

## 8.4 Parametric Equations

2.  $x = 6 - t$   
 $y = \sqrt{3t - 4}$

$$t = (6 - x)$$

$$y = \sqrt{3(6-x) - 4}$$

$$y = \sqrt{18 - 3x - 4}$$

$$y = \sqrt{14 - 3x}$$

6.  $x = 4 + 2\cos t$   
 $y = -1 + 4\sin t$

$$\cos t = \frac{x-4}{2}$$

$$\sin t = \frac{y+1}{4}$$

3.  $x = \frac{1}{2}t + 4$   
 $y = t^3$

$$x - 4 = \frac{1}{2}t$$

$$2(x-4) = t$$

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

$$y = 8(x-4)^3$$

$$\cos^2 t + \sin^2 t = 1$$

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

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

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

A.  $x = t$   
 $y = (t+2)^3 - 4$

B.  $x = t - 2$   
 $y = t^3 - 4$

These are  
NOT the  
only  
correct  
options!

4.  $x = 3\cos t$   $\cos t = \frac{x}{3}$   
 $y = 3\sin t$   $\sin t = \frac{y}{3}$

$$\cos^2 t + \sin^2 t = 1$$

$$\left(\frac{x}{3}\right)^2 + \left(\frac{y}{3}\right)^2 = 1$$

$$\boxed{\frac{x^2}{9} + \frac{y^2}{9} = 1}$$

8.  $x = \sqrt{y^2 - 3}$

A.  $y = t$   
 $x = \sqrt{t^2 - 3}$

B.  $y = \sqrt{t}$   
 $x = \sqrt{t - 3}$

5.  $x = \cos t$   $\cos t = x$   
 $y = 2\sin^2 t$   $\sin^2 t = \frac{y}{2}$

$$\cos^2 t + \sin^2 t = 1$$

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

$$\boxed{2x^2 + y = 2}$$

### 8.3 Converting Polar and Rectangular Equations

Convert the following polar equations to rectangular equations:

1.  $r = 8$
2.  $r \cos \theta = 6$
3.  $r = -5 \csc \theta$
4.  $r = 7 \sin \theta$
5.  $r = -3 \sec \theta$
6.  $r = 5 \cos \theta$

Convert the following rectangular equations to polar equations:

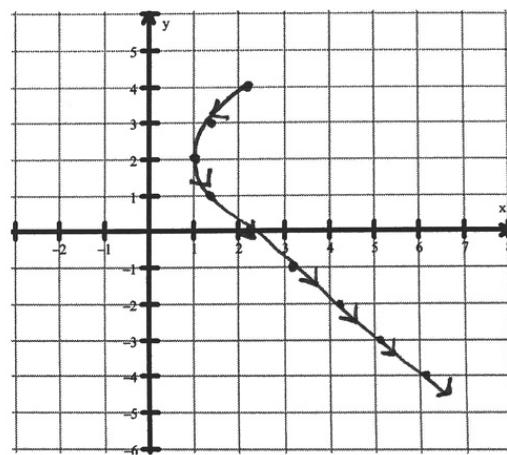
7.  $x^2 + y^2 = 10$
8.  $2x - y^2 = 0$
9.  $x^2 + y^2 = 81$
10.  $y = -5$
11.  $y^2 = 10x$
12.  $3xy = 7$

### 8.4 Parametric Equations

1. Fill in the table and sketch the parametric equation for  $t [-2, 6]$

$$x = \sqrt{t^2 + 1}$$
$$y = 2 - t$$

$t$	$x$	$y$
-2	$\sqrt{5}$	4
-1	$\sqrt{2}$	3
0	1	2
1	$\sqrt{2}$	1
2	$\sqrt{5}$	0
3	$\sqrt{10}$	-1
4	$\sqrt{17}$	-2
5	$\sqrt{26}$	-3
6	$\sqrt{37}$	-4



Problems 2 – 6: Eliminate the parameter to write the parametric equations as a rectangular equation.

$$2. x = 6 - t$$
$$y = \sqrt{3t - 4}$$

$$3. x = \frac{1}{2}t + 4$$
$$y = t^3$$

$$4. x = 3 \cos t$$
$$y = 3 \sin t$$

$$5. x = \cos t$$
$$y = 2 \sin^2 t$$

$$6. x = 4 + 2 \cos t$$
$$y = -1 + 4 \sin t$$

Problems 7 and 8: Write two new sets of parametric equations for the following rectangular equations.

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

$$8. x = \sqrt{y^2 - 3}$$

### 8.5 Polar and Parametric Review

1. Find the rectangular coordinates of the point given in polar coordinates.
  - a.  $(-2, 5\pi/6)$
  - b.  $(0, \pi/4)$
2. Find the polar coordinates with the given rectangular coordinates.
  - a.  $(-3, 1)$
  - b.  $(\frac{1}{2}, -\frac{\pi}{2})$
3. Give three sets of polar coordinates for the point
  - a.  $(-2, -\pi/3)$
  - b.  $(1, \pi/8)$