10.11.

$$\mathbf{u} = (x, y, z + 1)$$

$$\mathbf{n}_1 = grad(1 - x^2 - y^2 - z) = (-2x, -2y, -1)$$

Uppåtriktad normal $\mathbf{n} = (2x, 2y, 1)$

$$\hat{\mathbf{n}} = \frac{(2x, 2y, 1)}{\sqrt{4x^2 + 4y^2 + 1}}$$

$$\mathbf{u} \cdot \hat{\mathbf{n}} = (x, y, z + 1) \cdot \frac{(2x, 2y, 1)}{\sqrt{4x^2 + 4y^2 + 1}}$$

$$\mathbf{u} \cdot \hat{\mathbf{n}} = \frac{2x^2 + 2y^2 + z + 1}{\sqrt{4x^2 + 4y^2 + 1}}$$

$$\mathbf{u} \cdot \hat{\mathbf{n}} = \{\text{På ytan}\} = \frac{x^2 + y^2 + 2}{\sqrt{4x^2 + 4y^2 + 1}}$$

$$\text{Flödet } \Phi = \iint_Y \mathbf{u} \cdot \hat{\mathbf{n}} d\sigma$$

$$\Phi = \iint\limits_{D_{xy}} \frac{x^2 + y^2 + 2}{\sqrt{4x^2 + 4y^2 + 1}} \left| \frac{dxdy}{\frac{1}{\sqrt{4x^2 + 4y^2 + 1}}} \right|$$

$$\Phi = \iint\limits_{D_{xy}} (x^2 + y^2 + 2)dxdy$$

$$\Phi = \iint\limits_{D_{r\theta}} r^2 r dr d\theta + 2 \quad \pi \quad 1^2$$

$$\Phi = \frac{1}{4} \; 2\pi + 2 \; \pi \; 1^2 = \frac{5\pi}{2}$$

SVAR:

$$\text{Flödet } \Phi = \frac{5\pi}{2}.$$