

$$2) \int_S F \cdot n \, d\sigma$$

$$F(x, y, z) = (x, y, 0)$$

$$n = (x, y, z) \rightarrow \text{because } n = 1$$

$$m = \frac{1}{\sqrt{1+1+1}}$$

$$(x, y, z) \rightarrow (n \sin \theta \cos \phi, n \sin \theta \sin \phi, n \cos \theta) = d\Omega$$

$$d\sigma = \left\| \frac{dx}{d\theta} \times \frac{dy}{d\phi} \right\| d\theta d\phi = \sqrt{n^2 \sin^2 \theta} d\theta d\phi$$

$$= n \sin \theta d\theta d\phi$$

$$F \cdot n = (x, y, 0) \cdot (x, y, z)$$

$$= x^2 + y^2 = n^2 \cos^2 \theta + n^2 \sin^2 \theta$$

$$= n^2$$

$$\text{So: } \pi^{1/2} \times \pi^{1/2}$$

$$\int_0^{\pi} \int_0^{2\pi} n^2 \sin \theta \, d\theta d\phi = \frac{\pi^2}{2}$$