9.2 Second Derivatives of Parametric Equations

Calculus Name: _____ **CA #2**

1. Given a curve defined by the parametric equations $x(t) = 4\cos t$ and $y(t) = 2\sin t$, for $0 < t < 2\pi$. Determine the open t-intervals on which the curve is concave up or down.

2. If $x(t) = 2t^3$ and $y(t) = t^2 + 2t$, what is $\frac{d^2y}{dx^2}$ in terms of t?

3. If $x(t) = t^{-1}$ and $y(t) = t^2 - 7$, find the slope and the concavity at the point $(1, -6)$.

4. If $x(\theta) = \tan\theta$ and $y(\theta) = \sec\theta$, what is $\frac{d^2y}{dx^2}$ in terms of θ?

5. If $\frac{dx}{dt} = 4t$ and $\frac{dy}{dt} = t\cos(t^2)$, what is $\frac{d^2y}{dx^2}$ in terms of t?

Answers to 9.2 CA #2

1. Concave Up: $\pi < t < 2\pi$ Concave Down: $0 < t < \pi$	2. $-\frac{(t+2)}{18t^5}$	3. Slope: -2, Concave Up	4. $\cos^3\theta$	5. $-\frac{\sin(t^2)}{8}$