MATH2850 - Elementary Multivariable Calculus, Spring 2014
Quiz 1 — Solution
Jan 16, 2014

Printed NAME

- You have 10 min to complete your quiz

- Please show all your work neatly and indicate your final answers clearly. If you simply write down the final answer without appropriate intermediate steps, you may not get full credit for that problem.

- The quiz is closed book and notes **Calculators are not allowed.**

GOOD LUCK ·)

1 Determine the equation of the tangent line to the curve

$$r(t) = \ln t\,\mathbf{i} + \sin(\pi t)\mathbf{j} + t\ln t\,\mathbf{k}$$

at $(0,0,0)$ (that is when $t = 1$)

$$R'(t) = (\ln t)'\,i + (\sin \pi t)'\,j + (t \ln t)'\,k$$

$$= \frac{1}{t}\,i + \pi \cos \pi t\,j + \left(\ln t + t\frac{1}{t}\right)k$$

$$= \frac{1}{t}\,i + \pi \cos \pi t\,j + (\ln t + 1)\,k$$

at $t=1$ $\quad R'(1) = i + \pi j + (\ln 1 + 1)k$

$$R'(1) = i + \pi j + k$$

direction of the tangent line is $R'(1) = i + \pi j + k$.

At $(0,0,0)$, which corresponds to $t=1$ the tangent line is given by

$$\ell(t) = \langle 0,0,0 \rangle + t\,R'(1)$$

$$= \langle 0,0,0 \rangle + t\langle 1, \pi, 1 \rangle$$