

Math 2471 Calc 3 - Homework #1

Pg. 825-826, #11, 23, 25, 31, 35, 65, 67, 71, 72 and 73

Pg. 834, #11, 13, 17, 19, 23, 39, 47 and 53

Pg. 825-826

#11 Evaluate the given vector function at each given value of t

$$\vec{r}(t) = \frac{1}{2}t^2\vec{i} - (t-1)\vec{j}$$

$$(a) \vec{r}(1) \quad (b) \vec{r}(0) \quad (c) \vec{r}(s+1) \quad (d) \vec{r}(2+\Delta t) - \vec{r}(2)$$

Sketch the following plane curve/space curve of the following giving the vector functions orientation (direction)

$$\#23 \quad \vec{r}(t) = \frac{t}{4}\vec{i} - (t-1)\vec{j}$$

$$\#25 \quad \vec{r} = \langle t^3, t^2 \rangle$$

$$\#31 \quad \vec{r}(t) = (-t+1)\vec{i} + (4t+2)\vec{j} + (2t+3)\vec{k}$$

$$\#35 \quad \vec{r}(t) = \langle 2\sin t, 2\cos t, e^{-t} \rangle$$

Find the following limit

$$\#65 \quad \lim_{t \rightarrow \pi} (t\vec{i} + \cos t\vec{j} + \sin t\vec{k})$$

$$\#67 \quad \lim_{t \rightarrow 0} \left\langle t^2, 3t, \frac{1 - \cos t}{t} \right\rangle$$

Determine the interval(s) on which the following are continuous

$$\#71 \quad \vec{r}(t) = \frac{1}{2t+1}\vec{i} + \frac{1}{t}\vec{j}$$

$$\#72 \quad \vec{r}(t) = \langle \sqrt{t}, \sqrt{t-1} \rangle$$

$$\#73 \quad \vec{r}(t) = \langle t, \arcsin t, t-1 \rangle$$

Pg. 834

Find the derivative of the following:

$$\#11 \quad \vec{r}(t) = t^4\vec{i} - 5t\vec{j}$$

$$\#13 \quad \vec{r}(t) = 3\cos^3 t\vec{i} + 2\sin^3 t\vec{j} + \vec{k}$$

$$\#17 \quad \vec{r}(t) = \langle t\sin t, t\cos t, t \rangle$$

Find (a) $\vec{r}'(t)$ (b) $\vec{r}''(t)$ (c) $\vec{r}'(t) \cdot \vec{r}''(t)$ (d) $\vec{r}'(t) \times \vec{r}''(t)$ (23 only) for

$$\#19 \quad \vec{r}(t) = t^3 \vec{i} + \frac{1}{2}t^2 \vec{j}$$

$$\#23 \quad \vec{r}(t) = \frac{1}{2}t^2 \vec{i} - t \vec{j} + \frac{1}{6}t^3 \vec{k}$$

Find the following integrals:

$$\#39 \quad \int (2t \vec{i} + \vec{j} + 9\vec{k}) dt$$

$$\#47 \quad \int_0^1 (8t \vec{i} + t \vec{j} - \vec{k}) dt$$

#53 Find the antiderivative of the following:

$$\vec{r}'(t) = \langle 4e^{2t}, 3e^t \rangle \quad \vec{r}(0) = \langle 2, 0 \rangle$$

Due: Friday June 5, 2020