

Check your answers with those at the back of the book.

8. Graph $(x + 1) = \frac{1}{8}(y + 3)^2$. Label the vertex, focus, directrix, and axis.
7. Find the vertex, focus, directrix, and axis of the parabola $x^2 + 10x + 16y - 7 = 0$.
6. Find an equation of the parabola having focus $(0, 3)$ and vertex $(-4, 3)$.
5. Find the center and radius of the circle whose equation is $x^2 + y^2 + 12x - 4y + 32 = 0$.
4. Find an equation of the circle with center $(5, -4)$ and radius 7.
3. Determine whether the three points $A(2, 2)$, $B(8, 6)$, and $C(11, 10)$ are collinear by comparing the lengths of \overline{AB} , \overline{BC} , and \overline{AC} .
2. Find the midpoint of the line segment having endpoints $(-3, 5)$ and $(8, 11)$.
1. Find the distance between $(3, -6)$ and $(4, 2)$.

Obj. 9-3, p. 412

Obj. 9-2, p. 407

Obj. 9-1, p. 401

- Pythagorean theorem (p. 401)
- distance formula (p. 402)
- midpoint formula (p. 402)
- conic section (p. 407)
- conic (p. 407)
- circle (p. 407)
- radius (p. 407)
- center (p. 407)
- translation (p. 408)
- parabola (p. 412)
- directrix (p. 412)
- focus (of a parabola) (p. 412)
- vertex (p. 412)
- axis of symmetry (p. 412)

Vocabulary

Self-Test 1

6. The circle with center $(-1, 3)$ and radius 4.
5. The perpendicular bisector of the segment with endpoints $(7, -2)$ and $(1, -8)$.
4. The line having slope $\frac{3}{2}$ and passing through $(-2, -3)$.

Find an equation for each figure described.

1. $P(-3, 2)$, $Q(5, 2)$
2. $P(1, -6)$, $Q(3, 2)$
3. $P(4, 3)$, $Q(-3, 4)$

For the given points P and Q , find (a) the slope of \overline{PQ} , (b) the distance PQ , and (c) the midpoint of \overline{PQ} . Express radicals in simplest form.

Mixed Review Exercises

Check your answers with those at the back of the book.

Obj. 9-6, p. 432

Obj. 9-5, p. 426

Obj. 9-4, p. 418

- center (of an ellipse) (p. 419)
- major axis (p. 419)
- minor axis (p. 419)
- hyperbola (p. 426)
- focal radii (of a hyperbola) (p. 426)
- asymptotes (p. 427)
- central conic (p. 432)

- ellipse (p. 418)
- focus (of an ellipse) (p. 418)
- symmetric about the x-axis (p. 419)
- symmetric about the y-axis (p. 419)
- symmetric about the origin (p. 419)

Self-Test 2

Vocabulary

- Identify each conic. Find its center and its foci (if any). Then draw its graph. You may wish to check your graphs on a computer or graphing calculator.
13. $x^2 - 4y^2 - 2x - 24y - 39 = 0$
 15. $x^2 + y^2 - 6x - 16y + 57 = 0$
 17. $9x^2 + 25y^2 + 36x - 150y + 36 = 0$
- B** 19. Use the definition of an ellipse to find an equation of the ellipse having foci (1, 1) and (-1, -1) and sum of focal radii 3.
20. Use the definition of a hyperbola to find an equation of the hyperbola having foci (-1, 1) and (1, -1) and difference of focal radii 2.
- C** 21. Every conic section has an equation of the form $Ax^2 + By^2 + Cx + Dy + E = 0$ where A and B are not both zero. Let $A = 1$, $C = 2$, $D = -8$, and $E = 1$. Graph the resulting quadratic equation in two variables for each given value of B. Then identify the graph.
- a. $B = 0$
 - b. $B = 1$
 - c. $B = 4$
 - d. $B = -4$
- e. Analyze the different equations you graphed in parts (a)-(d). What is the relationship between the coefficients A and B for which the general equation gives a circle? a parabola? an ellipse? a hyperbola?

14. $x^2 + 9y^2 + 2x - 18y + 1 = 0$
16. $9x^2 - y^2 - 18x - 6y - 9 = 0$
18. $16x^2 - 9y^2 + 64x + 18y + 199 = 0$