Math 321 Quiz 3

Oct. 15/17, 2012

Your Name: *Your Section:*

Instructions: 15 minutes. Discussion within **pairs***. Dot on top means derivative on t.*
Below $\vec{r} = x\hat{x} + y\hat{y} + z\hat{z} = r\hat{r}$ is a function of a parameter t.
1). True or false? Explain. a. $\dot{\vec{r}} = \dot{r}\hat{r}$. b. $|d\vec{r}/dt| = d|\vec{r}|/dt = \dot{r}$ (6')
2). Writing $\dot{\vec{r}} = \vec{v} = v_r\hat{r} + \vec{v}_\perp$, $v_r = \vec{v} \cdot \hat{r}$. Then show $\dot{r} = v_r$ using $\vec{r} \cdot \vec{r} = r^2$. (4')
(Bonus) If $\dot{\vec{r}} = \vec{\omega} \times \vec{r}$, show that $|\vec{r}|$ won't change. (Notice $\vec{\omega}$ also depends on t. In homework, you are even required to solve $\vec{r}(t)$ for the case where $\vec{\omega}$ is a constant.). (2')