Hyperbolas & Ellipses

EASY (Questions 1–10)

1. What is the length of the semi-minor axis of the ellipse $64x^2 + 81y^2 = 5184$?

A. 9
B. 64
C. 81
D. 8

2. What is the length of the semi-major axis of the ellipse $64x^2 + 4y^2 = 256$?

A. 2
B. 8
C. 64
D. 68

3. What is the equation of the focal axis of the ellipse $x^2 + 9y^2 = 9$?

A. $y + x = 0$
B. y-axis
C. $y = x$
D. x-axis

4. Find the vertices of the ellipse $x^2 + 36y^2 = 36$.

A. $(0, \pm 6)$
B. $(\pm 6, 0)$
C. $(\pm 36, 0)$
D. $(0, \pm 36)$

5. Find the vertices of the ellipse $25y^2 + 36x^2 = 900$.

A. $(\pm 5, 0)$
B. $(0, \pm 6)$
C. $(\pm 6, 0)$
D. $(0, \pm 5)$

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6. Find an equation in standard form for the ellipse whose endpoints of axes are $(\pm 6, 0)$ and $(0, \pm 7)$.

A. $\frac{x^2}{36} + \frac{y^2}{49} = 1$

B. $-\frac{x^2}{36} - \frac{y^2}{49} = 1$

C. $\frac{x^2}{49} + \frac{y^2}{36} = 1$

D. $\frac{x^2}{36} - \frac{y^2}{49} = 1$

7. Find the asymptotes of the given hyperbola: $\frac{x^2}{4} - \frac{y^2}{16} = 1$

A. $y = 2x, y = -2x$
B. $y = 4x, y = -4x$
C. $y = 16x, y = -16x$
D. $y = 4x, y = 16x$

8. Find the vertices of the given hyperbola: $\frac{y^2}{9} - \frac{x^2}{4} = 1$

A. $(0, 3), (0, -3)$
B. $(3, 0), (-3, 0)$
C. $(0, 2), (0, -2)$
D. $(2, 3), (-2, -3)$

9. For the hyperbola $\frac{y^2}{16} - \frac{(x-2)^2}{9} = 1$ the center is .....

A. $(0, 2)$
B. $(2, 0)$
C. $(0, 4)$
D. $(0, 3)$

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10. What are the vertices of the ellipse $\frac{x^2}{49}+\frac{y^2}{25}=1$?

A. $(0, \pm 7)$
B. $(\pm 5, 0)$
C. $(\pm 7, 0)$
D. $(\pm\sqrt{74}, 0)$

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MEDIUM (Questions 11–20)

11. What are the foci of the ellipse $4x^2 + 64y^2 = 256$?

A. $(0, \pm\sqrt{60})$
B. $(0, \pm\sqrt{68})$
C. $(\pm\sqrt{68}, 0)$
D. $(\pm\sqrt{60}, 0)$

12. What are the foci of the ellipse $9y^2 + 25x^2 = 225$?

A. $(\pm 3, 0)$
B. $(0, \pm 4)$
C. $(0, \pm 5)$
D. $(\pm 4, 0)$

13. What is the center of the ellipse $16x^2 + 9y^2 + 32x + 36y - 92 = 0$?

A. $(1, 2)$
B. $(-1, 2)$
C. $(-1, -2)$
D. $(1, -2)$

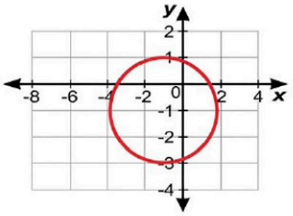
14. What are the foci of the ellipse $4x^2 + 9y^2 = 36$?

A. $(0, \pm\sqrt{5})$
B. $(\pm 2, 0)$
C. $(0, \pm 2)$
D. $(\pm\sqrt{5}, 0)$

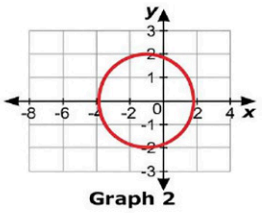
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15. The graph that represents the given equation $4x^2 + 8y^2 = 32$.

a)

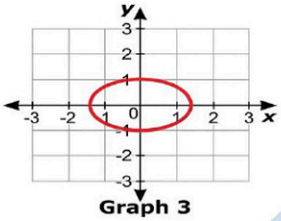


b)



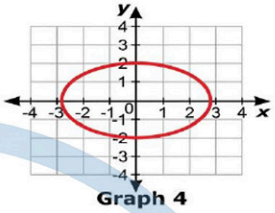
Graph 2

c)



Graph 3

d)



Graph 4

16. For the hyperbola $\frac{(x+3)^2}{4} - \frac{(y-1)^2}{9} = 1$ an asymptote is .....

A. $y = \frac{3}{2}x + \frac{11}{2}$

B. $y = \frac{2}{3}x + \frac{11}{2}$

C. $y = \frac{3}{2}x + \frac{7}{2}$

D. $y = \frac{3}{2}x - \frac{11}{2}$

17. For the hyperbola $\frac{y^2}{16} - \frac{(x-2)^2}{9} = 1$ the foci are .....

A. (7, 0), (−7, 5)
B. (5, 0), (−5, 0)
C. (2, 5), (2, −5)
D. (5, 2), (−5, 2)

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18. What are the equations of the asymptotes of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$?

A. $y = \pm\frac{4}{3}x$

B. $y = \pm\frac{3}{4}x$

C. $y = \pm\frac{9}{16}x$

D. $y = \pm\frac{16}{9}x$

19. What are the coordinates of the foci of the ellipse $25x^2 + 9y^2 = 225$?

A. $(0, \pm4)$

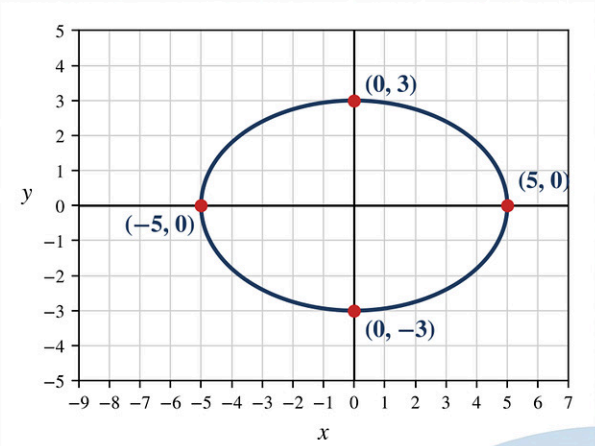
B. $(\pm4, 0)$

C. $(0, \pm\sqrt{34})$

D. $(\pm16, 0)$

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20. The graph shows an ellipse. Which equation represents the ellipse?



A. $\frac{x^2}{9}+\frac{y^2}{25}=1$

B. $\frac{x^2}{25}+\frac{y^2}{9}=1$

C. $\frac{x^2}{5}+\frac{y^2}{3}=1$

D. $\frac{x^2}{25}-\frac{y^2}{9}=1$

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HARD (Questions 21–30)

21. What is the eccentricity of the ellipse $16x^2 + 49y^2 = 784$? (nearest hundredth)

A. 0.43
B. 0.82
C. 0.22
D. −0.82

22. What is the eccentricity of the ellipse $4x^2 + 64y^2 = 256$ (nearest hundredth)

A. 3.87
B. 2.06
C. 0.97
D. 0.12

23. Find an equation of the ellipse with foci (0, −4) and (0, 4) whose minor axis has a length of 8 units.

A. $32x^2 + 16y^2 = 1$

B. $\frac{x^2}{16} + \frac{y^2}{32} = 1$

C. $\frac{x^2}{16} - \frac{y^2}{32} = 1$

D. $\frac{x^2}{32} + \frac{y^2}{16} = 1$

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24. Find the standard form of the equation for the ellipse whose major axis has endpoints (−5, −5) and (9, −5) and whose minor axis has length 6.

A. $\frac{(x-2)^2}{49} + \frac{(y+5)^2}{9} = 1$

B. $\frac{(x-2)^2}{49} + \frac{(y-5)^2}{9} = 1$

C. $\frac{(x-2)^2}{9} + \frac{(y+5)^2}{49} = 1$

D. $49x^2 + 7y^2 = 1$

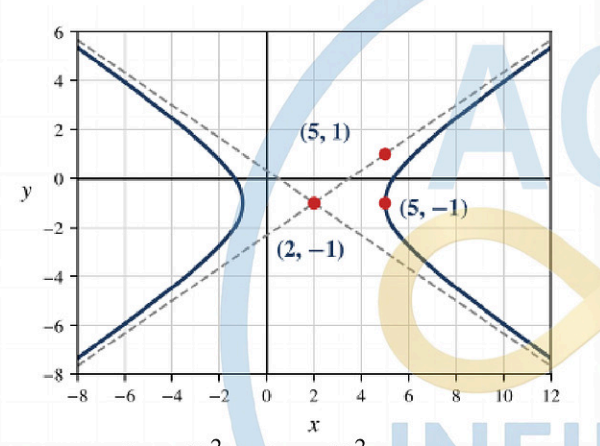
25. What is the center of the ellipse $36x^2 + 25y^2 + 72x + 200y - 464 = 0$?

A. $(-1, 4)$
B. $(1, 4)$
C. $(1, -4)$
D. $(-1, -4)$

26. What is the eccentricity of the ellipse $36x^2 + 49y^2 + 432x - 294y - 419 = 0$? (nearest tenth)

A. 0.9
B. 0.5
C. 0.1
D. 1.3

27. Which equation represents the hyperbola shown in the graph? The dashed lines are its asymptotes.



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

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

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

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

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28. Find the standard form of the hyperbola $4x^2 - 32x - y^2 - 4y + 24 = 0$.

A. $\frac{(x-4)^2}{9} - \frac{(y-2)^2}{36} = 1$

B. $\frac{(x-4)^2}{9} - \frac{(y+2)^2}{36} = 1$

C. $\frac{(x-2)^2}{9} - \frac{(y+4)^2}{36} = 1$

D. $\frac{(x-4)^2}{36} - \frac{(y+2)^2}{9} = 1$

29. What are the coordinates of the foci of the hyperbola $\frac{(y-1)^2}{16} - \frac{(x+2)^2}{9} = 1$?

A. (3, 1) and (−7, 1)
B. (−2, 5) and (−2, −3)
C. (−2, 17) and (−2, −15)
D. (−2, 6) and (−2, −4)

30. A parabola has its focus at (1, 5) and its directrix is the line $y = -1$. Which equation represents the parabola?

A. $(x-1)^2 = 6(y-2)$

B. $(x-1)^2 = 12(y-2)$

C. $(x-1)^2 = -12(y-2)$

D. $(y-2)^2 = 12(x-1)$

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