CHAPTER **1**0

Chapter Standardized Test

TEST-TAKING STRATEGY During the test, do not worry excessively about how much time you have left. Concentrate on the question in front of you.

1. MULTIPLE CHOICE What is the midpoint of the line segment connecting points (0, 0) and (-8, 2)?

(A) (-4, 1) (B) (4, 1) (C) (4, -1)(D) (1, 4) (E) (1, -4)

2. MULTIPLE CHOICE Which equation represents the perpendicular bisector of the line segment connecting points (-7, 1) and (9, 13)?

(A)
$$y = -\frac{4}{3}x + \frac{25}{3}$$

(B) $y = \frac{3}{4}x + \frac{25}{4}$
(C) $y = \frac{4}{3}x + \frac{25}{3}$
(D) $y = \frac{4}{3}x + \frac{17}{3}$
(E) $y = -\frac{4}{3}x + \frac{17}{3}$

3. MULTIPLE CHOICE Which equation is graphed?



4. MULTIPLE CHOICE What is the standard form of the ellipse with center at (0, 0), vertex at (0, 9), and co-vertex at (4, 0)?

(A)
$$\frac{x^2}{9} + \frac{y^2}{4} = 1$$

(B) $\frac{x^2}{4} + \frac{y^2}{9} = 1$
(C) $\frac{x^2}{81} + \frac{y^2}{16} = 1$
(D) $\frac{x^2}{16} + \frac{y^2}{81} = 1$
(E) $\frac{x^2}{2} + \frac{y^2}{3} = 1$

5. MULTIPLE CHOICE What is the focus of the parabola with equation $2x^2 = -120y$?

(A) (0, 60)
(B) (0, 15)
(C) (0, -60)
(D) (0, 12)
(E) (0, -15)

6. MULTIPLE CHOICE What is the directrix of the parabola with equation $y^2 = 24x$?

(A)
$$x = 6$$
 (B) $x = -6$ (C) $x = 24$
(D) $y = 6$ (E) $y = -6$

7. MULTIPLE CHOICE Which graph represents the equation $\frac{y^2}{25} - \frac{x^2}{9} = 1$?











- 8. **MULTIPLE CHOICE** What conic does the equation $x^2 5x + 10y + 11 = 0$ represent?
 - (A) circle (B) ellipse

 - E none of the above
- **9. MULTIPLE CHOICE** What point is the intersection of the graphs of $x^2 + y^2 = 41$ and y = 3x 7?

(
$$-4, -4$$
) **(B)** (4, 5) **(C)** (5, 8)

(D
$$(3, 2)$$
 (E $(-4, -19)$

QUANTITATIVE COMPARISON In Exercises 10 and 11, choose the statement that is true about the given quantities.

- A The quantity in column A is greater.
- **B** The quantity in column B is greater.
- **C** The two quantities are equal.
- **D** The relationship cannot be determined from the given information.

	Column A	Column B
10.	Distance between $(3, -2)$ and $(-5, 7)$	Distance between $(-8, -1)$ and $(0, 8)$
11.	Discriminant of $x^2 + y^2 - 6x + 1 = 0$	Discriminant of $3x^2 + y^2 - 2y + 5 = 0$

- **12. MULTI-STEP PROBLEM** Let (0, 0) represent a water fountain located in a city park. Each day Jane runs through the park along a path given by the equation $x^2 + y^2 200x 52,500 = 0$ where x and y are measured in meters.
 - **a.** *Writing* What type of conic is Jane's path? How do you know?
 - **b**. Write the equation of the conic in standard form. Then graph the equation.
 - **c.** After her run, Jane walks to the water fountain. If Jane stops running at (-100, 150), how far must she walk for a drink of water?
- **13. MULTI-STEP PROBLEM** The Mars Global Surveyor spacecraft followed an elliptical path with the center of Mars at one focus. The spacecraft's initial orbit had a low point of 262 kilometers above the northern hemisphere and a high point of 54,026 kilometers above the southern hemisphere. Source: NASA
 - **a.** *Writing* The radius of Mars is approximately 5400 kilometers. If (0, 0) represents the center of Mars and the positive *y*-axis represents north, what are the coordinates of the other focus of the orbit? How do you know?
 - **b**. Write an equation for the spacecraft's initial orbit around Mars.
 - **c.** In February, 1999, the spacecraft reached a nearly circular orbit, 410 kilometers above the surface of Mars. Write and graph an equation of the orbit.
- **14. MULTI-STEP PROBLEM** Sara Peters is a mail carrier for a post office that receives mail for everyone living within a radius of 5 miles. Her route covers the portions of Anderson Road and Murphy Road that pass through this region.
 - **a.** Assume that the post office is located at the point (0, 0). Write an equation for the circle that bounds the region where the mail is delivered.
 - **b.** Assuming Anderson Road follows one branch of a hyperbolic path given by $x^2 y^2 4x 23 = 0$, graph Anderson Road and the circular region where Sara delivers mail.
 - c. Writing If Sara begins delivery on Anderson Road at the point (-4, -3), where on Anderson Road does she end delivery? How do you know?
 - **d.** Sara finishes delivering on Anderson Road at the point where it intersects both the circular boundary and Murphy Road. At the intersection, she begins delivering on Murphy Road which is a straight road that cuts through the center of the circular region past the post office. Find the equation that represents Murphy Road. Where does Sara Peters end delivery on Murphy Road?