9.4 Derivatives of Vector-Valued Functions

Calculus Name: _____ **CA #1**

1. If f is a vector-valued function defined by $f(t) = \langle t \sin t\,, t \cos t \rangle$, then $f''(t) =$

2. At time t, $0 \le t \le 2\pi$, the position of a particle moving along a path in the xy-plane is given by the vector-valued function, $f(t) = \langle e^{2t} \cos t\,, e^{2t} \sin t \rangle$. Find the slope of the path of the particle at time $t = \frac{\pi}{2}$.

3. The position of a particle moving in the xy-plane is defined by the vector-valued function, $f(t) = \langle t^3 - 9t^2 + 1,\ 2t^3 - 15t^2 - 36t + 1 \rangle$. For what value of t is the particle at rest?

4. The vector-valued function f is defined by $f(t) = \langle 2e^{2t},\ te^{2t} \rangle$. Find $f'(1)$.

5. If h is the vector-valued function defined by $h(t) = \langle \sin\frac{t}{2}, \cos 3t \rangle$, then $h'(t) =$

Answers to 9.4 CA #1

1. $\langle 2\cos t - t\sin t, -2\sin t - t\cos t \rangle$	2. -2	3. $t = 6$	4. $\langle 4e^2, 3e^2 \rangle$	5. $\langle \frac{1}{2}\cos\frac{t}{2}, -3\sin 3t \rangle$