

Show all work. 5 points each.

1. Use the Divergence Theorem to evaluate $\iint_S \mathbf{F} \cdot d\mathbf{S}$ for $\mathbf{F}(x, y, z) = \langle x^3, xe^z, 3zy^2 \rangle$ where S is the surface of the solid bounded by the planes $z = -1$ and $z = 2$ and the cylinder $x^2 + y^2 = 1$.