

2. Hausübung

1) Skizze und NB wie 1. Schulübung:

$$\text{NB: } b = \frac{24-4a}{3}$$

$$\text{HB: } V(a, b) = \left(\frac{a}{2}\right)^2 \cdot \pi \cdot b$$

$$\text{NB} \rightarrow \text{HB: } V(a) = \frac{a^2}{4} \cdot \pi \cdot \frac{24-4a}{3}$$

$$\bar{V}(a) = a^2 \cdot (b-a) = 6a^2 - a^3$$

$$\bar{V}'(a) = 12a - 3a^2 = 0$$

$$a \cdot (12 - 3a) = 0 \Rightarrow a = 0 \vee 12 - 3a = 0$$

nicht mögl.

$$12 - 3a = 0 \Rightarrow \underline{\underline{a = 4}} \rightarrow \text{NB:}$$

$$b = \frac{24-16}{3} \Rightarrow \underline{\underline{b = \frac{8}{3} \approx 2,67}}$$

$$\underline{\underline{V = 4 \cdot \pi \cdot \frac{8}{3} \approx 33,51 \text{ (E}^3\text{)}}}$$

$$\bar{V}''(a) = 12 - 6a$$

$$\bar{V}''(4) = 12 - 24 < 0$$

\Rightarrow Max.

2) HB: $V(h, r) = r^2 \pi h \rightarrow \text{Max}$

$$\text{NB: } 0 = 2r^2\pi + 2r\pi h = 500 \text{ cm}^2$$

$$2r\pi h = 500 - 2r^2\pi \quad | : 2r\pi$$

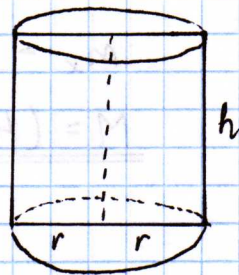
$$h = \frac{250 - r^2\pi}{r\pi} \rightarrow \text{HB}$$

$$\text{HB: } V(r) = r \cdot \frac{250 - r^2\pi}{r\pi} = r \cdot (250 - r^2\pi) = 250r - r^3\pi$$

$$V'(r) = 250 - 3r^2\pi = 0$$

$$\Rightarrow r = \sqrt{\frac{250}{3\pi}} \approx \underline{\underline{5,15 \text{ cm}}} \rightarrow \text{NB}$$

$$[V''(r) = -6\pi \cdot r \Rightarrow \text{Max.}]$$



$$h = \frac{250 - \frac{250}{3\pi} \cdot \pi}{\sqrt{\frac{250}{3\pi}} \cdot \pi} = \frac{\frac{250 - 250}{3}}{N} = \frac{500}{3\pi \cdot \sqrt{\frac{250}{3\pi}}} =$$

$$= \frac{2 \cdot 500 \cdot \sqrt{\frac{250}{3\pi}}}{3 \cdot \pi \cdot \frac{250}{3\pi}} = 2 \cdot \sqrt{\frac{250}{3\pi}} = 2 \cdot r \approx \underline{\underline{10,30 \text{ cm}}}$$

$$V = r^2 \cdot \pi \cdot h \approx \underline{\underline{858 \text{ cm}^3}}$$