**NAME:** (print!) Aditya Sivakumar **Section:** 24

**E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q24FirstLast.pdf) ASAP BUT NO LATER THAN Dec. 4, 2020, 8:00pm**

**By using Stokes' Theorem, or otherwise, evaluate $\int_C \mathbf{F}\cdot d\mathbf{r}$, where**

$$F(x,y,z) = (yz+2y+3z)\mathbf{i} + (xz+2x+4z)\mathbf{j} + (xy+3x+4y)\mathbf{k} \quad ,$$

**where $C$ is the curve if intersection of the plane $x+y+z=1$ and the cylinder $x^2+y^2=1$, oriented counterclockwise as viewed from above. Be sure to explain everything.**

$$\int_C F\cdot dr = \int_S \text{curl}(F)\cdot dS$$

$$\text{curl}(F) = \begin{vmatrix} i & j & k \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ yz+2y+3z & xz+2x+4z & xy+3x+4y \end{vmatrix}$$

$$= i\left(x+4-(x+4)\right) - j\left(y+3-(y+3)\right)$$

$$+k\left(z+2-(z+2)\right)$$

$$= \langle 0,0,0\rangle$$

$$\int_S \langle 0,0,0\rangle \cdot dS = \boxed{0}$$

(Because it is the integral of the zero vector)