

# Mathematische Grundlagen \*

## Vorlesung 16 – Lösungen

1.

$$\begin{aligned} V &= \int_0^{2\pi} d\phi \int_{R-h}^R dz \int_0^{\sqrt{R^2-z^2}} dr r \\ &= 2\pi \int_{R-h}^R dz \frac{1}{2}(R^2 - z^2) \\ &= \pi \left\{ R^2 h - \frac{1}{3}[R^3 - (R-h)^3] \right\} = \dots \end{aligned}$$

$$2. \quad (a) \quad V = 2\pi \int_0^1 dz \int_0^{\sqrt{z}} dr r = \pi \int_0^1 dz z = \frac{\pi}{2}$$

$$(b) \quad 2\pi \int_0^1 dz z \int_0^{\sqrt{z}} dr r = \pi \int_0^1 dz z^2 = \frac{\pi}{3}$$
$$x_x = y_s = 0 \quad z_s = \frac{2}{3}$$

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\*<http://www-com.physik.hu-berlin.de/~bunk/mathgrund>