

Name _____

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

Find the equation of the parabola determined by the given information.

- 1) Focus at (10, 6), directrix $y = 4$ 1) _____
 A) $y = \frac{1}{4}x^2 - 30x - 120$ B) $x = \frac{1}{4}y^2 - 5y - 30$
 C) $x = \frac{1}{4}y^2 + 20y + 120$ D) $y = \frac{1}{4}x^2 - 5x + 30$

- 2) Vertex at the origin, focus at (-7, 0) 2) _____
 A) $x^2 = -28y$ B) $y = -\frac{1}{28}x^2$ C) $x = -\frac{1}{28}y^2$ D) $y^2 = -28x$

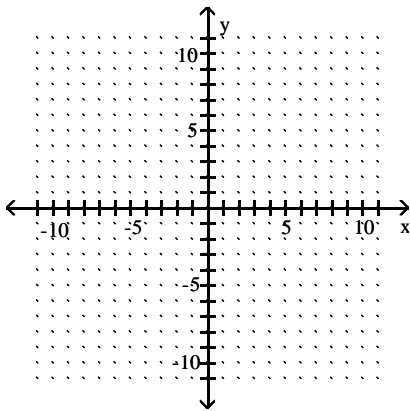
Find the coordinates of the vertex of the parabola.

- 3) $x = y^2 + 8y + 9$ 3) _____
 A) (0, -7) B) (-7, -4) C) (-4, -7) D) (-4, 0)

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

Graph the parabola.

- 4) $x = -3y^2 - 4y - 3$ 4) _____



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

Write an equation for the ellipse.

- 5) Foci $(0, \pm 3\sqrt{5})$ and x-intercepts $(\pm 2, 0)$ 5) _____
 A) $\frac{x^2}{49} + \frac{y^2}{4} = 1$ B) $\frac{x^2}{7} + \frac{y^2}{2} = 1$ C) $\frac{x^2}{2} + \frac{y^2}{7} = 1$ D) $\frac{x^2}{4} + \frac{y^2}{49} = 1$

Find the foci of the ellipse.

6) $16x^2 + 96x + 25y^2 + 200y + 144 = 0$

6) _____

A) $(-4, -7), (-4, 1)$

B) $(-7, -4), (1, -4)$

C) $(-4, -6), (-4, 0)$

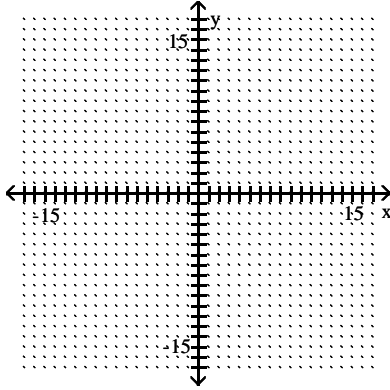
D) $(-6, -4), (0, -4)$

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

Graph the ellipse.

7) $9(x + 4)^2 + 25(y - 5)^2 = 225$

7) _____



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

Find the equation of the hyperbola.

8) Vertices at $(0, 2)$ and $(0, -2)$, foci at $(0, 9)$ and $(0, -9)$

8) _____

A) $\frac{y^2}{81} - \frac{x^2}{4} = 1$

B) $\frac{y^2}{4} - \frac{x^2}{77} = 1$

C) $\frac{y^2}{4} - \frac{x^2}{81} = 1$

D) $\frac{y^2}{77} - \frac{x^2}{4} = 1$

Find the foci and asymptotes of the hyperbola.

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

9) _____

A) $(-5, 0), (5, 0); y = \frac{4}{3}x, y = -\frac{4}{3}x$

B) $(0, -5), (0, 5); y = \frac{3}{4}x, y = -\frac{3}{4}x$

C) $(-4, 0), (4, 0); y = \frac{3}{4}x, y = -\frac{3}{4}x$

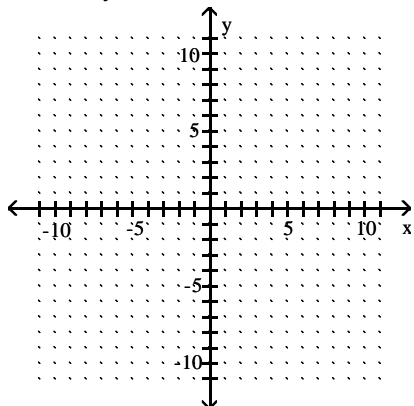
D) $(0, -4), (0, 4); y = \frac{3}{4}x, y = -\frac{3}{4}x$

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

Graph the hyperbola.

10) $25x^2 - 9y^2 = 225$

10) _____



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

Identify the equation as a parabola, circle, ellipse, or hyperbola.

11) $(x - 5)^2 = 49 - y^2$

11) _____

- A) Parabola B) Hyperbola C) Ellipse D) Circle

12) $15y = 4(x + 7)^2$

12) _____

- A) Ellipse B) Circle C) Hyperbola D) Parabola

13) $4x^2 = 4y^2 + 16$

13) _____

- A) Hyperbola B) Parabola C) Ellipse D) Circle

14) $9x^2 + 16y^2 = 144$

14) _____

- A) Circle B) Ellipse C) Hyperbola D) Parabola

Determine the appropriate rotation formulas to use so that the new equation contains no xy -term.

15) $4x^2 + 2xy + 4y^2 - 8x + 8y = 0$

15) _____

A) $x = \frac{1}{2}x' - \frac{\sqrt{3}}{2}y'$ and $y = \frac{\sqrt{3}}{2}x' + \frac{1}{2}y'$

B) $x = -y'$ and $y = x'$

C) $x = \frac{\sqrt{2}}{2}(x' - y')$ and $y = \frac{\sqrt{2}}{2}(x' + y')$

D) $x = \frac{\sqrt{2+\sqrt{2}}}{2}x' - \frac{\sqrt{2-\sqrt{2}}}{2}y'$ and $y = \frac{\sqrt{2-\sqrt{2}}}{2}x' + \frac{\sqrt{2+\sqrt{2}}}{2}y'$

Rotate the axes so that the new equation contains no xy -term. Discuss the new equation.

16) $xy + 16 = 0$

16) _____

A) $\theta = 45^\circ$

$$\frac{y'^2}{32} + \frac{x'^2}{32} = 1$$

ellipse

center at $(0, 0)$

major axis is y' -axis

vertices at $(0, \pm 4\sqrt{2})$

B) $\theta = 45^\circ$

$$y'^2 = -32x'$$

parabola

vertex at $(0, 0)$

focus at $(-8, 0)$

C) $\theta = 45^\circ$

$$\frac{y'^2}{32} - \frac{x'^2}{32} = 1$$

hyperbola

center at $(0, 0)$

transverse axis is y' -axis

vertices at $(0, \pm 4\sqrt{2})$

D) $\theta = 36.9^\circ$

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

ellipse

center at $(0, 0)$

major axis is the x' -axis

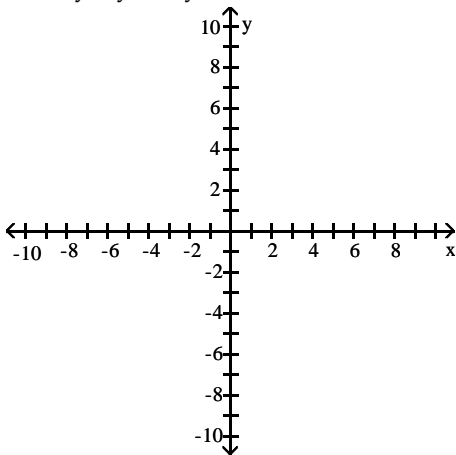
vertices at $(\pm 2, 0)$

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

Rotate the axes so that the new equation contains no xy -term. Graph the new equation.

17) $x^2 + xy + y^2 - 3y - 6 = 0$

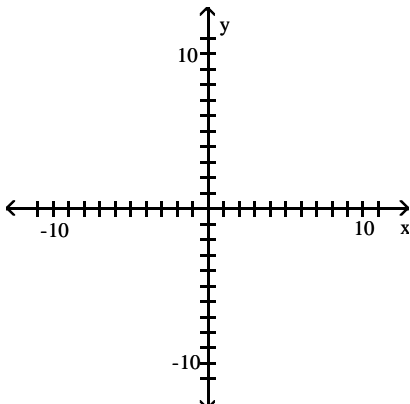
17) _____



Graph the curve whose parametric equations are given.

18) $x = 2t - 1, y = t^2 + 2; -4 \leq t \leq 4$

18) _____



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

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

19) $x = 3 \sin t, y = 3 \cos t; 0 \leq t \leq 2\pi$

19) _____

A) $x^2 + y^2 = 9; \text{ for } x \text{ in } -3 \leq x \leq 3$

B) $y^2 - x^2 = 9; \text{ for } x \text{ in } -\infty < x < \infty$

C) $y = x^2 - 9; \text{ for } x \text{ in } -2 \leq x \leq 2$

D) $y = \sqrt{a^2 - x^2} = 9; \text{ for } x \text{ in } -\infty < x < \infty$

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

20) $r = \frac{6}{1 - 2 \cos \theta}$

20) _____

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

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

C) ellipse; The directrix is 3 unit(s) to the right of the pole at $x = 3$.

D) hyperbola; The directrix is 3 unit(s) to the right of the pole at $x = 3$.

21) $r = \frac{2}{2 + 2 \sin \theta}$

21) _____

A) hyperbola; The directrix is 1 unit(s) to the right of the pole at $x = 1$.

B) parabola; The directrix is 1 unit(s) to the right of the pole at $x = 1$.

C) hyperbola; The directrix is 1 unit(s) above the pole at $y = 1$.

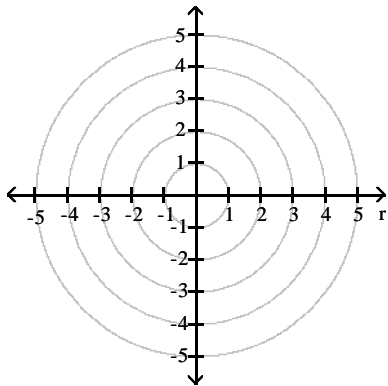
D) parabola; The directrix is 1 unit(s) above the pole at $y = 1$.

Graph the polar equation.

22) $r = \frac{9}{3 - 3 \cos \theta}$

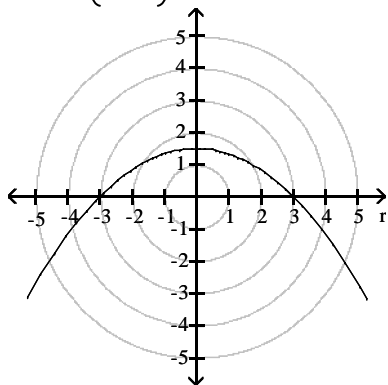
Identify the directrix and vertex.

22) _____



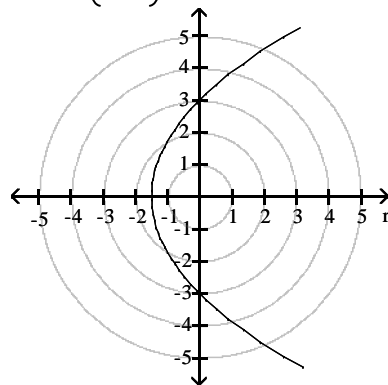
A) directrix: 3 unit(s) above the pole at $y = 3$

vertex: $\left(\frac{3}{2}, \frac{\pi}{2}\right)$



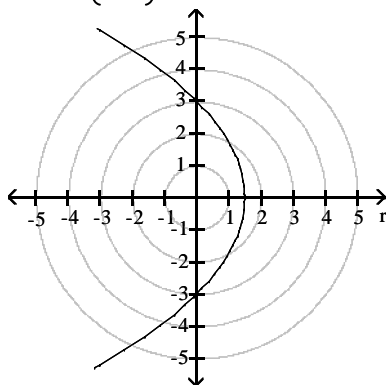
B) directrix: 3 unit(s) to the left of the pole at $x = -3$

vertex: $\left(\frac{3}{2}, \pi\right)$



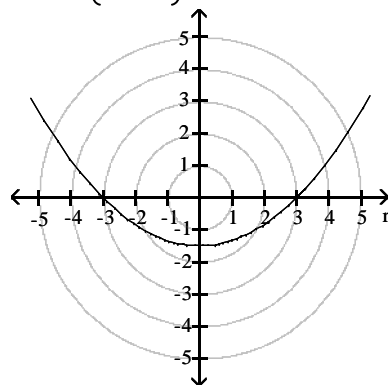
C) directrix: 3 unit(s) to the right of the pole at $x = 3$

vertex: $\left(\frac{3}{2}, 0\right)$



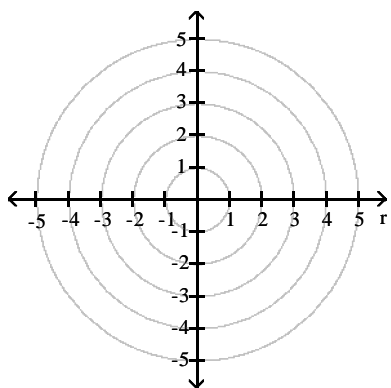
D) directrix: 3 unit(s) below the pole at $y = -3$

vertex: $\left(\frac{3}{2}, \frac{3\pi}{2}\right)$



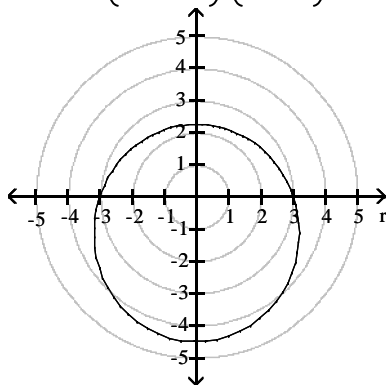
23) $r = \frac{9}{3 - \sin \theta}$ Identify the directrix and vertices.

23) _____



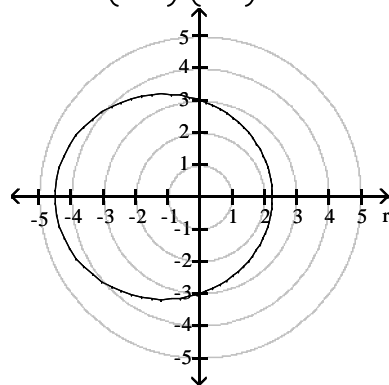
A) directrix: 9 unit(s) above
the pole at $y = 9$

vertices: $\left(-\frac{9}{4}, \frac{3\pi}{2}\right), \left(\frac{9}{2}, \frac{3\pi}{2}\right)$



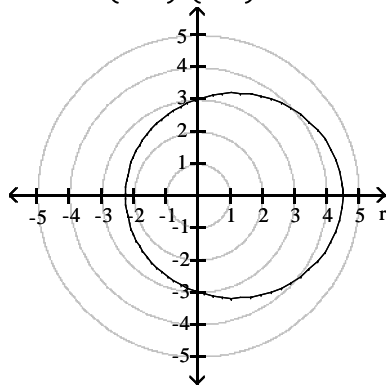
B) directrix: 9 unit(s) to the right of
the pole at $x = 9$

vertices: $\left(\frac{9}{2}, \pi\right), \left(\frac{9}{4}, 0\right)$



C) directrix: 9 unit(s) to the left of
the pole at $x = -9$

vertices: $\left(\frac{9}{4}, \pi\right), \left(\frac{9}{2}, 0\right)$



D) directrix: 9 unit(s) below
the pole at $y = -9$

vertices: $\left(\frac{9}{2}, \frac{\pi}{2}\right), \left(\frac{9}{4}, \frac{3\pi}{2}\right)$

