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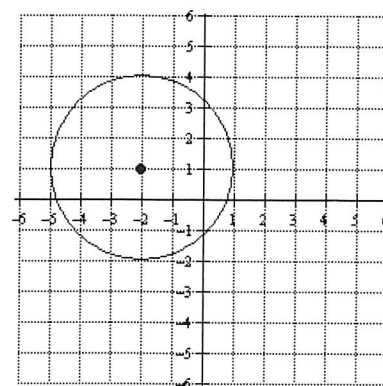
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Multiple Choice	× (3/4)	
Free Response	× 1	
Total Score out of 18		

MULTIPLE CHOICE – Calculator NOT Permitted

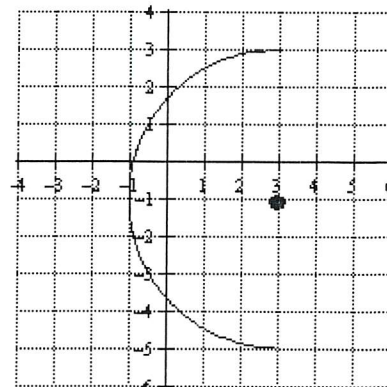
1. Which of the following would be the equation for the circle pictured to the right?

- A. $x^2 - 4x + y^2 + 2y - 4 = 0$
 B. $x^2 - 4x + y^2 - 2y - 4 = 0$
 C. $x^2 + 4x + y^2 + 2y - 4 = 0$
 D. $x^2 - 4x + y^2 + 2y - 9 = 0$
 E. $x^2 + 4x + y^2 - 2y - 4 = 0$

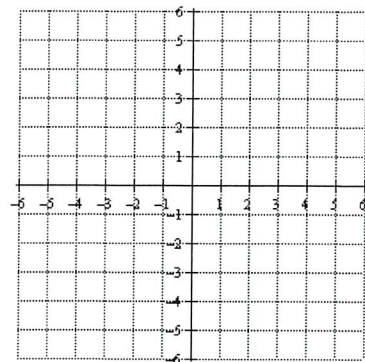


2. Which of the following equations would define the semi-circle pictured to the right?

- A. $y = -1 - \sqrt{16 - (x+3)^2}$
 B. $x = 3 - \sqrt{16 - (y+1)^2}$
 C. $y = 1 - \sqrt{16 - (x-3)^2}$
 D. $x = 3 + \sqrt{16 - (y+1)^2}$
 E. $x = 3 - \sqrt{16 - (y-1)^2}$



3. An ellipse is defined by the equation $4(x + 3)^2 + 9(y - 2)^2 = 36$. Which of the following statements is/are true about the graph?



- I. The center of the ellipse is the point $(3, -2)$.
- II. The co-vertices of the ellipse are $(-3, 4)$ and $(-3, 0)$.
- III. The major axis is horizontal and has a length of 6.

A. I only

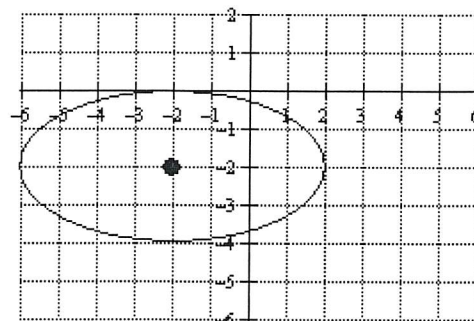
B. II only

C. II and III only

D. I and III only

E. III only

4. The graph of an ellipse is pictured to the right. Which of the following points is/are foci of the ellipse?



- I. $(-2, -2 + 2\sqrt{3})$
- II. $(-2 + 2\sqrt{3}, -2)$
- III. $(-2 - 2\sqrt{3}, -2)$

A. I only

B. II only

C. III only

D. I and II only

E. II and III only

5. Find the equation of an ellipse whose vertices are $(1, 6)$ and $(1, -2)$ and has a minor axis whose length is 6.

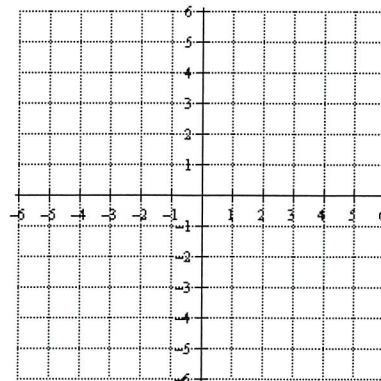
A. $\frac{(x-1)^2}{9} + \frac{(y-2)^2}{16} = 1$

B. $\frac{(x+1)^2}{3} + \frac{(y+2)^2}{4} = 1$

C. $\frac{(x-1)^2}{6} + \frac{(y-2)^2}{8} = 1$

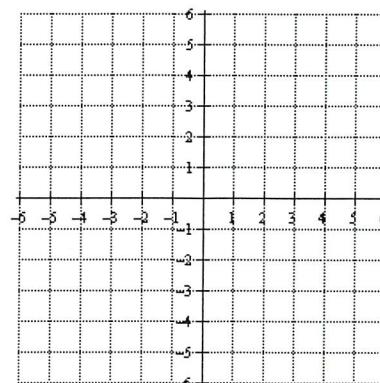
D. $\frac{(x+1)^2}{16} + \frac{(y+2)^2}{9} = 1$

E. $\frac{(x-1)^2}{36} + \frac{(y-2)^2}{16} = 1$



6. The equation of a circle is $(x + 2)^2 + (y + 3)^2 = 4$. The line $y = x - 1$...

- A. intersects the circle at only one point.
- B. does not intersect the circle at any points.
- C. intersects the circle at exactly two points and passes through the center.
- D. intersects the circle at exactly two points and does not pass through the center.



7. Find the distance from the center of the circle defined by the equation $x^2 + 6x + y^2 - 4y - 12 = 0$ and the negative zero of the quadratic function $g(x) = 2x^2 + 7x - 15$.

A. $2\sqrt{2}$

B. $2\sqrt{17}$

C. $2\sqrt{15}$

D. $\sqrt{13}$

E. 17

8. Which of the following equations, when graphed, is/are circles?

I. $2(x + 3)^2 - 2(y + 2)^2 = 1$

II. $2(x - 3)^2 + (y - 1)^2 = 4$

III. $x^2 + y^2 - 8x + 4y - 25 = 0$

A. I and II only

B. II only

C. II and III only

D. I and III only

E. III only

9. Which of the following is an equation of the graphed ellipse?

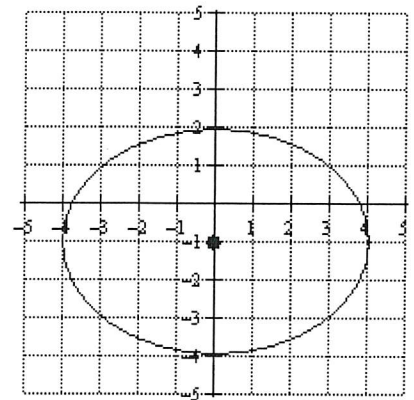
A. $\frac{x^2}{16} - \frac{(y+1)^2}{9} = 1$

B. $\frac{x^2}{4} + \frac{(y+1)^2}{3} = 1$

C. $\frac{x^2}{16} + \frac{(y-1)^2}{9} = 1$

D. $\frac{x^2}{4} + \frac{(y-1)^2}{3} = 1$

E. $\frac{x^2}{16} + \frac{(y+1)^2}{9} = 1$



10. Which of the following equations would be the correct equation for the hyperbola pictured to the right?

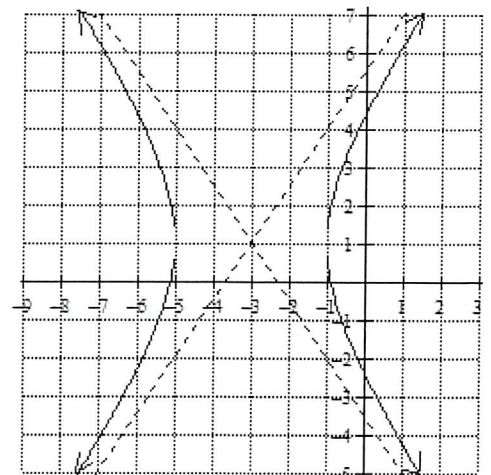
A. $\frac{(x+3)^2}{4} + \frac{(y-1)^2}{9} = 1$

B. $\frac{(x+3)^2}{2} - \frac{(y-1)^2}{3} = 1$

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

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

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



11. Which of the following statements is/are true about the graph of the hyperbola defined by the equation $\frac{(y+4)^2}{8} - \frac{(x-2)^2}{9} = 1$?

I. The transverse axis of the hyperbola is the y – axis.

II. The slopes of the asymptotes of the graph are $\pm \frac{2}{3}\sqrt{2}$.

III. One of the vertices of the hyperbola has coordinates $(2, -4 - 2\sqrt{2})$

A. I and III only

B. I only

C. I and II only

D. I, II, and III

E. II only

12. The equation $y^2 + 4x^2 = |2x|$ would have a graph that displayed which of the following types of symmetry?

I. x – axis

II. y – axis

III. origin

A. I and II only

B. I, II and III

C. I only

D. II only

E. III only

Free Response

Given below are three implicitly defined equations whose graphs represent conic sections. Answer the questions that follow.

Equation I	Equation II	Equation III
$4y^2 - x^2 + 8y - 4x - 4 = 0$	$2x^2 + 4x + 2y^2 - 16y - 16 = 0$	$9x^2 + 4y^2 + 36x - 8y + 4 = 0$

a. When each equation is graphed, which conic section will be formed by each equation? Justify your reasoning for each based on the equation in its given form above.

- b. Find the area of the circle represented by the equation you identified as being a circle in part a). Show your work, leaving your answer in terms of π .

- c. Graph the hyperbola defined by the equation from part a) that you identified, indicating the characteristics below.

Intersection of the Asymptotes: _____

Slope of the Asymptotes: _____

Coordinates of the Vertices: _____

