

8.18.

$$S = \{(x, y, z) : x^2 + z^2 = 4^2, x^2 + y^2 = 4^2\}$$

$$\mathbf{n} = \text{grad}(x^2 + z^2 - 4^2) = (2x, 0, 2z)$$

$$\hat{\mathbf{n}} = \frac{\mathbf{n}}{|\mathbf{n}|} = \frac{(x, 0, z)}{4}$$

$$\cos \gamma = \frac{z}{4} = \frac{\sqrt{16 - x^2}}{4}$$

$$\text{Arean } A = \int_S dS = \int_{D_{xy}} \frac{dx dy}{|\cos \gamma|} = \int_{D_{xy}} \frac{4 dx dy}{\sqrt{16 - x^2}}$$

$$A = \int_{x=-4}^4 \int_{y=-\sqrt{16-x^2}}^{\sqrt{16-x^2}} \frac{dy}{\sqrt{16-x^2}} dx$$

$$A = \int_{x=0}^4 2 \cdot 2 dx = 64$$

SVAR:

$$\text{Arean } A = 64$$