"QUIZ" for Lecture 24

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**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 of 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.

$F = (yz + 2y + 3z)i + (xz + 2x + 4z)j + (xy + 3x + 4y)k$

$\text{curl}(F) = ((x+4) - (x+4))i - ((y+3) - (y+3))j + ((z+2) - (z+2))k$

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

$x + y + z = 1 \qquad x^2 + y^2 = 1$

$z = 1 - x - y$

$z = g(x, y)$

$\iint_S F \cdot dS = \iint_D -P\left(\frac{dg}{dx}\right) - Q\left(\frac{dg}{dy}\right) + R \, dA$

$= \iint_D -(0)(-1) - (0)(-1) + 0 \, dA$

$= \iint_D 0 \, dA = \boxed{0}$