

## Parametric Curves in the Plane- HW Problems

Sketch the curve given by the parametric equations by plotting points. Indicate with an arrow the direction of the curve as  $t$  increases.

1.  $x = t^2 + 3t + 1$        $-3 \leq t \leq 3$   
 $y = t^2 - t$

2.  $x = e^t$        $-1 \leq t \leq 1$   
 $y = e^{2t} - 2$

In problems 3-9 eliminate the parameter to find a cartesian equation for the curve. Sketch a graph and indicate with an arrow the direction of the curve as  $t$  increases.

3.  $x = 2 \cos(t)$        $0 \leq t \leq 2\pi$   
 $y = 2 \sin(t)$

4.  $x = 2 \cos(t)$        $0 \leq t \leq 2\pi$   
 $y = 4 \sin(t)$

5.  $x = \cos(t)$        $0 \leq t < \frac{\pi}{2}$   
 $y = \sec(t)$

$$6. \quad x = e^t \quad -1 \leq t \leq 1$$

$$y = e^{2t} - 2$$

$$7. \quad x = \sinh(t) \quad -2 \leq t \leq 2$$

$$y = \cosh(t)$$

$$8. \quad x = 2 + 3\cos(t) \quad 0 \leq t \leq \pi$$

$$y = -1 + 2\sin(t)$$

$$9. \quad x = \cos^3(\theta) \quad 0 \leq \theta \leq 2\pi$$

$$y = \sin^3(\theta)$$

10. Find a parametrization of the following curves.

$$a. \quad y = x^4 - x^3 + 3x + 1, \quad x \in \mathbb{R}$$

$$b. \quad x = \cos(y) - \sin(2y), \quad y \in \mathbb{R}$$