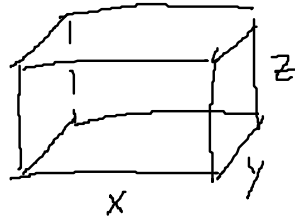


Skizze:



$$V = x \cdot y \cdot z = 100 \text{ Liter} = 100000 \text{ cm}^3$$

$$Ob(x, y, z) = x \cdot y + 2yz + 2xz$$

$$\text{Nebenbed: } g(x, y, z) = x \cdot y \cdot z - 100000 = 0$$

$$L(x, y, z, \lambda) = xy + 2yz + 2xz + \lambda(xyz - 100000)$$

$$\text{I: } L_x = y + 2z + \lambda yz = 0$$

$$\text{II: } L_y = x + 2z + \lambda xz = 0$$

$$\text{III: } L_z = 2y + 2x + \lambda xy = 0$$

$$\text{IV: } L_\lambda = xyz - 100000 = 0$$

$$\left. \begin{array}{l} \text{Aus I: } z = \frac{-y}{2 + \lambda y} \\ \text{Aus II: } z = \frac{-x}{2 + \lambda x} \end{array} \right\} \Rightarrow x = y \quad *$$

$$* \text{ in III: } 2x + 2x + \lambda x^2 = 0 \Leftrightarrow \lambda = -\frac{4}{x} \quad ** \quad (x \neq 0)$$

$$* \text{ in } \underline{IV} : x^2 \cdot z = 100000 \Rightarrow z = \frac{100000}{x^2} ***$$

$$** \text{ und } *** \text{ in } \underline{II} : x + \frac{200000}{x^2} - \frac{4}{x} \cdot x \cdot \frac{100000}{x^2} = 0$$

$$\Leftrightarrow x - \frac{200000}{x^2} = 0$$

$$\Leftrightarrow x^3 = 200000$$

$$\Rightarrow x = \sqrt[3]{200000} \approx 58.45 \text{ cm}$$

$$\Rightarrow z = \frac{-58.45}{-2} = 29.228 \text{ cm}$$
