9.7 Differentiating in Polar Form

Calculus Name: _____ **CA #2**

1. Find the slope of the tangent line to the polar curve $r = 4$ at $\theta = \frac{\pi}{4}$.

2. A particle moves along the polar curve $r = 5\sin 2\theta$ so that $\frac{d\theta}{dt} = 2$. Find the value of $\frac{dr}{dt}$ at $\theta = \frac{\pi}{2}$.

3. For $0 \leq \theta \leq 2\pi$, find the values of θ for which the polar curve $r = 1 - \sin\theta$ **<u>might</u>** have a vertical tangent line. Second, use a graphing utility to eliminate any of your possible answers.

4. A polar curve is given by the equation $r = 5 - 4\sin\theta$ for $\theta \geq 0$. What is the instantaneous rate of change of r with respect to θ where $\theta = \frac{\pi}{6}$.

5. **Calculator active.** For a certain polar curve $r = f(\theta)$, it is known that $\frac{dx}{d\theta} = \cos\theta - \theta\sin\theta$ and $\frac{dy}{d\theta} = \sin\theta + \theta\cos\theta$. What is the value of $\frac{d^2y}{dx^2}$ at $\theta = 5$?

Answers to 9.7 CA #2

1. -1	2. -20	3. $\frac{7\pi}{6}, \frac{11\pi}{6}$ eliminated $\frac{\pi}{2}$	4. $-2\sqrt{3}$	5. 0.206