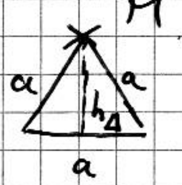
S. 168 / 4 a)

Geg: $s = 5\,cm$; $a = 4\,cm$



$$h_\Delta^2 + \left(\frac{a}{2}\right)^2 = a^2$$

$$\Rightarrow h_\Delta = \sqrt{\frac{3}{4}a^2} = \frac{\sqrt{3}}{2}\underset{\substack{\uparrow \\ 4cm}}{a} \approx 3{,}46\,cm$$

Grundfläche (6-Eck): $G = 6 \cdot A_\Delta = 6 \cdot \frac{1}{2} \cdot a \cdot h_\Delta$

$$= 3 \cdot 4cm \cdot 3{,}46cm = 41{,}52\,cm^2$$

(*) Höhe der Pyramide: $h^2 + a^2 = s^2$

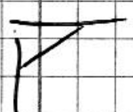
$$h = \sqrt{s^2 - a^2} = \sqrt{(5cm)^2 - (4cm)^2}$$

$$= 3\,cm$$

Volumen: $V = \frac{1}{3} \cdot G \cdot h = \frac{1}{3} \cdot 41{,}52\,cm^2 \cdot 3\,cm$

$$= 41{,}52\,cm^3$$

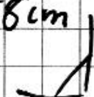
Mantelfläche: $M = 6 \cdot A_{\Delta_2} = 6 \cdot \frac{1}{2} a \cdot h'$



Höhe in den Mantel-Dreiecken:

$$s^2 = h'^2 + \left(\frac{a}{2}\right)^2$$

$$h' = \sqrt{s^2 - \frac{a^2}{4}} = \sqrt{(5cm)^2 - \frac{(4cm)^2}{4}} = \sqrt{21}\,cm \approx 4{,}58cm$$



$$\Rightarrow M = 3 \cdot a \cdot h' = 3 \cdot 4cm \cdot 4{,}58\,cm = 54{,}99\,cm^2$$

$$O = M + G = 54{,}99\,cm^2 + 41{,}52\,cm^2 = 96{,}51\,cm^2$$

b) & c): Zunächst (*) nutzen um s bzw. a zu berechnen, dann Vorgehen wie bei a).