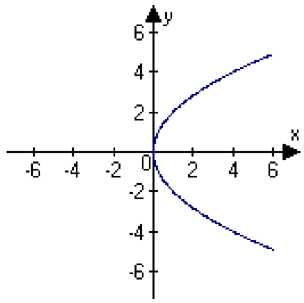
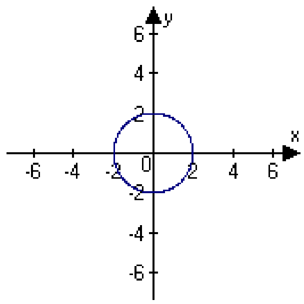
M251 practice exam 6 9.1-9.5
P. Staley

1. Match the equation with its graph. $y^2 = 4x$

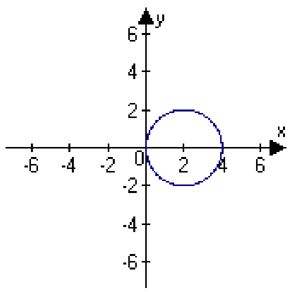
A)



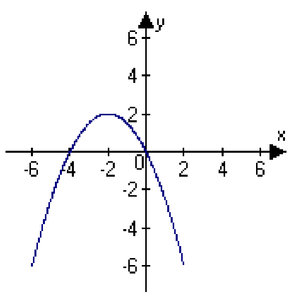
B)



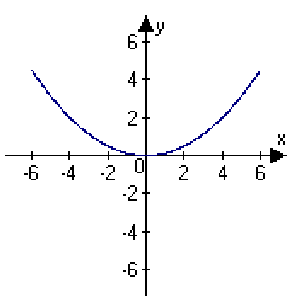
C)



D)

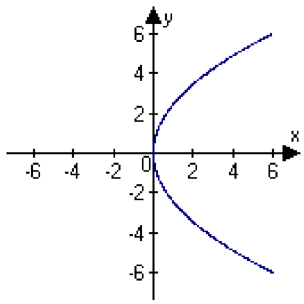


E)

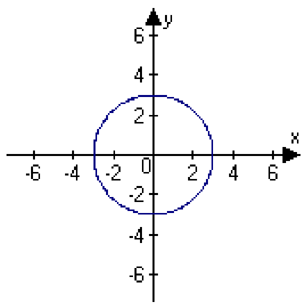


2. Match the equation with its graph. $\frac{x^2}{9} + \frac{y^2}{9} = 1$

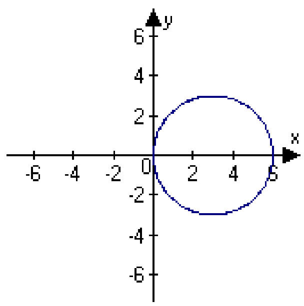
A)



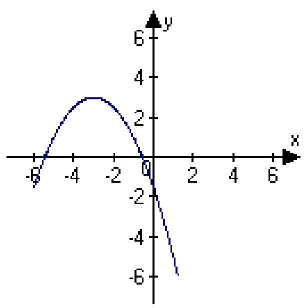
B)



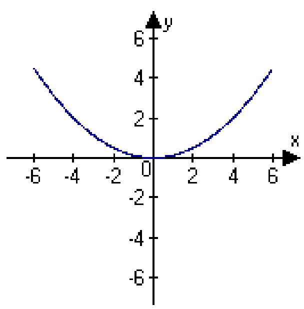
C)



D)

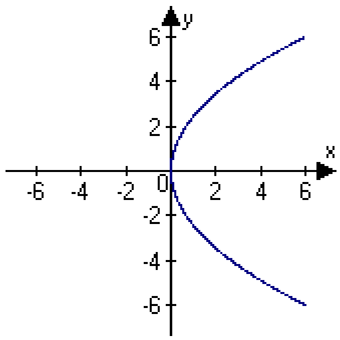


E)

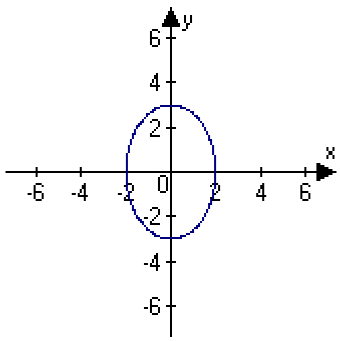


3. Match the equation with its graph. $\dfrac{(x-2)^2}{1} - \dfrac{y^2}{4} = 1$

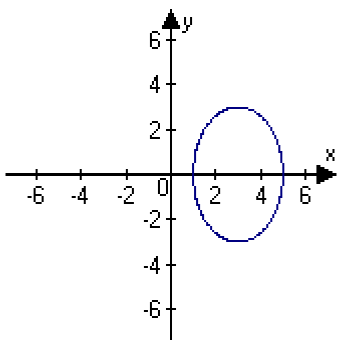
A)



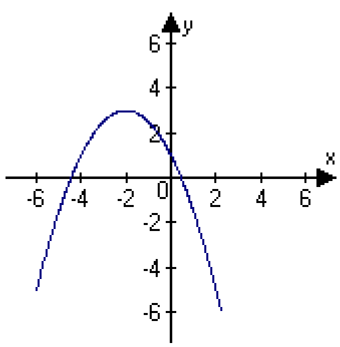
B)



C)



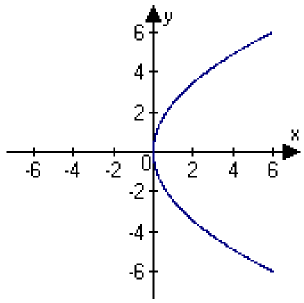
D)



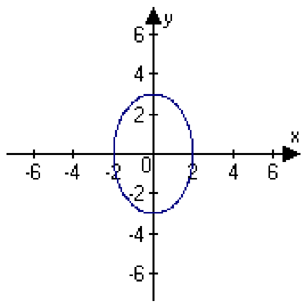
E) None of the above.

4. Match the equation with its graph. $(x+2)^2 = -2(y-3)$

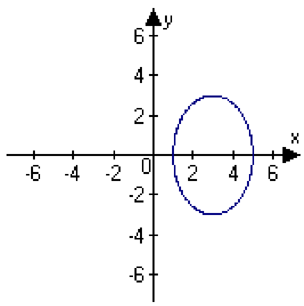
A)



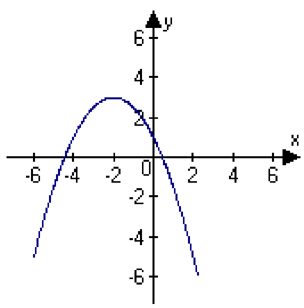
B)



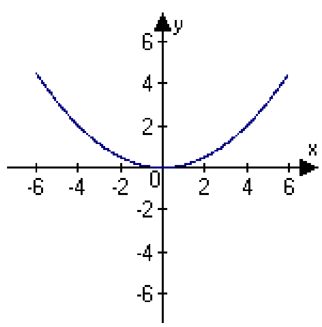
C)



D)



E)



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

$$y^2 + 8y + 4x + 12 = 0$$

vertex: focus: directrix:

6. Find an equation of the parabola with vertex (0,8) and directrix $y = -5$.

7. Find the center, foci, vertices, and eccentricity of the ellipse.

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

center: vertices: foci: eccentricity:

8. Find an equation of the ellipse with vertices (0,6), (14,6) and eccentricity $\varepsilon = \frac{1}{7}$.

9. Find the center, foci, and vertices of the hyperbola.

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

center: vertices: foci:

10. Find an equation of the hyperbola with vertices (-2,0), (2,0) and asymptotes $y=\pm 8x$.

11. Find an equation of the hyperbola with vertices (0,–10), (0,10) and asymptotes $y=\pm\frac{1}{10}x$.

12. Classify the graph of the equation as a circle, a parabola, an ellipse, or a hyperbola.

$x^2+7y+9x-6=0$

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

13. Classify the graph of the equation as a circle, a parabola, an ellipse, or a hyperbola.

$6x^2+5y^2+7x+5y-3=0$

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

14. Classify the graph of the equation as a circle, a parabola, an ellipse, or a hyperbola.

$4x^2 + 4y^2 + 4x + 9y - 7 = 0$

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

15. Classify the graph of the equation as a circle, a parabola, an ellipse, or a hyperbola.

$9x^2 - 8y^2 + 6x + 3y - 1 = 0$

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

16. Write the corresponding rectangular equation by eliminating the parameter.

$x = 2t - 1$

$y = 3t + 1$

17. Write the corresponding rectangular equation by eliminating the parameter.

$x = \sqrt{t}$

$y = t - 4$

18. Write the corresponding rectangular equation by eliminating the parameter.

$x = e^t$

$y = e^{2t} + 1$

19. Write the corresponding rectangular equation by eliminating the parameter.

$$x = 4\cos\theta$$
$$y = 8\sin\theta$$

20. Write the corresponding rectangular equation by eliminating the parameter.

$$x = 16 + 8\cos\theta$$
$$y = -4 + 4\sin\theta$$

21. Write the corresponding rectangular equation by eliminating the parameter.

$$x = t^3$$
$$y = 3\ln t$$

22. Find $\dfrac{dy}{dx}$.

$$x = t^2$$
$$y = 8 - 10t$$

23. Find $\dfrac{dy}{dx}$.

$$x = \sqrt{t}$$
$$y = 6 - t$$

24. Find $\frac{dy}{dx}$.

$$x = 2e^{\theta}$$
$$y = e^{-\frac{\theta}{2}}$$

25. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ if possible, and find the slope and concavity (if possible) at the point corresponding to $t = 4$.

$$x = t + 6$$
$$y = t^2 + 4t$$

$dy/dx =$ $d^2y/dx^2 =$ At $t = 4$: slope: and convave ______

26. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ if possible, and find the slope and concavity (if possible) at the point corresponding to $\theta = \frac{\pi}{4}$.

$x = 3\cos\theta$
$y = 3\sin\theta$

dy/dx = d^{2}y/dx^2 = at $\theta = \frac{\pi}{4}$: slope: and concave ______

27. Find the arc length of the curve on the given interval.

$x = t^2,\ y = 20t,\ 0 \le t \le 10$

28. Find the arc length of the curve on the given interval.

$x = t^2 + 6,\ y = 4t^3 + 10,\ -1 \le t \le 0$

29. Find the arc length of the curve on the given interval.

$x = \sqrt{t},\ y = 8t - 6,\ 0 \le t \le 8$

30. Find the area of the surface generated by revolving the curve about the given axis.

$x = t,\ y = 5t,\ 0 \le t \le 10$

(i) x-axis:

(ii) y-axis:

31. Find the area of the surface generated by revolving the curve about the given axis.

$x = 9\cos^3\theta,\ y = 9\sin^3\theta,\ 0 \le \theta \le \pi/2$

(i) x-axis:

(ii) y-axis:

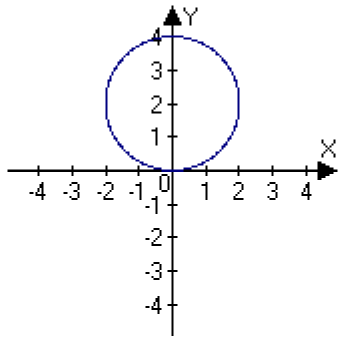
32. For the given point in polar coordinates, find the corresponding rectangular coordinates for the point.

$\left(4, \frac{\pi}{2}\right)$

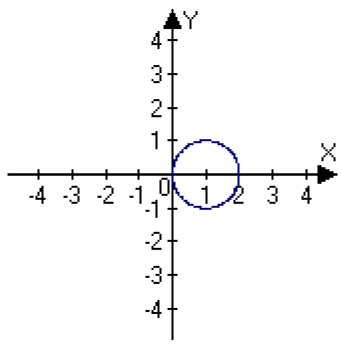
33. For the given point in rectangular coordinates, find two sets of polar coordinates for the point for $0 \le \theta \le 2\pi$.

$\left(8\sqrt{3}, 8\right)$

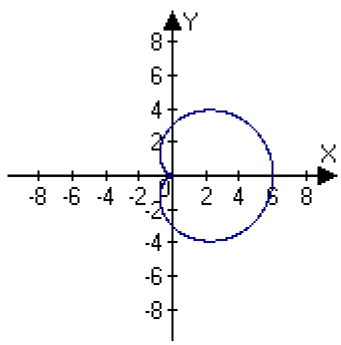
34. Specify the polar equation for the given graph.



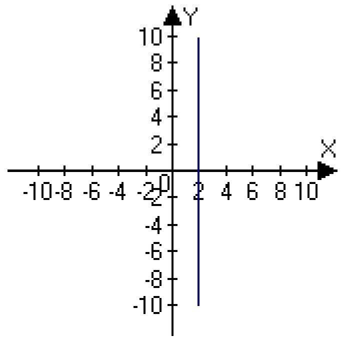
35. Specify the polar equation for the given graph.



36. Specify the polar equation for the given graph.



37. Specify the polar equation for the given graph.



38. Convert the rectangular equation to polar form.

$x = 5$

39. Convert the rectangular equation to polar form.

$9x - y + 8 = 0$

40. Convert the polar equation to rectangular form.

$r = 6$

41. Convert the polar equation to rectangular form.

$r = 10\sin\theta$

42. Find the points of intersection of the graphs of the equations.

$$r = 1 + \cos\theta$$
$$r = 3\cos\theta$$

43. Find the points of intersection of the graphs of the equations.

$$r = \frac{\theta}{2.4}$$
$$r = 2.4$$

44. Find the length of the curve over the given interval.

$$r = 20\cos\theta,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$$

45. Find the length of the curve over the given interval.

$$r = 5 + 5\sin\theta,\ 0 \le \theta \le 2\pi$$

46. Find the length of the curve over the given interval.

$$r = 9(1 + \cos\theta),\ 0 \le \theta \le 2\pi$$

47. Find the area of the surface formed by revolving about the *polar axis* the following curve over the given interval.

$$r = 8\cos\theta,\ 0 \le \theta \le \frac{\pi}{2}$$

48. Find the area of the surface formed by revolving about the $\theta = \frac{\pi}{2}$ axis the following curve over the given interval.

$$r = e^{5\theta},\ 0 \le \theta \le \frac{\pi}{2}$$