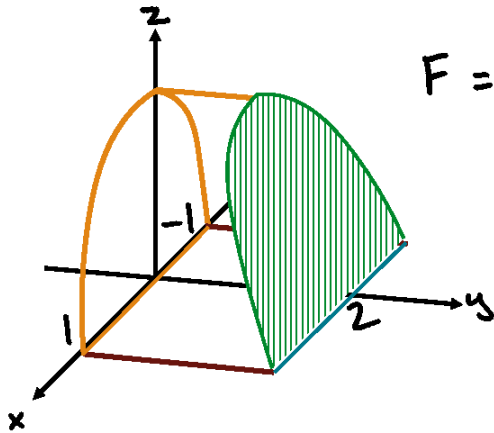


# Divergence Theorem - Example



$$\mathbf{F} = \left(\frac{1}{2}x^2 + e^{\cos zy}\right)\mathbf{i} + (yx + \ln|z|)\mathbf{j} + \tan(xy)\mathbf{k}$$

$$\iiint_S \vec{F} \, ds = ? = \iiint_R \text{div} \vec{F} \, dV$$

$$\text{div} \vec{F} = x + x + 0 = 2x$$

$$0 \leq y \leq 2 - z$$

$$0 \leq z \leq 1 - x^2$$

$$-1 \leq x \leq 1$$

$$= \int_{-1}^1 \int_0^{1-x^2} \int_0^{2-z} 2x \, dy \, dz \, dx$$

$$= \int_{-1}^1 \int_0^{1-x^2} 2x(2-z) \, dz \, dx$$

$$= \int_{-1}^1 (3x - 2x^3 - x^5) \, dx = 0$$