"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.

$x = \cos t \quad y = \sin t \quad z = 0 \qquad r = \cos t, \sin t, 0$

$r' = -\sin t, \cos t, 0$

$\langle 2\sin t, 2\cos t, \cos t \sin t + 3\cos t + 4\sin t\rangle \cdot \langle \sin t, \cos t, 0\rangle$

$2\sin t^2 + 2\cos t^2 + 0 = 2(\sin t^2 + \cos^2 t) = 2(1) = 2$

$\int_0^{2\pi} 2\,dt = 2t\Big|_0^{2\pi} = 4\pi$