

9.2

Homework # 1, 3, 5, 7, 9

#1

$$x = t \sin t \quad y = t^2 + t$$

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$$

#3

$$x = 1 + 4t - t^2$$

$$y = 2 - t^3$$

$$t = 1$$

$$\frac{2t+1}{1 \sin t + 1 \cos t}$$

$$= \frac{2t+1}{\sin t + \cos t}$$

$$\frac{dy}{dt} = -3t^2$$

$$\frac{-3t^2}{4-2t} = \frac{-3}{2}$$

$$\frac{dx}{dt} = 4 - 2t$$

$$t = 1$$

$$\text{Slope} = \frac{y - B}{x - a} = m$$

$$x = 1 + 4 - 1 = x = 4 \quad y = 1$$

$$\frac{y-1}{x-4} = \frac{-3}{2} \quad 2y-2 = -3x+12$$

$$3x + 2y = 14$$

#5

$$x = t \cos t \quad y = t \sin t \quad t = \pi$$

$$\frac{dy}{dt} = t \cos t - 1 \sin t$$

$$\frac{t \cos t + \sin t}{-t \sin t + \cos t} = \pi$$

$$\frac{dx}{dt} = t \sin t + \cos t$$

$$x = \pi \cos \pi = -\pi \quad y = \pi \cdot 0 = 0$$

$$\frac{y-0}{x+\pi} = \pi \quad y = \pi(x+\pi) = y = \pi x + \pi^2$$

## 9.2 Homework # 7, 9

#7  $x = 1 + \ln t$   $y = t^2 + 2$  (1, 3)  
 $\sqrt{y-2} = t$

$x = 1 + \ln \sqrt{y-2}$   $y = (e^{x-1})^2 + 2$

$y - 3 = 2(x - 1)$   $y - 3 = 2x - 2$   $\boxed{y = 2x + 1}$

a)  $\frac{dx}{dt} = \frac{1}{t}$   $\frac{dy}{dt} = 2t$   $\frac{2t}{\frac{1}{t}} = 2t^2$   $2(1)^2 = 2$

$\boxed{y = 2x + 1}$

#9  $x = t^2 + 1$   $y = t^2 + t$

$\frac{dx}{dt} = 2t + 1$   $\frac{dy}{dt} = 2t + 1$

Concaves up on  
 $(-\infty, 0)$

$\frac{d^2y}{dx^2} = \frac{d}{dt} \left( 1 + \frac{1}{2t} \right) \cdot \frac{dt}{dx} = \frac{-1}{4t^3}$