Math 2471 Calc 3 - Homework #2

Pg. 852, #3, 5, 15, 17, 47, and 50

Pg. 852, #25, 39, and 40

Find the unit Tangent vector for the following

$$\#3 \quad \vec{r}(t) = t^2\,\vec{i} + 2t\,\vec{j}, \; t = 1$$

$$\#5 \quad \vec{r}(t) = 5\cos t\,\vec{i} + 5\sin t\,\vec{j}, \; t = \pi/3$$

Find the unit Normal vector for the following

$$\#15 \quad \vec{r}(t) = t\,\vec{i} + \frac{1}{2}t^2\,\vec{j}, \; t = 2$$

$$\#17 \quad \vec{r}(t) = t\,\vec{i} + t^2\,\vec{j} + \ln t\,\vec{k}, \; t = 1$$

Find the Binormal vector for

$$\#47 \quad \vec{r}(t) = 2\cos t\,\vec{i} + 2\sin t\,\vec{j} + \frac{t}{2}\,\vec{k}, \; t = \pi/2$$

$$\#50 \quad \vec{r}(t) = <2e^t, e^t\cos t, e^t\sin t> \text{ for all } t.$$

Calculate the unit Tangent and unit Normal vectors for the following

$$(i) \quad \vec{r}(t) = <(t-1)e^t - 1, (t-1)e^t + 1>,$$

$$(ii) \quad \vec{r}(t) = <3t, 4\cos t, 4\sin t>,$$

Find the tangential and normal components of acceleration for the following:

$$\#25 \quad \vec{r}(t) = <t, \frac{1}{t}> \text{ at } t = 1$$

$$\#39 \quad \vec{r}(t) = <e^t\sin t, e^t\cos t, e^t> \text{ for all } t.$$

$$\#40 \quad \vec{r}(t) = <e^t, 2t, e^{-t}> \text{ for all } t.$$

Due: Friday June 17, 2022