MTH 265, Quiz #14, Summer 2024 Name _____

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Evaluate the surface integral $\iint_S y^2 dS$ where S is the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies inside the cylinder $x^2 + y^2 = 1$.

2. Find the flux $\iint_S \vec{F} \cdot d\vec{S}$ for $\vec{F}(x, y, z) = xy\hat{\imath} + yz\hat{\jmath} + xz\hat{k}$ where S is the surface of the paraboloid $z = 4 - x^2 - y^2$ that lies above the square $0 \leq x \leq 1, 0 \leq y \leq 1$ with upward orientation.