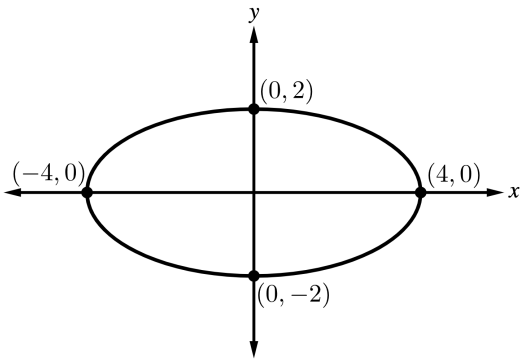
Date Completed: _____
Mentor Initials: _____

Conic Sections

1. Which of the following equations determines the ellipse shown in the standard (x, y) coordinate plane below?

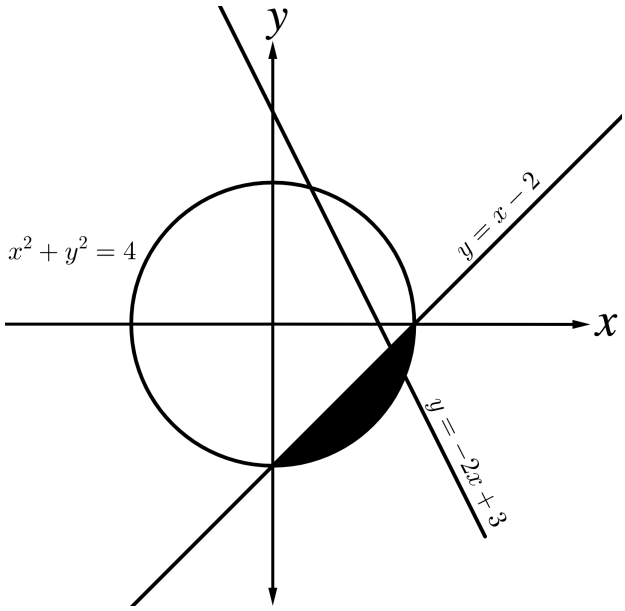


A. $2x^2 + 4y^2 = 8$
B. $4x^2 + 2y^2 = 8$
C. $x^2 + 4y^2 = 16$
D. $4x^2 + y^2 = 16$
E. $x^2 + 4y^2 = 64$

2. Suppose the equations $(x - 6)^2 + (y - 10)^2 = 9$ and $\frac{(x-6)^2}{4} + \frac{(y-4)^2}{9} = 1$ are graphed in the same standard (x, y) coordinate plane. How many points of intersection do these graphs share?

A. 0
B. 1
C. 2
D. 3
E. 4

3 The graphs of $y = -2x + 3, y = x - 2,$ and $x^2 + y^2 = 4$ are shown in the standard (x, y) coordinate plane below. The shaded region is the solution set to one of the following systems of inequalities. What system is it?



A. $y \leq x - 2$

$x^2 + y^2 \leq 4$

B. $y \leq x - 2$

$x^2 + y^2 \geq 4$

C. $y \leq -2x + 3$

$x^2 + y^2 \leq 4$

D. $y \geq x - 2$

$x^2 + y^2 \leq 4$

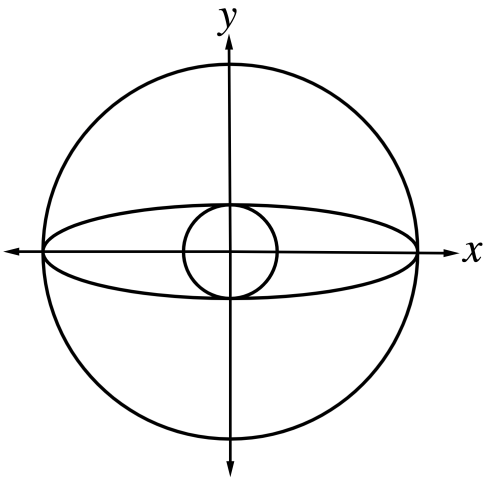
E. $y \geq -2x + 3$

$x^2 + y^2 \geq 4$

4. Which of the following equations is that of a circle that is in the standard (x, y) coordinate plane, has center $(3, -6)$ and radius of 6 coordinate units?

A. $(x - 3) + (y + 6) = 36$
B. $(x + 3) + (y - 6) = 6$
C. $(x + 3)^2 + (y - 6)^2 = 36$
D. $(x - 3)^2 + (y + 6)^2 = 6$
E. $(x - 3)^2 + (y + 6)^2 = 36$

5. Shown below in the standard (x, y) coordinate plane are two circles and one ellipse, each centered at $(0,0)$. The larger circle has equation $x^2 + y^2 = 16$ and intersects the ellipse at exactly two points, both on the x-axis. The smaller circle has equation $x^2 + y^2 = 1$ and intersects the ellipse at exactly two points, both on the y-axis. Which of the following equations represents the ellipse?



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

B. $\frac{x^2}{1} - \frac{y^2}{16} = 1$

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

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

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

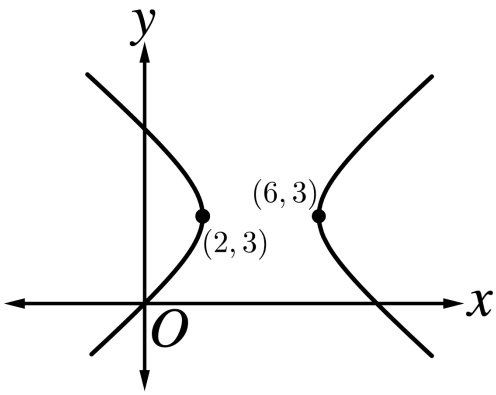
6. The equation $(x + 5)^2 + (y - 10)^2 = 25$ is that of a circle that lies in the standard (x, y) coordinate plane. One endpoint of a diameter of the circle has y-coordinate 6. What is the y-coordinate of the other endpoint of that diameter?

A. -5
B. 2
C. 4
D. 10
E. 14

7. The circle with equation $x^2 + (y-2)^2 = 4$ is graphed in the standard (x, y) coordinate plane below. Suppose the circle rolls along the positive $x-$ axis for 1 rotation and then stops. Which of the following is an equation of the circle in its new position?

A. $(x-4)^2 + (y-2)^2 = 4$
B. $(x-2\pi)^2 + (y-2)^2 = 4$
C. $(x+4\pi)^2 + (y-2)^2 = 4$
D. $(x-4\pi)^2 + (y-2)^2 = 4$
E. $(x-8\pi)^2 + (y-2)^2 = 4$

8. A hyperbola that has vertices (2,3) and (6,3) and that passes through the origin is shown below in the standard (x, y) coordinate plane. The hyperbola has which of the following equations.

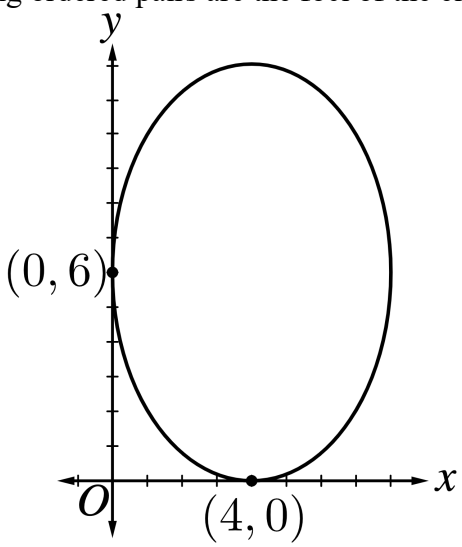


A. $\frac{(x-4)^2}{4} - \frac{(y-3)^2}{9} = 1$
B. $\frac{(x-4)^2}{4} - \frac{(y-3)^2}{3} = 1$
C. $\frac{(x+4)^2}{1} - \frac{(y+3)^2}{9} = 1$
D. $\frac{(x-4)^2}{1} + \frac{3(y-3)^2}{4} = 1$
E. $\frac{(x+4)^2}{4} + \frac{(y+3)^2}{3} = 1$

9. In the standard (x, y) coordinate plane, the circle centered at $(2,4)$ that passes through $(5,0)$ is the set of all points that are:

A. 5 coordinate units from $(2,4)$
B. equidistant from $(2,4)$ and $(5,0)$
C. 5 coordinate units from both $(2,4)$ and $(5,0)$
D. 5 coordinate units from the line segment with endpoints $(2,4)$ and $(5,0)$
E. equidistant from the line segment with endpoints $(2,4)$ and $(5,0)$

10 The ellipse shown in the standard (x, y) coordinate plane below has equation $\frac{(x-4)^2}{16} + \frac{(y-6)^2}{36} = 1$. Which of the following ordered pairs are the foci of the ellipse?



A. $(4, 2)$ and $(4, 10)$
B. $(4, 6 - \sqrt{20})$ and $(4, 6 + \sqrt{20})$
C. $(4, 3)$ and $(4, 9)$
D. $(4 - \sqrt{20}, 6)$ and $(4 + \sqrt{20}, 6)$
E. $(4 - \sqrt{52}, 6)$ and $(4 + \sqrt{52}, 6)$