

① If  $\vec{v} \cdot \vec{a} = \frac{1}{3} |\vec{v}| |\vec{a}|$ , what does that tell you about the motion of  $\vec{r}(t)$ ? Is it turning? Is it speeding up? slowing down?

② Given  $\vec{r} = \langle \cos(e^{-t}), \sin(e^{-t}) \rangle$ , find each of the following at time  $t=1$ , accurate to at least 4 significant figures:  
 $\vec{r}, \vec{v}, \vec{a}, \vec{T}, \vec{a}_{||}, \vec{a}_{\perp}, \vec{N}, |\vec{v}|, \frac{d|\vec{v}|}{dt}$ .