

Part A: Sketch the graph of each of the following conic sections on graph paper.

Be sure to include the features listed below.

- If it is a circle, label the center and radius.
- If it is a parabola, label the vertex, focus and the equation for the directrix.
- If it is a hyperbola, label the center, vertices, foci and the equations for the asymptotes.
- If it is an ellipse, label the center, vertices, and foci.

1. $x^2 + y^2 = 11$

7. $(y + 5)^2 = 12x$

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

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

3. $x^2 = -8y$

9. $\frac{(x + 2)^2}{25} - \frac{(y + 3)^2}{4} = 1$

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

10. $(x - 2)^2 = 4(y + 6)$

5. $\frac{(x + 1)^2}{25} + \frac{(y + 2)^2}{9} = 1$

11. $(x - 3)^2 + \frac{(y + 4)^2}{10} = 1$

6. $(x - 4)^2 + (y + 1)^2 = 25$

12. $x^2 + (y + 6)^2 = 36$

Part B: For each of the following:

a) Write the equation in standard form.

b) Identify the type of conic section that is represented by the equation.

c) State the indicated features of each conic section

- If it is a circle, state the center and radius.
- If it is a parabola, state the vertex, focus and the equation for the directrix.
- If it is a hyperbola, state the center, vertices, foci and the equations for the asymptotes.
- If it is an ellipse, state the center, vertices, and foci.

You do not need to graph each of these, but it never hurts to practice! ☺

1. $4x^2 + 4y^2 = 9$

9. $16x^2 - 9y^2 - 64x - 18y - 89 = 0$

2. $4x^2 + 3y^2 = 24$

10. $x^2 + 4x = -2y$

3. $y^2 - 6x^2 = 12$

11. $x^2 + y^2 + 40x + 6y + 359 = 0$

4. $x^2 - 10y = 0$

12. $2x^2 + 3y^2 - 8x + 6y + 5 = 0$

5. $4(x-11)^2 - 5(y-17)^2 = 100$

13. $4x^2 + 9y^2 - 16x - 18y = 11$

6. $27(x+1)^2 + 2(y-10)^2 = 54$

14. $(y-3)^2 = 8x + 20$

7. $3y^2 + 11x = 0$

15. $x^2 - 8y^2 - 8x + 80y - 176 = 0$

8. $3(x-5)^2 + 3(y-11)^2 = 6$

16. $2x^2 + 2y^2 - 12x + 8y - 37 = 0$