Conic Sections … Set 2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the vertex, focus, directrix, and focal width of the parabola.

1) $x^2 = 20y$

A) Vertex: (0, 0); Focus: (5, 0); Directrix: y = 5; Focal width: 80
B) Vertex: (0, 0); Focus: (0, –5); Directrix: x = –5; Focal width: 80
C) Vertex: (0, 0); Focus: (5, 0); Directrix: x = 5; Focal width: 5
D) Vertex: (0, 0); Focus: (0, 5); Directrix: y = –5; Focal width: 20

2) $-\frac{1}{4}x^2 = y$

A) Vertex: (0, 0); Focus: (0, 1); Directrix: y = –1; Focal width: 1
B) Vertex: (0, 0); Focus: (0, –1); Directrix: y = 1; Focal width: 16
C) Vertex: (0, 0); Focus: (0, –1); Directrix: y = 1; Focal width: 4
D) Vertex: (0, 0); Focus: (–2, 0); Directrix: x = 1; Focal width: 16

3) $y^2 = 36x$

A) Vertex: (0, 0); Focus: (9, 0); Directrix: x = –9; Focal width: 144
B) Vertex: (0, 0); Focus: (0, 9); Directrix: y = –9; Focal width: 9
C) Vertex: (0, 0); Focus: (9, 0); Directrix: x = –9; Focal width: 36
D) Vertex: (0, 0); Focus: (9, 9); Directrix: x = 9; Focal width: 144

4) $(y - 7)^2 = 4(x - 3)$

A) Vertex: (3, 7); Focus: (4, 7); Directrix: x = 2; Focal width: 4
B) Vertex: (7, 3); Focus: (7, 7; Directrix: y = –1; Focal width: 4
C) Vertex: (3, 7); Focus: (7, 7); Directrix: x = –1; Focal width: 4
D) Vertex: (7, 3); Focus: (7, 4); Directrix: y = 2; Focal width: 1

5) $(x + 5)^2 = -8(y - 1)$

A) Vertex: (–5, 1); Focus: (–5, –1); Directrix: y = 3; Focal width: 8
B) Vertex: (5, –1); Focus: (5, –9); Directrix: y = 7; Focal width: 8
C) Vertex: (1, –5); Focus: (–7, –5); Directrix: x = 3; Focal width: 8
D) Vertex: (1, –5); Focus: (–1, –5); Directrix: x = –3; Focal width: 2

Conic Sections … Set 2

Answers

1) D

2) C

3) C

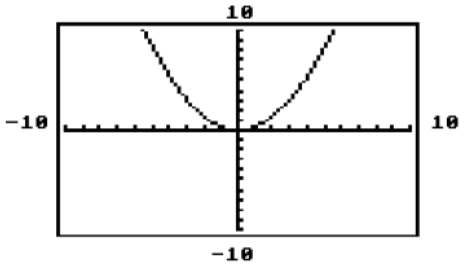
4) A

5) A

Conic Sections … Set 2

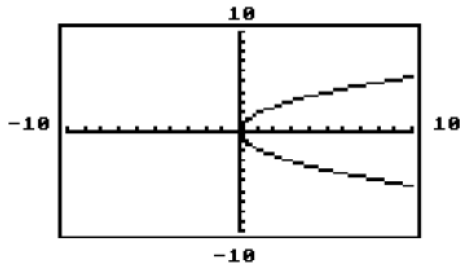
Find an equation that matches the parabola's graph.

6)



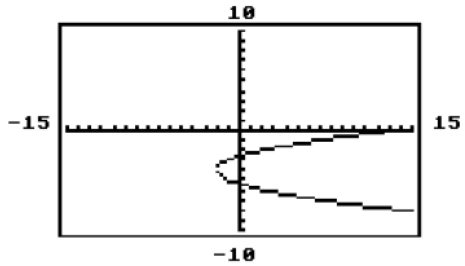
A) $y = \frac{1}{3}x^2$ B) $y = -\frac{1}{3}x^2$ C) $x = -\frac{1}{3}y^2$ D) $x = \frac{1}{3}y^2$

7)



A) $x = -\frac{1}{3}y^2$ B) $x = \frac{1}{3}y^2$ C) $y = -\frac{1}{3}x^2$ D) $y = \frac{1}{3}x^2$

8)



A) $y = (x + 4)^2 - 2$ B) $x = (y - 4)^2 + 2$ C) $y = (x - 4)^2 - 2$ D) $x = (y + 4)^2 -$

Conic Sections … Set 2

Answers

6) A

7) B

8) D

Conic Sections … Set 2

Find the standard form of the equation of the parabola.

9) Vertex at the origin, focus at (0, –4)

A) $y^2 = -16x$ B) $y = -\frac{1}{16}x^2$ C) $y = -\frac{1}{4}x^2$ D) $y^2 = -4x$

10) Focus at (0, –5), directrix $y = 5$

A) $y = -\frac{1}{20}x^2$ B) $y = -\frac{1}{5}x^2$ C) $y^2 = -5x$ D) $y^2 = -20x$

11) Focus at (9, 0), directrix $x = -9$

A) $x = \frac{1}{36}y^2$ B) $y^2 = 36x$ C) $36y = x^2$ D) $y = \frac{1}{36}x^2$

12) Focus at (2, –6), directrix $x = 0$

A) $(y + 6)^2 = 4(x - 1)$ B) $(y + 6)^2 = 4(x - 2)$

C) $(x + 6)^2 = 4(y - 1)$ D) $(x - 2)^2 = 4(y + 6)$

13) Focus at (9, 1), directrix $y = -7$

A) $(x - 1)^2 = 16(y + 3)$ B) $(x - 9)^2 = 16(y + 3)$

C) $(y - 1)^2 = 16(x - 9)$ D) $(x - 9)^2 = 16(y - 1)$

14) Vertex at the origin, opens to the right, focal width = 16

A) $y^2 = -16x$ B) $y^2 = -4x$ C) $y^2 = 16x$ D) $x^2 = 16y$

Conic Sections … Set 2

Answers

9) B

10) A

11) A

12) A

13) B

14) A

Conic Sections … Set 2

15) Vertex at (−1, −2), opens upward, focal width = 10

A) $(x + 1)^2 = -10(y + 2)$

B) $(y + 2)^2 = 10(x + 1)$

C) $(x + 1)^2 = 10(y + 2)$

D) $(x + 1)^2 = 2.5(y + 2)$

16) Vertex at (1, −1), opens to the left, focal width = 18

A) $(y + 1)^2 = 4.5(x - 1)$

B) $(y + 1)^2 = -18(x - 1)$

C) $(y + 1)^2 = 18(x - 1)$

D) $(x - 1)^2 = 18(y + 1)$

Conic Sections … Set 2

Answers

15) C

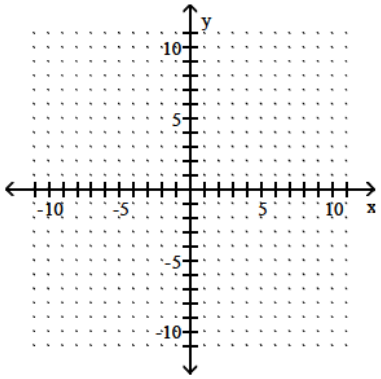
16) C

Conic Sections … Set 2

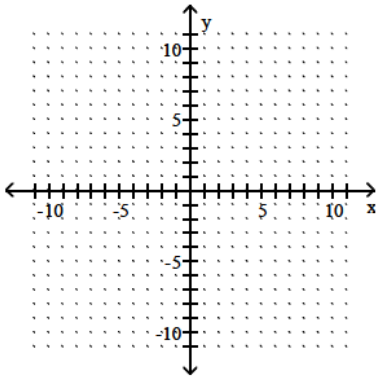
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Graph the parabola.

17) $12y = x^2$



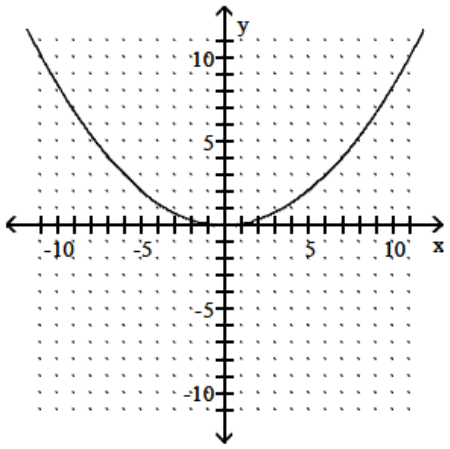
18) $x = \frac{1}{16}y^2$



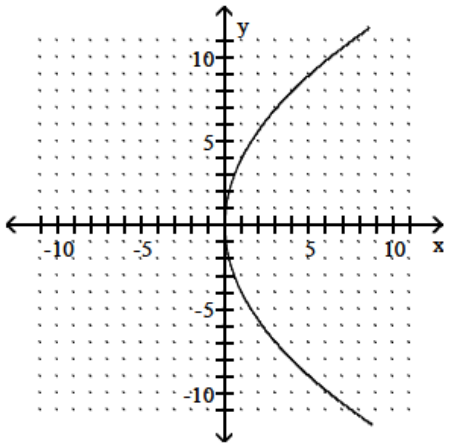
Conic Sections … Set 2

Answers

17)

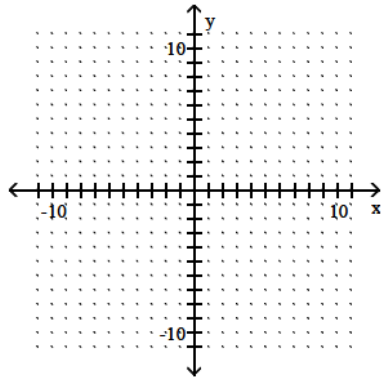


18)

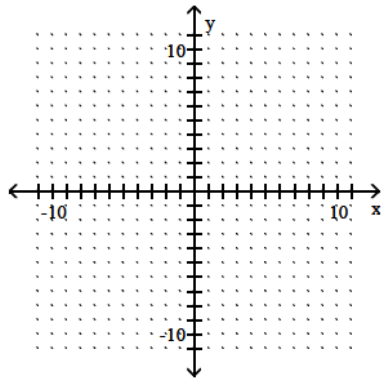


Conic Sections … Set 2

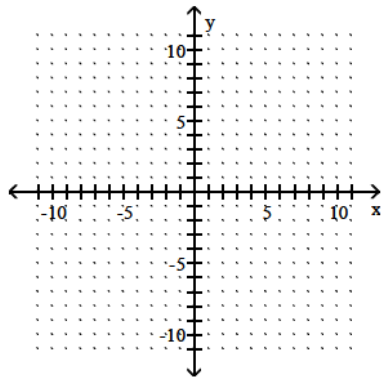
19) $(x-1)^2 = 8(y-3)$



20) $(y-7)^2 = 8(x+1)$



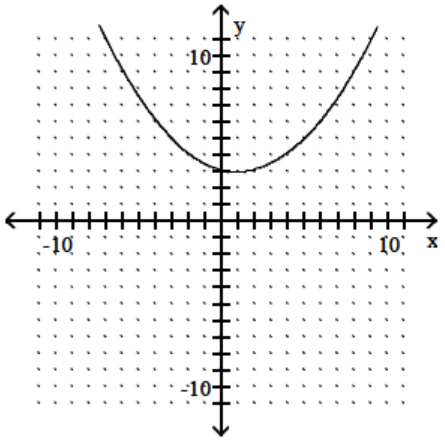
21) $x = \frac{6}{7}(y-4)^2 + 1$



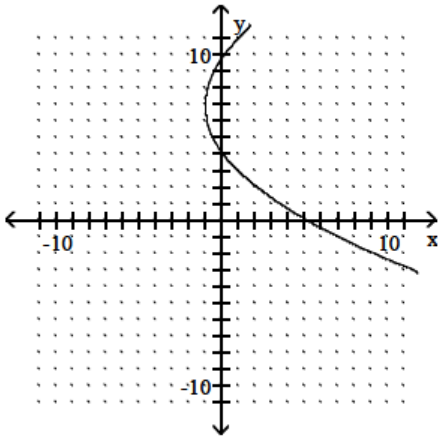
Conic Sections … Set 2

Answers

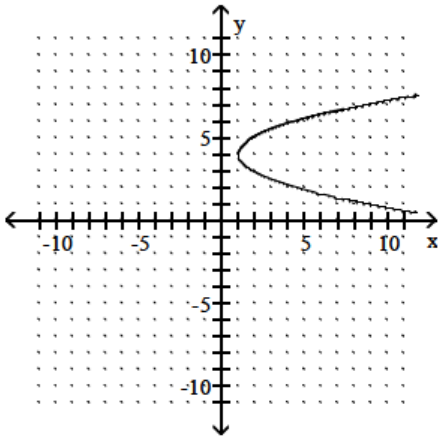
19)



20)



21)



Conic Sections … Set 2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the vertex, the focus, and the directrix of the parabola.

22) $x^2 - 10x + 8y + 1 = 0$

A) Vertex: $\left(5, \frac{23}{8}\right)$; Focus: (5, −5); Directrix: $y = \frac{25}{8}$

B) Vertex: $(5, 3)$; Focus: (5, 1); Directrix: $y = 5$

C) Vertex: $(5, 5)$; Focus: (5, 5); Directrix: $y = 1$

D) Vertex: $(5, 0)$; Focus: (5, −5); Directrix: $y = -11$

23) $2x^2 - 16x - y + 28 = 0$

A) Vertex: $(4, 1)$; Focus: (4, −2); Directrix: $x = -6$

B) Vertex: $(4, 4)$; Focus: (4, 4); Directrix: $x = 12$

C) Vertex: $(4, 32)$; Focus: $\left(4, -\frac{33}{8}\right)$; Directrix: $x = -\frac{31}{8}$

D) Vertex: $(4, -4)$; Focus: $\left(4, -\frac{31}{8}\right)$; Directrix: $y = -\frac{33}{8}$

24) $y^2 + 4x + 4y + 0 = 0$

A) Vertex: $\left(\frac{3}{2}, 1\right)$; Focus: (2, 1); Directrix: $y = 0$

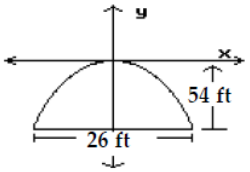
B) Vertex: $(1, -2)$; Focus: (0, −2); Directrix: $x = 2$

C) Vertex: $(-1, 1)$; Focus: (−3, 1); Directrix: $y = -5$

D) Vertex: $(2, -2)$; Focus: $\left(\frac{3}{4}, -2\right)$; Directrix: $y = \frac{5}{4}$

Solve the problem.

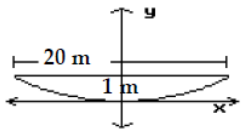
25)



A building has an entry the shape of a parabolic arch 54 ft high and 26 ft wide at the base. Find an equation for the parabola if the vertex is put at the origin of the coordinate system.

A) $y^2 = -3.1x$ B) $y^2 = -12.5x$ C) $x^2 = -3.1y$ D) $x^2 = -12.5y$

26)



A radio telescope has a parabolic surface. If it is 1 m deep and 20 m wide, how far is the focus from the vertex?

A) 100 m B) 1 m C) 5 m D) 25 m

27) A cross-section of an irrigation canal is a parabola. If the surface of the water is 14 ft wide and the canal is 45 ft deep at the center, how deep is it 6 ft from the edge?

A) 14.7 ft B) 44.1 ft C) 30.3 ft D) 0.9 ft

Conic Sections … Set 2

Answers

22) B

23) D

24) B

25) C

26) D

27) B

Conic Sections … Set 2

Find the center, vertices, and foci of the ellipse with the given equation.

28) $\frac{x^2}{225} + \frac{y^2}{144} = 1$

A) Center: (0, 0); Vertices: (0, −15), (0, 15); Foci: (0, −9), (0, 9)
B) Center: (0, 0); Vertices: (−15, 0), (15, 0); Foci: (−12, 0), (12, 0)
C) Center: (0, 0); Vertices: (−15, 0), (15, 0); Foci: (−9, 0), (9, 0)
D) Center: (0, 0); Vertices: (0, −15), (0, 15); Foci: (0, −12), (0, 12)

29) $\frac{x^2}{256} + \frac{y^2}{400} = 1$

A) Center: (0, 0); Vertices: (0, −20), (0, 20); Foci: (−16, 0), (16, 0)
B) Center: (0, 0); Vertices: (−20, 0), (20, 0); Foci: (0, −16), (0, 16)
C) Center: (0, 0); Vertices: (−20, 0), (20, 0); Foci: (−12, 0), (12, 0)
D) Center: (0, 0); Vertices: (0, −20), (0, 20); Foci: (0, −12), (0, 12)

30) $\frac{(x+5)^2}{400} + \frac{(y+4)^2}{625} = 1$

A) Center: (−5, −4); Vertices: (−5, −29), (−5, 21); Foci: (−5, −19), (−5, 11)
B) Center: (−5, −4); Vertices: (−29, −4), (21, −4); Foci: (−5, −24), (−5, 16)
C) Center: (−5, −4); Vertices: (−29, −4), (21, −4); Foci: (−19, −5), (11, −5)
D) Center: (−5, −4); Vertices: (−5, −29), (−5, 21); Foci: (−24, −4), (16, −4)

31) $4x^2 + 9y^2 = 36$

A) Center: (0, 0); Vertices: $(0, -3)$, $(0, -3)$; Foci: $(0, -\sqrt{5})$, $(0, \sqrt{5})$
B) Center: (0, 0); Vertices: $(0, -9)$, $(0, 9)$; Foci: $(0, -\sqrt{65})$, $(0, \sqrt{65})$
C) Center: (0, 0); Vertices: $(-9, 0)$, $(9, 0)$; Foci: $(-\sqrt{65}, 0)$, $(\sqrt{65}, 0)$
D) Center: (0, 0); Vertices: $(-3, 0)$, $(-3, 0)$; Foci: $(-\sqrt{5}, 0)$, $(\sqrt{5}, 0)$

32) $8x^2 + 5y^2 = 40$

A) Center: (0, 0); Vertices: $(-2\sqrt{2}, 0)$, $(-2\sqrt{2}, 0)$; Foci: $(-\sqrt{3}, 0)$, $(\sqrt{3}, 0)$
B) Center: (0, 0); Vertices: $(0, -2\sqrt{2})$, $(0, 2\sqrt{2})$; Foci: $(0, -\sqrt{3})$, $(0, \sqrt{3})$
C) Center: (0, 0); Vertices: $(0, -8)$, $(0, 8)$; Foci: $(0, -\sqrt{39})$, $(0, \sqrt{39})$
D) Center: (0, 0); Vertices: $(-8, 0)$, $(8, 0)$; Foci: $(-\sqrt{39}, 0)$, $(\sqrt{39}, 0)$

Conic Sections … Set 2

Answers

28) C

29) D

30) A

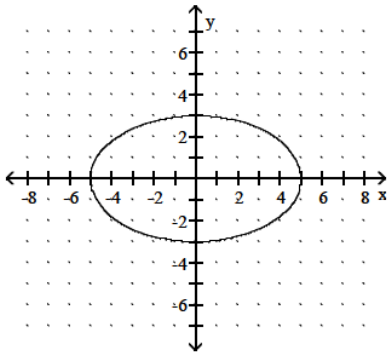
31) D

32) B

Conic Sections … Set 2

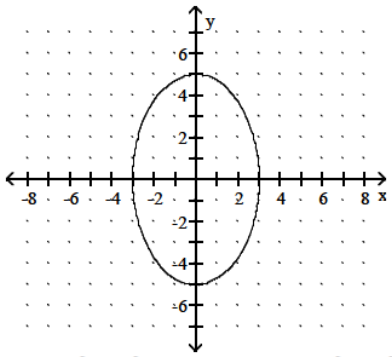
Match the given graph with its equation.

33)



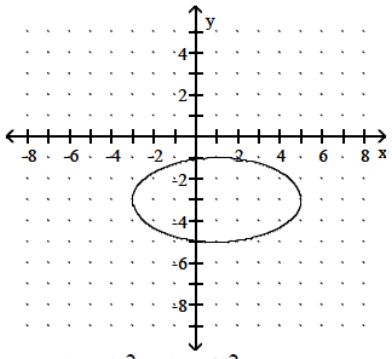
A) $\frac{x^2}{25} + \frac{y^2}{9} = 1$ B) $\frac{x^2}{9} + \frac{y^2}{25} = 1$ C) $\frac{x^2}{5} + \frac{y^2}{3} = 1$ D) $\frac{x^2}{10} + \frac{y^2}{6} = 1$

34)



A) $\frac{y^2}{25} - \frac{x^2}{9} = 1$ B) $\frac{y^2}{10} + \frac{x^2}{6} = 1$ C) $\frac{x^2}{25} + \frac{y^2}{9} = 1$ D) $\frac{y^2}{25} + \frac{x^2}{9} = 1$

35)



A) $\frac{(x+1)^2}{4} + \frac{(y-3)^2}{16} = 1$ B) $\frac{(x-1)^2}{4} + \frac{(y+3)^2}{16} = 1$

C) $\frac{(x-1)^2}{16} + \frac{(y+3)^2}{4} = 1$ D) $\frac{(x+1)^2}{16} + \frac{(y-3)^2}{4} = 1$

Conic Sections … Set 2

Answers

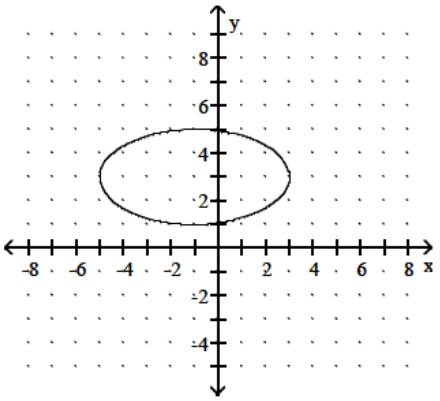
33) A

34) D

35) C

Conic Sections … Set 2

36)



A) $\frac{(x+1)^2}{16} + \frac{(y-3)^2}{4} = 1$

B) $\frac{(x-1)^2}{16} + \frac{(y+3)^2}{4} = 1$

C) $\frac{(x-1)^2}{4} + \frac{(y+3)^2}{16} = 1$

D) $\frac{(x+1)^2}{4} + \frac{(y-3)^2}{16} = 1$

Conic Sections … Set 2

Answers

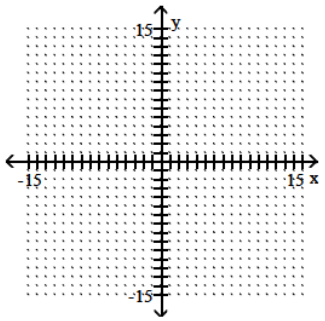
36) A

Conic Sections … Set 2

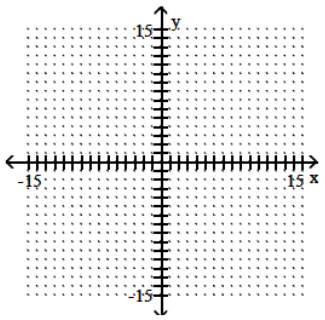
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Graph the ellipse.

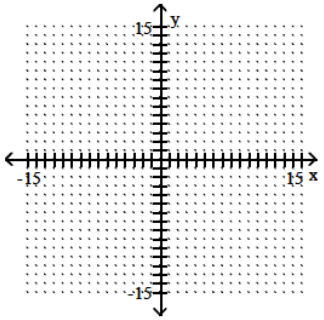
37) $\frac{x^2}{9} + \frac{y^2}{49} = 1$



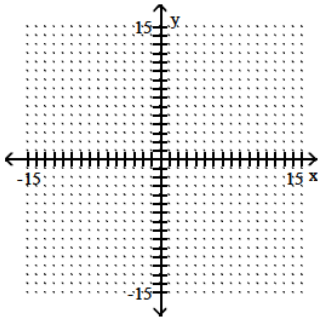
38) $\frac{(x+4)^2}{16} + \frac{(y+4)^2}{25} = 1$



39) $36(x-2)^2 + 25(y-1)^2 = 900$



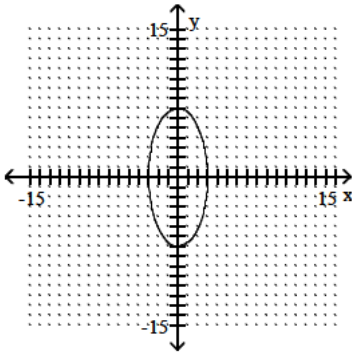
40) $4x^2 + 25y^2 = 100$



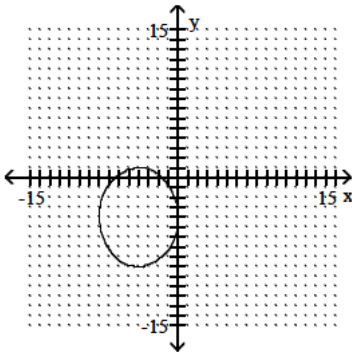
Conic Sections … Set 2

Answers

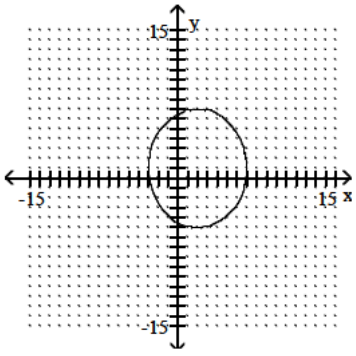
37)



38)



39)



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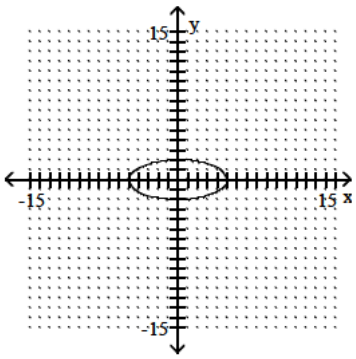


Conic Sections … Set 2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find an equation in standard form for the ellipse that satisfies the given conditions.

41) Vertices at (±6, 0) and foci at (±3 , 0)

A) $\frac{x^2}{36} + \frac{y^2}{27} = 1$ B) $\frac{x}{6} + \frac{y^2}{27} = 2$ C) $\frac{x^2}{36} + \frac{y}{27} = 1$ D) $\frac{x^2}{729} + \frac{y^2}{6} = 1$

42) The vertical major axis is of length 18, and the minor axis is of length 10.

A) $\frac{x^2}{81} + \frac{y^2}{25} = 1$ B) $\frac{x^2}{25} + \frac{y^2}{81} = 1$ C) $\frac{x^2}{5} + \frac{y^2}{9} = 1$ D) $\frac{x^2}{9} + \frac{y^2}{5} = 1$

43) The horizontal major axis is of length 8, and the minor axis is of length 4.

A) $\frac{x^2}{2} + \frac{y^2}{4} = 1$ B) $\frac{x^2}{16} + \frac{y^2}{4} = 1$ C) $\frac{x^2}{4} + \frac{y^2}{16} = 1$ D) $\frac{x^2}{4} + \frac{y^2}{2} = 1$

44) An ellipse with intercepts (±3, 0) and (0, ±8), center at origin

A) $\frac{x^2}{8} + \frac{y^2}{3} = 1$ B) $\frac{x^2}{64} + \frac{y^2}{9} = 1$ C) $\frac{x^2}{9} + \frac{y^2}{64} = 1$ D) $\frac{x^2}{3} + \frac{y^2}{8} = 1$

45) An ellipse with foci at (3, 2) and (3, –4); major axis length of 10

A) $\frac{(y+1)^2}{25} + \frac{(x+3)^2}{16} = 1$ B) $\frac{(x+1)^2}{16} + \frac{(y+3)^2}{25} = 1$

C) $\frac{(y+1)^2}{25} + \frac{(x-3)^2}{16} = 1$ D) $\frac{(x+1)^2}{25} + \frac{(y+3)^2}{16} = 1$

46) An ellipse with foci at (1, –2) and (7, –2); major axis length of 10

A) $\frac{(x+2)^2}{25} + \frac{(y+4)^2}{16} = 1$ B) $\frac{(x-2)^2}{25} + \frac{(x+4)^2}{16} = 1$

C) $\frac{(x-4)^2}{25} + \frac{(y+2)^2}{16} = 1$ D) $\frac{(y+2)^2}{25} + \frac{(x-4)^2}{16} = 1$

47) An ellipse with major axis from (–7, 3) to (5, 3); minor axis from (–1, –2) to (–1, 8)

A) $\frac{(x+1)^2}{36} + \frac{(y-3)^2}{25} = 1$ B) $\frac{(x-6)^2}{36} + \frac{(y-5)^2}{25} = 1$

C) $\frac{(x-3)^2}{36} + \frac{(y+1)^2}{25} = 1$ D) $\frac{(x-1)^2}{36} + \frac{(y+3)^2}{25} = 1$

Conic Sections … Set 2

Answers

41) A

42) B

43) B

44) C

45) C

46) C

47) A

Conic Sections … Set 2

Find the eccentricity of the ellipse.

48) $x^2 + 7y^2 = 35$

A) $\frac{\sqrt{35}}{28}$ B) $\frac{\sqrt{35}}{30}$ C) $\frac{\sqrt{2}}{7}$ D) $\frac{2\sqrt{7}}{35}$

49) $42x^2 + y^2 = 42$

A) $\frac{\sqrt{1763}}{42}$ B) $\frac{\sqrt{42}}{41}$ C) $\frac{\sqrt{1722}}{42}$ D) $\frac{42}{\sqrt{1763}}$

50) $x^2 + 39y^2 = 39$

A) $\frac{\sqrt{39}}{38}$ B) $\frac{39}{4\sqrt{95}}$ C) $\frac{\sqrt{1482}}{39}$ D) $\frac{4\sqrt{95}}{39}$

Conic Sections … Set 2

Answers

48) C

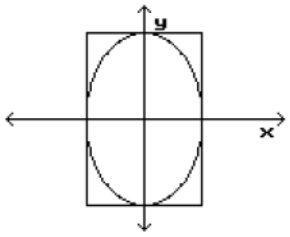
49) C

50) C

Conic Sections … Set 2

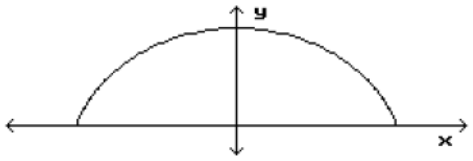
Solve the problem.

51) An elliptical riding path is to be built on a rectangular piece of property that measures 10 mi by 4 mi. Find an equation for the ellipse if the path is to touch the center of the property line on all 4 sides



A) $\frac{x^2}{4} + \frac{y^2}{100} = 1$ B) $\frac{x^2}{25} + \frac{y^2}{4} = 1$ C) $\frac{x^2}{4} + \frac{y^2}{25} = 1$ D) $\frac{x^2}{100} + \frac{y^2}{4} = 1$

52) A railroad tunnel is shaped like a semiellipse. The height of the tunnel at the center is 18 ft and the vertical clearance must be 6 ft at a point 16 ft from the center. Find an equation for the ellipse.



A) $\frac{x^2}{256} + \frac{y^2}{324} = 1$ B) $\frac{x^2}{288} + \frac{y^2}{36} = 1$ C) $\frac{x^2}{324} + \frac{y^2}{288} = 1$ D) $\frac{x^2}{288} + \frac{y^2}{324} = 1$

Conic Sections … Set 2

Answers

51) C

52) D

Conic Sections … Set 2

Find the vertices and foci of the hyperbola.

53) $\frac{x^2}{16} - \frac{y^2}{65} = 1$

A) Vertices: $(0, \pm 9)$; Foci: $(0, \pm 4)$
B) Vertices: $(\pm 9, 0)$; Foci: $(\pm 4, 0)$
C) Vertices: $(\pm 4, 0)$; Foci: $(\pm 9, 0)$
D) Vertices: $(0, \pm 4)$; Foci: $(0, \pm 9)$

54) $\frac{(x + 2)^2}{225} - \frac{(y + 4)^2}{400} = 1$

A) Vertices: $(-4, 18), (-4, -22)$; Foci: $(-4, -22), (-4, 18)$
B) Vertices: $(18, -4), (-22, -4)$; Foci: $(-22, -4), (18, -4)$
C) Vertices: $(13, -4), (-17, -4)$; Foci: $(-27, -4), (23, -4)$
D) Vertices: $(-4, 13), (-4, -17)$; Foci: $(-4, -27), (-4, 23)$

55) $\frac{(y + 4)^2}{400} - \frac{(x + 4)^2}{225} = 1$

A) Vertices: $(16, -4), (-24, -4)$; Foci: $(21, -4), (-29, -4)$
B) Vertices: $(-4, 16), (-4, -24)$; Foci: $(-4, 21), (-4, -29)$
C) Vertices: $(11, -4), (-19, -4)$; Foci: $(-19, -4), (11, -4)$
D) Vertices: $(-4, 11), (-4, -19)$; Foci: $(-4, -19), (-4, 11)$

Conic Sections … Set 2

Answers

53) C

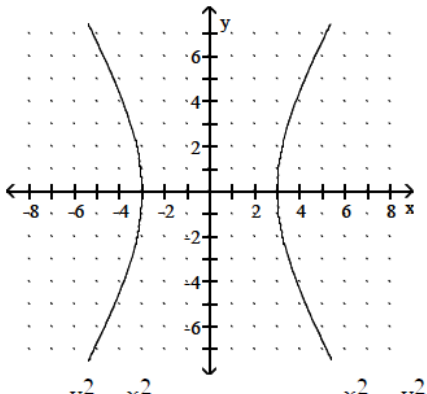
54) C

55) B

Conic Sections … Set 2

Match the given graph with its equation.

56)



A) $\frac{y^2}{9} - \frac{x^2}{25} = 1$ B) $\frac{x^2}{9} + \frac{y^2}{25} = 1$ C) $\frac{x^2}{9} - \frac{y^2}{25} = 1$ D) $\frac{x^2}{25} - \frac{y^2}{9} = 1$

Find an equation in standard form for the hyperbola that satisfies the given conditions.

57) Vertices at (±4, 0), foci at (±10, 0)

A) $\frac{x^2}{100} - \frac{y^2}{16} = 1$ B) $\frac{x^2}{16} - \frac{y^2}{84} = 1$ C) $\frac{x^2}{84} - \frac{y^2}{16} = 1$ D) $\frac{x^2}{16} - \frac{y^2}{100} = 1$

58) Foci at (±8, 0), transverse axis with length 12

A) $\frac{x^2}{28} - \frac{y^2}{36} = 1$ B) $\frac{x^2}{36} - \frac{y^2}{64} = 1$ C) $\frac{x^2}{36} - \frac{y^2}{28} = 1$ D) $\frac{x^2}{64} - \frac{y^2}{36} = 1$

59) Foci at (0, ±8), a conjugate axis with length 4

A) $\frac{y^2}{16} - \frac{x^2}{64} = 1$ B) $\frac{y^2}{64} - \frac{x^2}{16} = 1$ C) $\frac{y^2}{4} - \frac{x^2}{64} = 1$ D) $\frac{y^2}{60} - \frac{x^2}{4} = 1$

60) Center (1, −4), focus (6, −4), vertex (5, −4)

A) $\frac{(x+1)^2}{16} - \frac{(y+4)^2}{9} = 1$ B) $\frac{(x-1)^2}{9} - \frac{(y+4)^2}{16} = 1$

C) $\frac{(x-1)^2}{16} - \frac{(y+4)^2}{9} = 1$ D) $\frac{(x-1)^2}{16} - \frac{(y+4)^2}{25} = 1$

61) Center (−1, 3), focus (−1, 9), vertex (−1, 6)

A) $\frac{(y-3)^2}{9} - \frac{(x+1)^2}{45} = 1$ B) $\frac{(y+3)^2}{9} + \frac{(x+1)^2}{27} = 1$

C) $\frac{(y+3)^2}{9} - \frac{(x+1)^2}{27} = 1$ D) $\frac{(y-3)^2}{9} - \frac{(x+1)^2}{27} = 1$

Conic Sections … Set 2

Answers

56) C

57) B

58) C

59) D

60) C

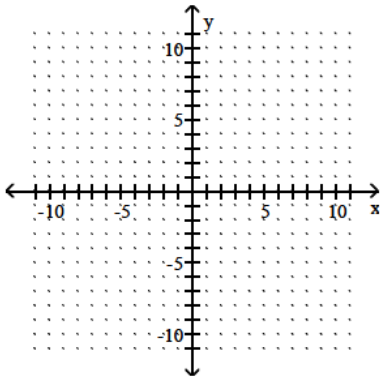
61) D

Conic Sections … Set 2

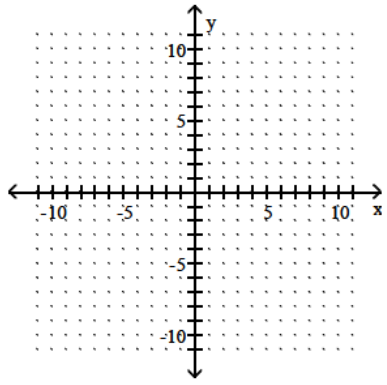
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Graph the hyperbola.

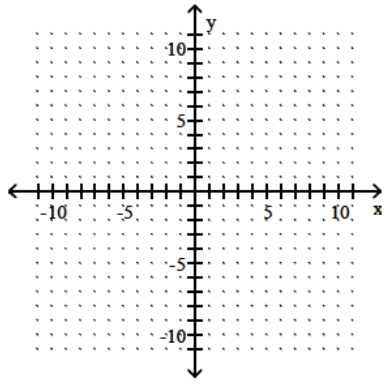
62) $\frac{y^2}{4} - \frac{x^2}{64} = 1$



63) $\frac{x^2}{25} - \frac{y^2}{64} = 1$



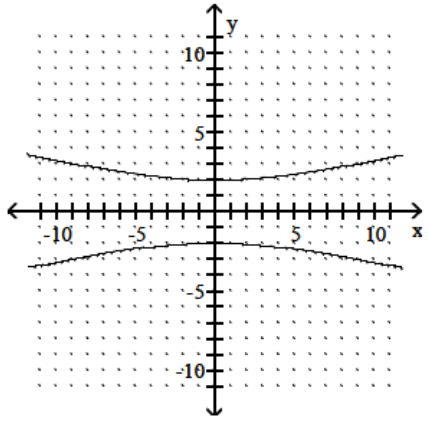
64) $36y^2 - 9x^2 = 324$



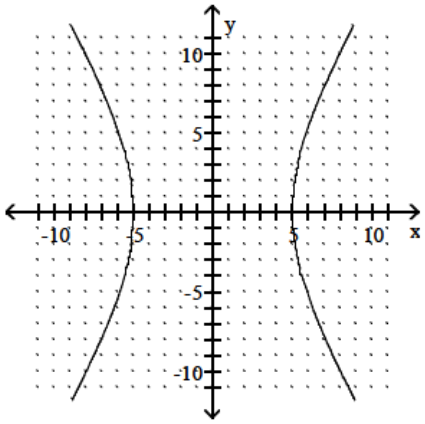
Conic Sections … Set 2

Answers

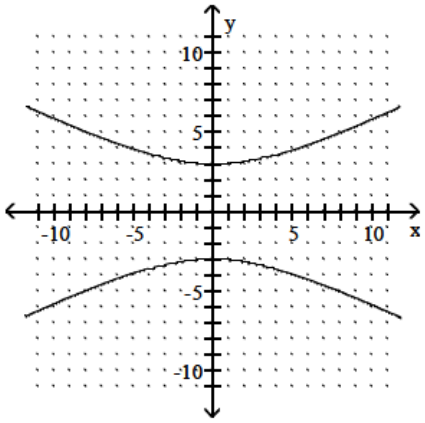
62)



63)



64)

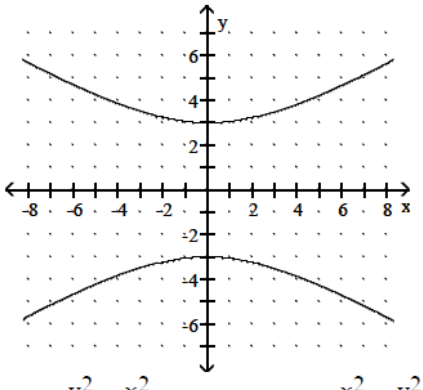


Conic Sections … Set 2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the given graph with its equation.

65)



A) $\frac{y^2}{25} - \frac{x^2}{9} = 1$

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

C) $\frac{y^2}{9} - \frac{x^2}{25} = 1$

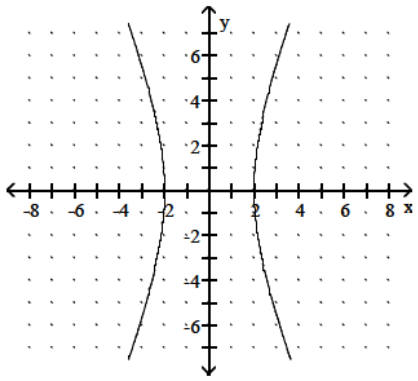
D) $\frac{y^2}{9} + \frac{x^2}{25} = 1$

Answers

65) C

Conic Sections … Set 2

66)



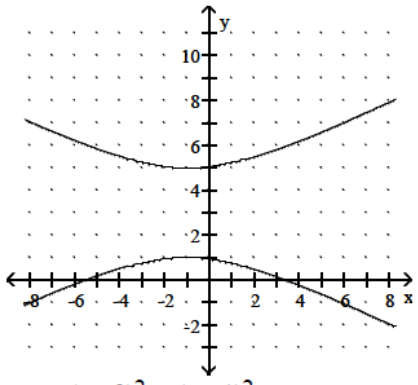
A) $25x^2 - 4y^2 = 100$

B) $4x^2 - 25y^2 = 100$

C) $25x^2 + 4y^2 = 100$

D) $4y^2 - 25x^2 = 100$

67)



A) $\frac{(x-3)^2}{16} - \frac{(x+1)^2}{4} = 1$

B) $\frac{(x-1)^2}{16} - \frac{(y-3)^2}{4} = 1$

C) $\frac{(y-3)^2}{4} - \frac{(x+1)^2}{16} = 1$

D) $\frac{(y-3)^2}{16} - \frac{(x+1)^2}{4} = 1$

Conic Sections … Set 2

Answers

66) A

67) C

Conic Sections … Set 2

Find an equation in standard form for the hyperbola that satisfies the given conditions.

68) Vertices at (±6, 0), foci at (±10, 0)

A) $\frac{x^2}{100} - \frac{y^2}{36} = 1$ B) $\frac{x^2}{36} - \frac{y^2}{100} = 1$ C) $\frac{x^2}{36} - \frac{y^2}{64} = 1$ D) $\frac{x^2}{64} - \frac{y^2}{36} = 1$

69) Foci at (±9, 0), transverse axis with length 16

A) $\frac{x^2}{64} - \frac{y^2}{81} = 1$ B) $\frac{x^2}{64} - \frac{y^2}{17} = 1$ C) $\frac{x^2}{81} - \frac{y^2}{64} = 1$ D) $\frac{x^2}{17} - \frac{y^2}{64} = 1$

70) Foci at (0, ±7), a conjugate axis with length 4

A) $\frac{y^2}{16} - \frac{x^2}{49} = 1$ B) $\frac{y^2}{49} - \frac{x^2}{16} = 1$ C) $\frac{y^2}{4} - \frac{x^2}{49} = 1$ D) $\frac{y^2}{45} - \frac{x^2}{4} = 1$

71) Center (1, −5), focus (6, −5), vertex (4, −5)

A) $\frac{(x+1)^2}{9} - \frac{(y+5)^2}{16} = 1$ B) $\frac{(x-1)^2}{9} - \frac{(y+5)^2}{25} = 1$

C) $\frac{(x-1)^2}{9} - \frac{(y+5)^2}{16} = 1$ D) $\frac{(x-1)^2}{16} - \frac{(y+5)^2}{9} = 1$

72) Center (−3, 4), focus (−3, 9), vertex (−3, 8)

A) $\frac{(y+4)^2}{16} - \frac{(x+3)^2}{9} = 1$ B) $\frac{(y+4)^2}{16} + \frac{(x+3)^2}{9} = 1$

C) $\frac{(y-4)^2}{16} - \frac{(x+3)^2}{9} = 1$ D) $\frac{(y-4)^2}{16} - \frac{(x+3)^2}{41} = 1$

Conic Sections … Set 2

Answers

68) C

69) B

70) D

71) C

72) C

Conic Sections … Set 2

Find the eccentricity of the hyperbola.

73) $x^2 - y^2 = 49$

A) $\sqrt{7}$ B) $\sqrt{2}$ C) 1 D) 0

74) $8x^2 - 9y^2 = 72$

A) $\frac{1}{2}$ B) $\frac{\sqrt{13}}{3}$ C) $\frac{3}{2}$ D) $\frac{\sqrt{17}}{3}$

75) $x^2 - 16y^2 = 1$

A) $\sqrt{17}$ B) 17 C) $\frac{\sqrt{17}}{4}$ D) 4

Conic Sections … Set 2

Answers

73) B

74) D

75) C

Conic Sections … Set 2

Compute the distance between the points.

93) (9, –7, 1), (–5, 3, 7)

A) $-2\sqrt{83}$ B) $2\sqrt{83}$ C) $i\sqrt{2}$ D) -2

94) (a, b, c), (–4, 3, 10)

A) $((a + 4) + (b - 3) + (c - 10))^2$

B) $\sqrt{(a + 4)^2 + (b - 3)^2 + (c - 10)^2}$

C) $a + b + c - (-4 + 3 + 10)$

D) $(a + 4)^2 + (b - 3)^2 + (c - 10)^2$

95) (6, –9, 1), (x, y, z)

A) $(6 - x)^2 + (-9 - y)^2 + (1 - z)^2$

B) $(6 + x)^2 + (-9 + y)^2 + (1 + z)^2$

C) $\sqrt{(6 - x)^2 + (-9 - y)^2 + (1 - z)^2}$

D) $\sqrt{(6 + x)^2 + (-9 + y)^2 + (1 + z)^2}$

Conic Sections … Set 2

Answers

93) B

94) B

95) C

Conic Sections … Set 2

Find the midpoint of the segment PQ.

96) P(8, –3, –9), Q(11, 3, –3)

A) $\left(\frac{19}{2}, 0, -6\right)$ B) $\left(\frac{3}{2}, 3, 3\right)$ C) $\left(4, -\frac{3}{2}, -\frac{9}{2}\right)$ D) $\left(\frac{11}{2}, \frac{3}{2}, -\frac{3}{2}\right)$

97) P(2, 2, –5), Q(4, –4, –2)

A) $\left(3, -1, -\frac{7}{2}\right)$ B) $\left(1, 1, -\frac{5}{2}\right)$ C) $(3, 2, -2)$ D) $(2, -2, -1)$

98) P(4, –6, –6), Q(9, –10, –9)

A) $\left(\frac{13}{2}, -6, -9\right)$ B) $\left(\frac{9}{2}, -5, -\frac{9}{2}\right)$ C) $(2, -3, -3)$ D) $\left(\frac{13}{2}, -8, -\frac{15}{2}\right)$

99) P(–1, 1, –3), Q(0, 2, –2)

A) $\left(-\frac{1}{2}, 1, -2\right)$ B) $\left(-\frac{1}{2}, \frac{3}{2}, -\frac{5}{2}\right)$ C) $(0, 1, -1)$ D) $\left(-\frac{1}{2}, \frac{1}{2}, -\frac{3}{2}\right)$

Conic Sections … Set 2

Answers

96) A

97) A

98) D

99) B

Conic Sections … Set 2

Find and simplify the difference quotient of f, $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$, for the function.

151) $f(x) = 9x + 9$

A) 0 B) $9 + \frac{18(x+9)}{h}$ C) $9 + \frac{18}{h}$ D) 9

152) $f(x) = x^2 + 4x + 8$

A) $\frac{2x^2 + 2x + 2xh + h^2 + h + 16}{h}$ B) 1

C) $2x + h + 8$ D) $2x + h + 4$

153) $f(x) = \frac{1}{4x}$

A) $\frac{1}{4x}$ B) $\frac{-1}{x(x+h)}$ C) $\frac{-1}{4x(x+h)}$ D) 0

Conic Sections … Set 2

Answers

151) D

152) D

153) C

Conic Sections … Set 2

Convert the equation to the standard form for a hyperbola by completing the square on x and y.

154) $x^2 - y^2 + 6x - 4y + 4 = 0$

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

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

C) $\frac{(y + 3)^2}{16} - \frac{(x + 2)^2}{36} = 1$

D) $(x + 3)^2 + (y + 2)^2 = 1$

155) $y^2 - 25x^2 + 4y + 50x - 46 = 0$

A) $\frac{(y + 2)^2}{25} - (x - 1)^2 = 1$

B) $\frac{(y + 4)^2}{25} - (x - 2)^2 = 1$

C) $\frac{(x + 2)^2}{25} - (y - 1)^2 = 1$

D) $(x - 1)^2 - \frac{(y + 2)^2}{25} = 1$

156) $4x^2 - 16y^2 - 16x + 32y - 64 = 0$

A) $\frac{(x - 2)^2}{4} - \frac{(y - 1)^2}{16} = 1$

B) $\frac{(x - 2)^2}{16} - \frac{(y + 1)^2}{4} = 1$

C) $\frac{(x - 2)^2}{16} - \frac{(y - 1)^2}{4} = 1$

D) $\frac{(x + 2)^2}{16} - \frac{(y - 1)^2}{4} = 1$

157) $9y^2 - 16x^2 + 18y + 64x - 199 = 0$

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

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

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

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

Conic Sections … Set 2

Answers

154) B

155) A

156) C

157) B

Conic Sections … Set 2

Convert the equation to the standard form for an ellipse by completing the square on x and y.

158) $16x^2 + 25y^2 - 32x - 150y - 159 = 0$

A) $\frac{(x-3)^2}{25} + \frac{(y-1)^2}{16} = 1$

B) $\frac{(x-1)^2}{16} + \frac{(y-3)^2}{25} = 1$

C) $\frac{(x-1)^2}{25} + \frac{(y-3)^2}{16} = 1$

D) $\frac{(x+1)^2}{25} + \frac{(y+3)^2}{16} = 1$

159) $36x^2 + 16y^2 + 72x + 96y - 396 = 0$

A) $\frac{(x+1)^2}{36} + \frac{(y+3)^2}{16} = 1$

B) $\frac{(x+3)^2}{16} + \frac{(y+1)^2}{36} = 1$

C) $\frac{(x+1)^2}{16} + \frac{(y+3)^2}{36} = 1$

D) $\frac{(x-1)^2}{16} + \frac{(y-3)^2}{36} = 1$

Conic Sections … Set 2

Answers

158) C

159) C