№2.

$$\int_0^{2\Pi} d\varphi \int_0^R r\,dr \int_{\frac{hr}{R}}^{h} x\,dx = \int_0^{2\Pi} d\varphi \int_0^R r\,dr \cdot \left(\frac{h^2}{2} - \frac{1}{2}\left(\frac{hr}{R}\right)^2\right) =$$

$$x^2 = \frac{h^2}{R}(z^2+y^2)$$

$$\begin{cases} x = x \\ z = r\sin\varphi \\ y = r\cos\varphi \end{cases}$$

$$\frac{h^2}{R^2}(r^2\sin^2\varphi + r^2\cos^2\varphi) \Rightarrow x = \frac{hr}{R}$$

$$= \int_0^{2\Pi} d\varphi \int_0^R r \cdot \frac{h^2}{2} \cdot \left(1 - \frac{r^2}{R^2}\right) dr =$$

$$= \int_0^{2\Pi} d\varphi \left(\frac{h^2 x^2}{4} - \frac{h^2 x^4}{8x^2}\right)\Bigg|_0^R = \int_0^{2\Pi} d\varphi \left(\frac{h^2 r^2}{8}\right) =$$

$$= \int_0^{2\Pi} \left(\frac{h^2 r^2}{8}\right) d\varphi = \frac{\Pi h^2 r^2}{4} = \frac{\Pi}{4} \cdot (hr)^2$$

№3.

$$\begin{cases} x = 0 \\ y = 0 \\ z = 0 \\ x = a \\ y = b \\ z = c \end{cases}$$

$$\iiint (x+y+z)\,dx\,dy\,dz = \int_0^a dx \int_0^b dy \int_0^c (x+y+z)\,dz =$$

$$= \int_0^a dx \int_0^b dy \left(\frac{c^2}{2} + c(x+y)\right) =$$

$$= \int_0^a dx \; \frac{b^2 c}{2} + b\left(\frac{c^2}{2} + cx\right) = \frac{a^2 bc}{2} + \frac{ab^2 c}{2} + \frac{abc^2}{2} =$$

$$= \frac{1}{2} abc\,(a+b+c)$$