3) Parametrizamos S_3

$$\Phi_3 : (0,\sqrt{3}) \times (0,2\pi) \longrightarrow \mathbb{R}^3$$
$$(r,\theta) \longrightarrow (r\cos\theta, r\,\text{sen}\,\theta, 0)$$

Φ_3 es de clase C^1 e inyectiva y si $D_3 = (0,\sqrt{3}) \times (0,2\pi)$ entonces $\Phi_3(D_3) = S_3$

$$\left.\begin{array}{l} \dfrac{\partial \Phi_3}{\partial r} = (\cos\theta, \text{sen}\,\theta, 0) \\ \dfrac{\partial \Phi_3}{\partial \theta} = (-r\,\text{sen}\,\theta, r\cos\theta, 0) \end{array}\right\} \quad \frac{\partial \Phi_3}{\partial r} \times \frac{\partial \Phi_3}{\partial \theta} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ \cos\theta & \text{sen}\,\theta & 0 \\ -r\,\text{sen}\,\theta & r\cos\theta & 0 \end{vmatrix} =$$

$$= 0\vec{i} + 0\vec{j} + r(\cos^2\theta + \text{sen}^2\theta)\vec{k} =$$

$$= (0,0,r).$$

Esta es la normal interior y como estamos considerando la exterior, reescribimos

$$\tilde{\Phi}_3 : \tilde{D}_3 \longrightarrow \mathbb{R}^3$$
$$(\theta, r) \longrightarrow (r\cos\theta, r\,\text{sen}\,\theta, 0)$$

con $\tilde{D}_3 = (0,2\pi) \times (0,\sqrt{3})$

$\tilde{\Phi}_3(\tilde{D}_3) = S_3$

$$y \quad \frac{\partial \tilde{\Phi}_3}{\partial \theta} \times \frac{\partial \tilde{\Phi}_3}{\partial r} = - \frac{\partial \Phi_3}{\partial r} \times \frac{\partial \Phi_3}{\partial \theta} = -(0,0,r) = (0,0,-r)$$

Por tanto

$$\iint_{S_3} Df \cdot d\vec{S} = \iint_{\tilde{D}_3} (Df \circ \tilde{\Phi}_3) \cdot \left(\frac{\partial \tilde{\Phi}_3}{\partial \theta} \times \frac{\partial \tilde{\Phi}_3}{\partial r} \right) d\theta\, dr =$$

$$= \iint_{\tilde{D}_3} Df(r\cos\theta, r\,\text{sen}\,\theta, 0) \cdot (0,0,r)\, dr = \iint_{\tilde{D}_3} (2r\cos\theta + 2r\,\text{sen}\,\theta - 3, 2r\cos\theta, 0) \cdot (0,0,r) =$$

$$= \iint_{\tilde{D}_3} 0 \, dr\, d\theta = 0$$