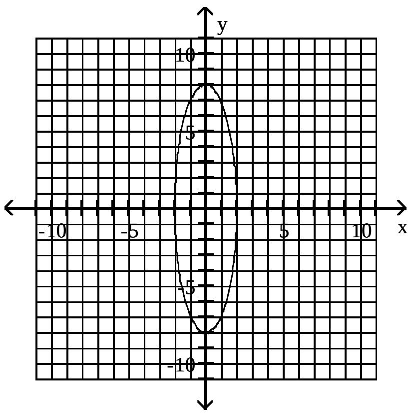
Ch. 9 Review
Precalculus   Name____________________

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

Find the standard form of the equation of the ellipse and give the location of its foci.

1) 1) ____________



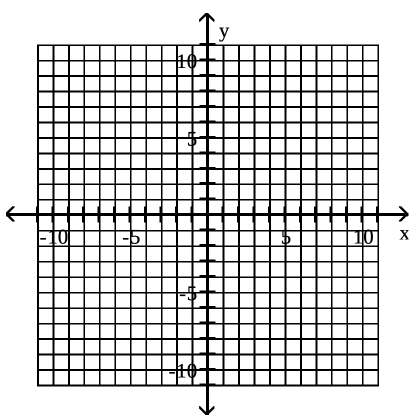
Find the standard form of the equation of the ellipse satisfying the given conditions.

2) Foci: (0, −2), (0, 2); y−intercepts: −5 and 5 2) ____________

3) Endpoints of major axis: (−2, 1) and (−2, 7); endpoints of minor axis: (−4, 4) and (0, 4); 3) ____________

Graph the ellipse.

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



Find the foci of the ellipse whose equation is given.

5) $\frac{(x+2)^2}{9} + \frac{(y-1)^2}{36} = 1$ 5) ____________

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

6) $36x^2 + 16y^2 + 72x + 96y - 396 = 0$ 6) ____________

Find the vertices and locate the foci for the hyperbola whose equation is given.

7) $\frac{x^2}{144} - \frac{y^2}{49} = 1$ 7) ________________

Find the standard form of the equation of the hyperbola satisfying the given conditions.

8) Foci: (0, −4), (0, 4); vertices: (0, −3), (0, 3) 8) ________________

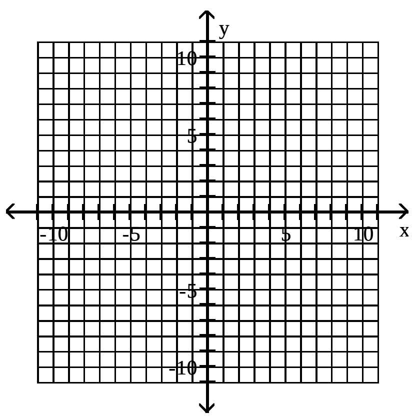
9) Endpoints of transverse axis: (−3, 0), (3, 0); foci: (−8, 0), (−8, 0) 9) ________________

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

10) $9y^2 - 16x^2 + 18y + 64x - 199 = 0$ 10) ________________

Use vertices and asymptotes to graph the hyperbola. Find the equations of the asymptotes.

11) $4y^2 - 9x^2 = 36$ 11) ________________



Find the location of the center, vertices, and foci for the hyperbola described by the equation.

12) $\frac{(x + 4)^2}{36} - \frac{(y - 1)^2}{25} = 1$ 12) ________________

Find the focus and directrix of the parabola with the given equation.

13) $y^2 = -24x$ 13) ________________

Find the standard form of the equation of the parabola using the information given.

14) Vertex: (6, −4); Focus: (3, −4) 14) ________________

15) Focus: (−4, 5); Directrix: y = −1 15) ________________

Convert the equation to the standard form for a parabola by completing the square on x or y as appropriate.

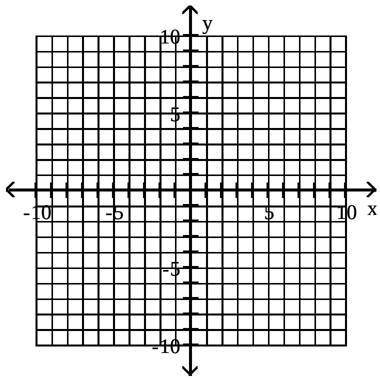
16) $x^2 - 2x + 7y - 34 = 0$ 16) ________________

Find the vertex, focus, and directrix of the parabola with the given equation.

17) $(x + 1)^2 = -20(y - 3)$ 17) ________________

Graph the parabola with the given equation.

18) $(y + 2)^2 = -8(x - 2)$ 18) ________



Solve the problem.

19) A bridge is built in the shape of a parabolic arch. The bridge arch has a span of 194 feet and a maximum height of 35 feet. Find the height of the arch at 15 feet from its center. 19) ________

Identify the equation without completing the square.

20) $3x^2 + 4y^2 + 2x + 2 = 0$ 20) ________

21) $y^2 - 2x^2 + 3x + 4y + 1 = 0$ 21) ________

Write the equation in terms of a rotated x'y'–system using θ, the angle of rotation. Write the equation involving x' and y' in standard form.

22) $x^2 + 2xy + y^2 - 8x + 8y = 0;\ \theta = 45°$ 22) ________

Write the appropriate rotation formulas so that in a rotated system the equation has no x'y' –term.

23) $5x^2 - 4xy + 2y^2 - 8x + 8y = 0$ 23) ________

Rewrite the equation in a rotated x'y'–system without an x'y' term. Express the equation involving x' and y' in the standard form of a conic section.

24) $24xy - 7y^2 + 36 = 0$ 24) ________

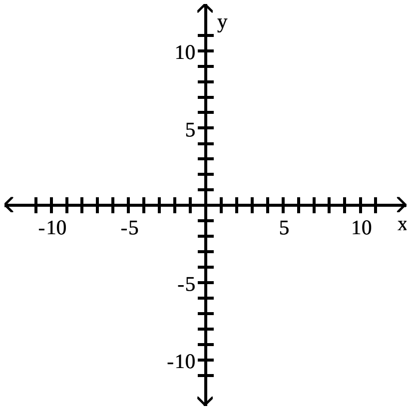
Identify the equation without applying a rotation of axes.

25) $x^2 + 4xy + 4y^2 + 3x - 2y - 1 = 0$ 25) ________

26) $x^2 - 11xy + 8y^2 - 14 = 0$ 26) ________

Use point plotting to graph the plane curve described by the given parametric equations.

27) $x = 5 \sin t$, $y = 5 \cos t$; $0 \le t \le 2\pi$ 27) ______________



Eliminate the parameter t. Find a rectangular equation for the plane curve defined by the parametric equations.

28) $x = 3 \tan t$, $y = 5 \sec t$; $0 \le t \le 2\pi$ 28) ______________

29) $x = 2 + \sec t$, $y = 5 + 2 \tan t$; $0 < t < \frac{\pi}{2}$ 29) ______________

Eliminate the parameter. Write the resulting equation in standard form.

30) A circle: $x = 1 + 4 \cos t$, $y = 3 + 4 \sin t$ 30) ______________

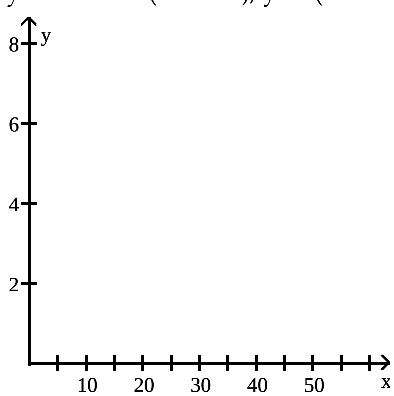
Find a set of parametric equations for the conic section or the line.

31) Circle: Center: (2, 3); Radius: 2 31) ______________

32) Hyperbola: Vertices: (3, 0); Vertices: (–3, 0); Foci: (5, 0) and (–5, 0) 32) ______________

Use a graphing utility to obtain the plane curve represented by the given parametric equations.

33) Cycloid: $x = 2(t - \sin t)$, $y = 2(1 - \cos t)$, $0 \le t \le 6\pi$ 33) ______________



Identify the conic section that the polar equation represents. Describe the location of a directrix from the focus located at the pole.

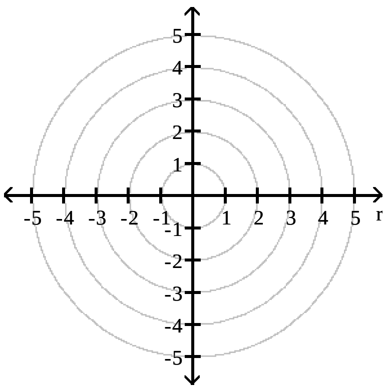
34) $r = \frac{2}{1 - 2 \cos \theta}$ 34) ______________

35) $r = \dfrac{7}{9 - 3 \sin \theta}$ 35) ______________

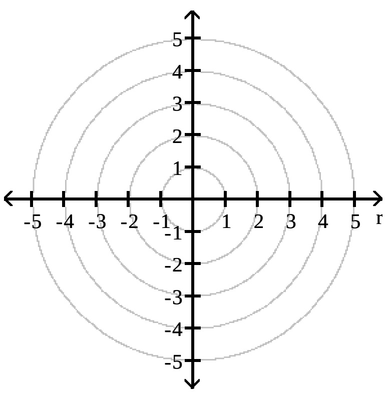
36) $r = \dfrac{9}{3 - 3 \cos \theta}$ 36) ______________

Graph the polar equation.

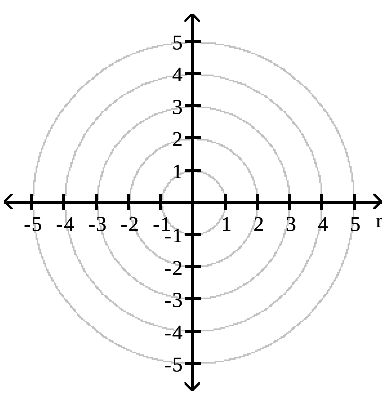
37) $r = \dfrac{9}{3 - 3 \cos \theta}$ Identify the directrix and vertex. 37) ______________



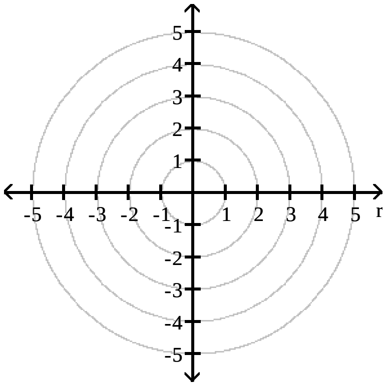
38) $r = \dfrac{6}{3 + 3 \sin \theta}$ Identify the directrix and vertex. 38) ______________



39) $r = \dfrac{4}{4 - \sin \theta}$ Identify the directrix and vertices. 39) ______________



40) $r = \dfrac{8}{1 + 4\cos\theta}$ Identify the directrix and vertices. 40) ______________



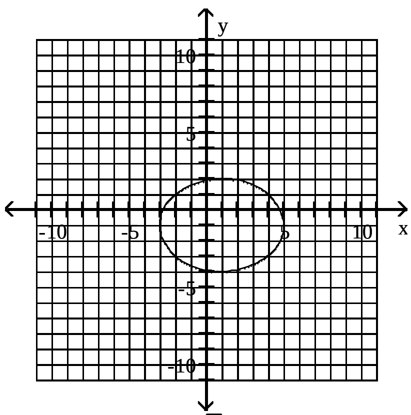
1) $\frac{x^2}{4} + \frac{y^2}{64} = 1$

foci at $(0, -2\sqrt{15})$ and $(0, 2\sqrt{15})$

2) $\frac{x^2}{21} + \frac{y^2}{25} = 1$

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

4)



5) foci at $(-2, 1 - 3\sqrt{3})$ and $(-2, 1 + 3\sqrt{3})$

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

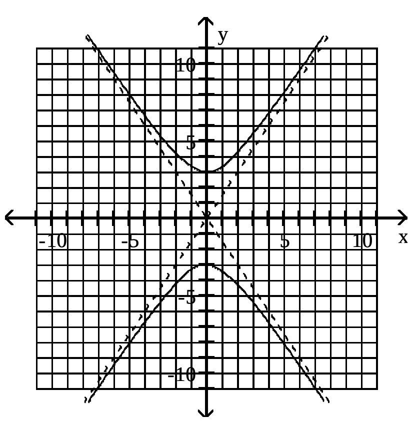
7) vertices: $(-12, 0)$, $(12, 0)$
foci: $(-\sqrt{193}, 0)$, $(\sqrt{193}, 0)$

8) $\frac{y^2}{9} - \frac{x^2}{7} = 1$

9) $\frac{x^2}{9} - \frac{y^2}{55} = 1$

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

11) Asymptotes: $y = \pm\frac{3}{2}x$



12) Center: $(-4, 1)$; Vertices: $(-10, 1)$ and $(2, 1)$; Foci: $(-4 - \sqrt{61}, 1)$ and $(-4 + \sqrt{61}, 1)$

13) focus: (−6, 0)
directrix: $x = 6$

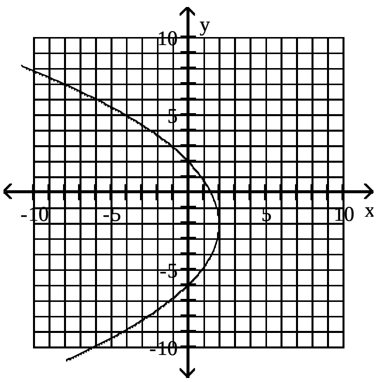
14) $(y + 4)^2 = -12(x - 6)$

15) $(x + 4)^2 = 12(y - 2)$

16) $(x - 1)^2 = -7(y - 5)$

17) vertex: (−1, 3)
focus: (−1, −2)
directrix: $y = 8$

18)



19) 34.2 ft

20) ellipse

21) hyperbola

22) $x'^2 = -4\sqrt{2}\, y'$

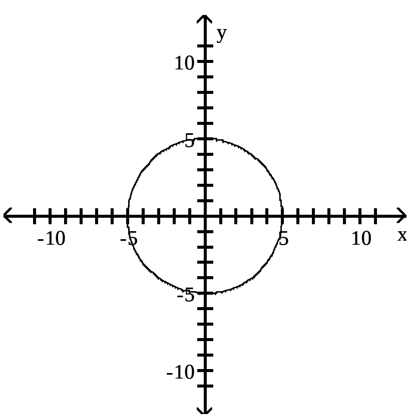
23) $x = \sqrt{5}\left(\dfrac{x' - 2y'}{5}\right)$; $y = \sqrt{5}\left(\dfrac{2x' + y'}{5}\right)$

24) $\dfrac{y'^2}{9/4} - \dfrac{x'^2}{4} = 1$

25) parabola

26) hyperbola

27)



28) $\dfrac{y^2}{25} - \dfrac{x^2}{9} = 1$; $-\infty < x < \infty$

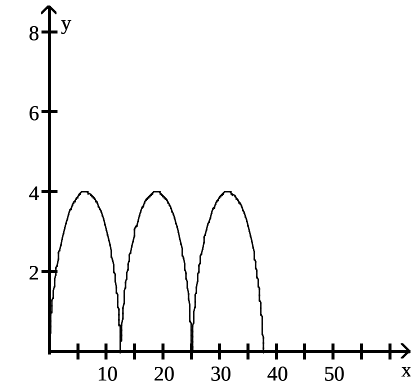
29) $(x - 2)^2 - \dfrac{(y - 5)^2}{4} = 1$; $x > 3$

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

31) $x = 2 + 2\cos t$; $y = 3 + 2\sin t$

32) $x = 3\sec t$, $y = 4\tan t$

33)

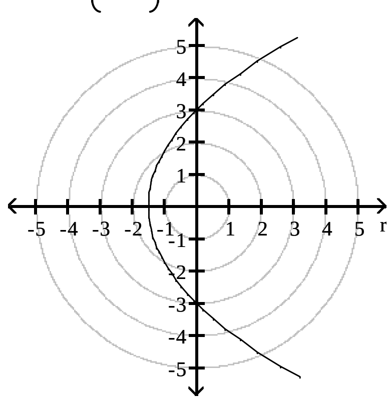


34) hyperbola; The directrix is 1 unit(s) to the left of the pole at $x = -1$.

35) ellipse; The directrix is $\frac{7}{3}$ unit(s) below the pole at $y = -\frac{7}{3}$.

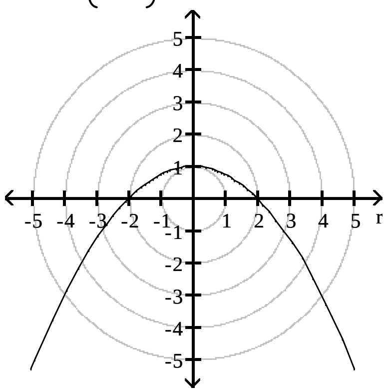
36) parabola; The directrix is 3 unit(s) to the left of the pole at $x = -3$.

37) directrix: 3 unit(s) to the left of
the pole at $x = -3$
vertex: $\left(\frac{3}{2}, \pi\right)$



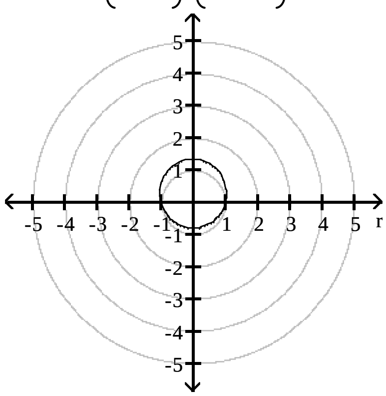
38) directrix: 2 unit(s) above the pole at y = 2

vertex: $\left(1, \frac{\pi}{2}\right)$



39) directrix: 4 unit(s) below the pole at y = −4

vertices: $\left(\frac{4}{3}, \frac{\pi}{2}\right), \left(\frac{4}{5}, \frac{3\pi}{2}\right)$



40) directrix: 2 unit(s) to the right of the pole at x = 2

vertices: $\left(-\frac{8}{3}, \pi\right), \left(\frac{8}{5}, 0\right)$