- Let's compute $d_N F$

$$d_N F = \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} + \frac{\partial F_3}{\partial z}$$

$$= \frac{\partial}{\partial x} x + \frac{\partial}{\partial y} xy + \frac{\partial}{\partial z} z$$

$$= 1 + x + 1$$

$$= 2 + x$$

$$= 2 + r\cos\theta$$

- So:

$$\int_S F \cdot n \, dA = \int_{z=0}^{5} \int_{\theta=0}^{2\pi} \int_{r=0}^{1} (2 + r\cos\theta) r \, dr \, d\theta \, dz$$

$$= \int_0^5 \int_0^{2\pi} \left(1 + \frac{\cos\theta}{3}\right) d\theta \, dz$$

$$= \int_0^5 2\pi \, dz$$

$$= \underline{10\pi} \; //$$