.  $\frac{(x-4)^2}{9} - \frac{(y+5)^2}{4} = 1$

11.  $x^2 - 4y^2 + 24y - 52 = 0$

12.  $-9x^2 + 25y^2 + 54x - 250y + 319 = 0$

13.  $9x^2 - 4y^2 - 36x - 32y + 8 = 0$

14.  $9x^2 - 4y^2 - 90x + 189 = 0$

15.  $9x^2 - 49y^2 - 18x + 196y - 628 = 0$

16.  $x^2 - 9y^2 - 4x - 54y - 41 = 0$

17.  $-x^2 + 4y^2 + 6x - 40y + 75 = 0$

18.  $25x^2 - 4y^2 + 200x - 8y + 296 = 0$