

MAT 175 HOMEWORK #5

DUE OCTOBER 19 (WEDNESDAY)

Note: Please indicate you are in **Section C01**. Numbering of problems is as in the textbook.

(11.5.6) Find the required limit or indicate that the limit does not exist.

$$\lim_{t \rightarrow \infty} \left[\frac{t \sin t}{t^2} \mathbf{i} - \frac{7t^3}{t^3 - 3t} \mathbf{j} - \frac{\sin t}{t} \mathbf{k} \right]$$

(11.5.10(a)) State the domain of the following vector-valued function:

$$\vec{r}(t) = \ln(t - 1)\mathbf{i} + \sqrt{20 - t} \mathbf{j}$$

(11.5.14(a)) Find $\mathbf{r}'(t)$ and $\mathbf{r}''(t)$, where

$$\mathbf{r}(t) = (e^t + e^{-t^2})\mathbf{i} + 2^t\mathbf{j} + t\mathbf{k}$$

(11.5.40) Find $\mathbf{F}'(t)$ in terms of t , where $\mathbf{F}(t) = \mathbf{f}(u(t))$ with

$$\mathbf{f}(u) = u^2\mathbf{i} + \sin^2(u)\mathbf{j} \quad \text{and} \quad u(t) = \tan t$$

(11.5.42) Evaluate the integral

$$\int_{-1}^1 \left[(1+t)^{3/2}\mathbf{i} + (1-t)^{3/2}\mathbf{j} \right] dt$$

(11.6.2) Find the parametric equations of the line through the points $(2, -1, -5)$ and $(7, -2, 3)$.

(11.6.6) Write both the parametric equations and the symmetric equations for the line through the point $(-1, 3, -6)$ parallel to the vector $\langle -2, 0, 5 \rangle$.

(11.6.10) Find the symmetric equations of the line of intersection of the given two planes:

$$x + y - z = 2, \quad 3x - 2y + z = 3$$

(11.6.18) Show that the lines

$$\frac{x-1}{-4} = \frac{y-2}{3} = \frac{z-4}{-2}$$

and

$$\frac{x-2}{-1} = \frac{y-1}{1} = \frac{z+2}{6}$$

intersect, and find the equation of the plane that they determine.

(11.6.24) Find the parametric equations of the line tangent to the curve

$$x = 2t^2, \quad y = 4t, \quad z = t^3$$

at $t = 1$.