Choice E, "NOTA", means "none of these answers".

1. What is the radius of the figure defined by the equation $x^2 + y^2 + 8x - 6y - 15 = 0$?

   A) 10 B) $2\sqrt{10}$ C) 20 D) 40 E) NOTA

2. What is the length of the major axis of the figure defined by the following: $36x^2 + 9y^2 = 324$?

   A) 3 B) 6 C) 9 D) 12 E) NOTA

3. What is the vertex of the figure defined by the equation $y^2 - 6y + 32x - 23 = 0$?

   A) (1, -3) B) (-3,1) C) (1, 0) D) (1, 3) E) NOTA

4. What is the center of the figure defined by the equation $x^2 + y^2 + 14x - 2y - 94 = 0$?

   A) (-7, 1) B) (7, 1) C) (-7, 2) D) (7, -1) E) NOTA

5. What type of conic section is defined by the equation $9x^2 - 36x + 9 = y^2 - 6y - 18$?

   A) Circle B) Ellipse C) Hyperbola D) Parabola E) NOTA

6. Which of the following is the equation of the parabola which has vertex at (2, 1) and focus at (2, 4)?

   A) $y^2 + 6y + 9 + 16x = 16$ B) $y = \frac{1}{4}x^2 - x + 2$ C) $y = \frac{1}{12}\left(x^2 - 4x - 8\right)$ D) $y = \frac{1}{12}\left(x^2 + 4x + 16\right)$ E) NOTA

7. What is the equation of the directrix of the parabola which has vertex at (1, -3) and focus at (-3, -3)?

   A) $y = -3$ B) $x = 2$ C) $x = 5$ D) $y = 5$ E) NOTA

8. Find the length of the radius of the circle that is tangent to the line $5x - 3y = 7$, and has center at (-3, 4).

   A) $2\sqrt{7}$ B) $\sqrt{34}$ C) 6 D) $3\sqrt{5}$ E) NOTA

9. Which of the points listed below is one of the foci of the ellipse $3x^2 + 4y^2 - 6x + 16y + 7 = 0$?

   A) (0, -2) B) $\left(1 + \sqrt{7}, -2\right)$ C) (-4, -2) D) (1, -1) E) NOTA

10. What is the length of the transverse axis of the hyperbola with equation $9x^2 - 90x - 16y^2 + 64y + 17 = 0$?

A) 6 B) 8 C) 9 D) 16 E) NOTA

11. What geometric figure is defined by the following equation: $6x = y^2 - 2y + x^2 - 5$?

A) circle B) ellipse C) hyperbola D) parabola E) NOTA

12. A diameter of a circle has endpoints at (-2, 3) and (6, 5). What is the area enclosed by this circle?

A) 68π B) 20π C) 17π D) 10π E) NOTA

13. Which of the following points is the focus of the parabola $y^2 - 4y - 4x = 0$?

A) (-1, 1) B) (-1, 3) C) (2, -1) D) (0, 2) E) NOTA

14. Which of the equations below represents one of the asymptotes of the graph of $4x^2 - 24x - 9y^2 - 36y = 36$?

A) $3x - 2y = 5$ B) $2x - 3y = 0$ C) $2x - 3y = 12$ D) $2x + 3y = 12$ E) NOTA

15. An ellipse has foci at (3, 4) and (3, -2); the length of the minor axis is 8. What is the area enclosed by this ellipse?

A) 12π B) 15π C) 20π D) 25π E) NOTA

16. Find the area enclosed by the circle that passes through the points (-2, 3), (6, -5), and (0, 7).

A) 50π B) 25π C) 48π D) 24π E) NOTA

17. A point P moves across the coordinate plane on a path such that the sum of the distances from the P to (5, -1) and (5, 3) is 8. Which equation below describes the path of point P ?

A) $3(x-5)^2 + 4(y-1)^2 = 12$ B) $(x-5)^2 + 2(y-1)^2 = 12$ E) NOTA

C) $4(x-5)^2 + 3(y-1)^2 = 48$ D) $3(x-5)^2 + 4(y-1)^2 = 48$

18. Which of the following points is a vertex of the graph of $25x^2 - 4y^2 + 100x + 24y = 36$

A) (-4,3) B) (2, 3) C) (-2, 5) D) (-4, 1) E) NOTA

19. What is the eccentricity of the conic section whose equation is $\frac{(x-3)^2}{4} + \frac{(y+4)^2}{25} = 1$?

A) $\frac{21}{25}$ B) $\frac{\sqrt{21}}{5}$ C) $\frac{4}{25}$ D) $\frac{4}{21}$ E) NOTA

20. Which of the following is the graph of $3x^2 - 12x + 4y^2 - 8y + 16 = 0$?

A) a point B) a hyperbola C) 2 intersecting lines D) an ellipse E) NOTA

21. Find the *x*-intercept of the line that is tangent to the graph of $x^2 = 2y$ at the point (-3, 4.5).

A) 4.5 B) -1.5 C) -4.5 D) 0.5 E) NOTA

22. The center of an ellipse is (-1, 8), and one of its vertices is (-1, 17). The length of the minor axis is 6. Which of the following represents the equation of this ellipse?

A) $x^2 + 2x + 9y^2 - 144y + 495 = 0$ C) $9x^2 + 18x + y^2 - 16y - 16 = 0$ E) NOTA

B) $4x^2 + 8x + y^2 - 16y + 28 = 0$ D) $9x^2 + 18x + y^2 - 16y - 8 = 0$

23. What is the length of the conjugate axis of $9x^2 + 72x - 25y^2 + 100y + 269 = 0$?

A) 10 B) 9 C) 1 D) does not exist E) NOTA

24. A parabola has *x*-intercepts at (2, 0) and (4, 0) and a *y*-intercept of -8. Which of the following is the focus of this parabola?

A) $\left(3, \frac{7}{4}\right)$ B) $\left(3, \frac{5}{4}\right)$ C) $(3,1)$ D) $\left(3, \frac{3}{4}\right)$ E) NOTA

25. Find the *x*-intercept of the line which is tangent to the circle $x^2 + y^2 = 10$ at the point (-1,3).

A) $\frac{10}{3}$ B) 3 C) -10 D) 0 E) NOTA

26. A parabola with a horizontal axis of symmetry passes through the point (3, 3) and has its vertex at (4, 1). What is the arithmetic mean of the *y*-intercepts of this parabola?

A) cannot tell B) 4 C) 0 D) 1 E) NOTA

27. What is the sum of the *y*-intercepts of the asymptotes of the graph of $\frac{(y-3)^2}{25} - \frac{(x-2)^2}{16} = 1$?

A) -6 B) -5 C) 0 D) 5 E) NOTA

28. Which of the following is the directrix of the parabola $y^2 - 12x - 2y + 25 = 0$?

A) $y = -1$ B) $x = -1$ C) $x = 5$ D) $y = 2$ E) NOTA

29. A parabola has focus at (4, -3) and directrix of $y = 6$. Find the length of the latus rectum of this parabola.

A) $\frac{2}{9}$ B) $\frac{9}{2}$ C) 9 D) 18 E) NOTA

30. Which describes the locus of points that are equidistant from a fixed point and a line?

A) ellipse B) parabola C) hyperbola D) a plane E) NOTA