

Math 2270 Quiz 5B

Name _____

Points will be deducted for untidy or disorganized answers

1. (4 points) Evaluate

$$\iint_S yz \, d\sigma$$

where S is the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the cone $z = \sqrt{x^2 + y^2}$.

2. (6 points) Let $\mathbf{F} = \langle y, -x, z \rangle$ be a vector field and S be the boundary surface of the solid region in space bounded above by the paraboloid $z = 4 - x^2 - y^2$, below by $z = 0$, and on the sides by the cylinder $x^2 + y^2 = 1$.

- (a) Find the flux

$$\iint_{S_1} \mathbf{F} \cdot \mathbf{n} \, d\sigma$$

upwards across the “top” portion S_1 of S .

- (b) Use the *Divergence Theorem* to find the outward flux of \mathbf{F} across the entire surface S .