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Department of Mathematics and Statistics

MATH 302-2
Quiz 5, Term 101

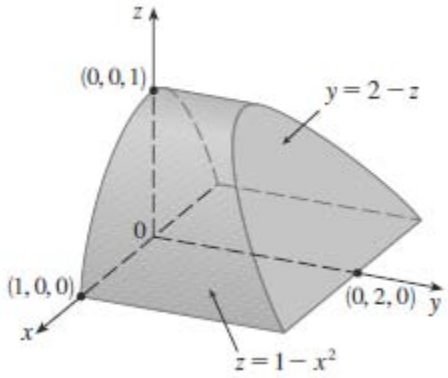
NAME: . . . . . .
ID : . . . . . .

Instructor: Prof. Dr. Othman Echi

Exercise. Let F be the vector field defined by

$$F(x, y, z) = xy\mathbf{i} + (y^2 + e^{xz^2})\mathbf{j} + \sin(xy)\mathbf{k}.$$

Let Σ be the surface of the region M bounded by the parabolic cylinder $z = 1 - x^2$ and the planes $z = 0$, $y = 0$, and $y + z = 2$.



Evaluate the flux of F across the surface Σ. (Hint: remark that

$$M = \{(x, y, z) \in R^3 \mid -1 \leq x \leq 1,\ 0 \leq z \leq 1 - x^2,\ 0 \leq y \leq 2 - z\}.)$$