**Derivatives of Exponential Functions (polar, parametric, vector)**

1. Given the position vector of a particle as $\langle \cos^{-1} t , 8t - 10e^{2t-1} \rangle$, determine what direction the particle is moving when $t = \frac{1}{2}$.

2. Find the tangent line for the polar curve $r = e^{-\theta}$ at $\theta = 0$.

3. A particle is moving along a curve so that its position at time $t$ is defined by $x(t) = t^2 - e^{-3t}$ and $y(t) = -1 + e^{\cos t}$. Determine at what time $t$, where $0 \le t \le 2\pi$, the particle is resting, if there is a time.