Conics- The Ellipse

Write each of the following in standard form. Identify the center of each ellipse, as well as whether the ellipse has a Horizontal or Vertical Major Axis.

1.
$$9x^2 + 4y^2 + 54x - 48y + 189 = 0$$

2. $x^2 + 4y^2 - 10x - 16y + 25 = 0$
3. $4x^2 + 3y^2 + 16x + 42y + 151 = 0$
4. $4x^2 + 25y^2 + 16x + 150y + 141 = 0$

6. $15x^2 + 4y^2 - 90x - 48y + 219 = 0$

Graph each of the following. Label the center, the four vertices and the foci.

5. $x^2 + 4y^2 - 14x - 16y + 29 = 0$

7.
$$\frac{(x-7)^2}{9} + \frac{(y+1)^2}{64} = 1$$

8. $\frac{(x+3)^2}{16} + \frac{(y+2)^2}{4} = 1$

9.
$$25x^2 + 4y^2 - 150x - 8y + 129 = 0$$

10. $9x^2 + 16y^2 - 72x - 96y + 144 = 0$

11.
$$9x^2 + y^2 + 72x + 6y + 144 = 0$$

12. $x^2 + 9y^2 + 2x + 54y + 46 = 0$

13.
$$9x^2 + 49y^2 + 294y = 0$$

14. $25x^2 + 4y^2 - 200x + 300 = 0$

15.
$$9x^2 + 16y^2 - 54x - 64y + 1 = 0$$

16. $9x^2 + y^2 - 72x + 8y + 124 = 0$

Find the equation of the ellipse given the following.

- **17.** Find the equation of the ellipse in standard from that has a center at (-3,2), a vertical major axis of 16 units, and a horizontal minor axis of 10 units.
- **18.** Find the equation of the ellipse in standard from that has a center at (4,7), a vertical minor axis of 12 units, and a horizontal major axis of 20 units.
- **19.** Find the equation of the ellipse in standard from that has a center at (-2,-5), a vertical major axis of 10 units, and a horizontal minor axis of 4 units.
- **20.** Find the equation of the ellipse that has the center at the origin, x-intercepts of (-3,0) and (3,0), and y-intercepts of (0,7) and (0,-7).
- **21.** Find the equation of the ellipse that has the center at the origin, an x-intercept of (12,0), and a y-intercept of (0,3).
- **22.** Find the equation of an ellipse that has vertices of (-1,5), (3,13), (7,5) and (3,-3).
- **23.** Find the equation of an ellipse that has vertices of (-7,7), (-2,9), (3,7) and (-2,5).
- **24.** Find the equation of an ellipse that has vertices of (1,-6), (5,3), (9,-6) and (5,-15).
- **25.** Find the equation of an ellipse that has foci of (6,0) and (6,6) and the sum of the focal radii is 10.