(x - 3)^2 + (y - 9)^2 ≥ 9
(See Exercise 4.)

y ≤ -x^2 - 6x + 6
(See Exercise 5.)

(x - 3)^2 + (y + 2)^2 ≥ 1
(See Exercise 6.)

35. 9x^2 + 25y^2 ≤ 225
\[ x^2 + 4y^2 ≥ 16 \]

36. \[ \frac{x^2}{16} + \frac{y^2}{9} ≤ 1 \]

37. \[ \frac{x^2}{9} + \frac{y^2}{16} ≤ 1 \]

**KEY TERMS**

Review these **key terms** so that you are able to define or describe them. A clear understanding of these terms is very helpful when reviewing the developments of this chapter.

- Quadratic function
- Parabola
- Axis of symmetry and vertex
- Increasing and decreasing
- Concave up and concave down
- Vertical shift of parabolas
- Horizontal shift of parabolas
- Multiplying ordinates
- Relation
- Vertical line test for functions
- Quadratic inequality in two variables
- Completing the square
- Quadratic formula
- Roots of a quadratic equation
- Discriminant
- Quadratic inequality in one variable
- Maximum or minimum of a quadratic function
- Distance formula
- Normal formula
- Conic section
- Circle: center, radius
- Tangent to a circle
- Ellipse: major and minor axes, foci, vertices
- Hyperbola: transverse axis, foci, vertices, asymptotes
- Focus
- Directrix
- Vertex
- Axis of symmetry (of a parabola)
- Standard form for a circle, ellipse, hyperbola, parabola
- Nonlinear system of equations or inequalities

**REVIEW EXERCISES**

The solutions to the following exercises can be found within the text of Chapter 3. Try to answer each question before referring to the text.

Section 3.1

Graph each of the following.

1. \( y = x^2 \)
2. \( y = x^2 + 2 \)
3. \( y = x^2 - 2 \)
4. \( y = (x + 2)^2 \)
5. \( y = (x - 2)^2 \)
6. \( y = -x^2 \)
7. \( y = \frac{1}{2}x^2 \)
8. \( y = 2x^2 \)
9. \( y = -x^2 + 2 \)
10. \( y = f(x) = -(x - 2)^2 + 1 \)
11. \( y = f(x) = -2(x - 3)^2 + 4 \)
12. \( x = y^2 \)
13. \( x = (y + 2)^2 - 4 \)
14. \( y ≥ x^2 \)
15. \( y + (x - 2)^2 ≤ 5 \)

Section 3.2

Write in standard form.

16. \( y = x^2 + 4x + 3 \)
17. \( y = 2x^2 - 12x + 11 \)
18. \( y = -\frac{1}{2}x^2 - 2x + 1 \)

Write in standard form, graph, and give the vertex and axis of symmetry.

19. \( y = x^2 - 4x + 4 \)
20. \( y = -2 - 4x + 3x^2 \)

21. Graph the function \( y = f(x) = |x^2 - 4| \) and find the range.
22. State the conditions on the values \( a \) and \( k \) so that the parabola \( y = a(x - h)^2 + k \) opens downward and intersects the \( x \)-axis in two points. What are the domain and range of this function?