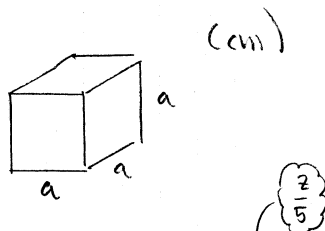


Kortfattad lösningsskiss

27

Bl. övn 3

Micke (kub)



$$5a = 200 \Rightarrow a = 40$$

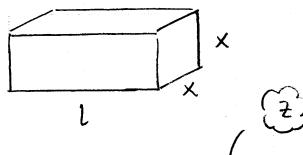
$$V(a) = a^3 \quad 0 < a \leq 40$$

Störst volym om $a = 40$

$$V(40) = 40^3 = 64000 \text{ (cm}^3\text{)}$$

$$\left(\frac{z}{5}\right)^3 = \frac{z^3}{125}$$

Peter (rätblock)



$$l + 2x + 2x = 200 \Rightarrow l = 200 - 4x$$

$$V(x) = x^2 \cdot l = x^2 (200 - 4x) = 200x^2 - 4x^3, \quad 0 < x < 50$$

Derivataundersökning

$$V'(x) = 2 \cdot 200x - 12x^2$$

$$V'(x) = 0 \text{ ger } 2 \cdot 200x - 12x^2 = 0$$

$$x(2 \cdot 200 - 12x) = 0$$

$$x = 0 \text{ eller } x = \frac{2 \cdot 200}{12} = \frac{200}{6}$$

Max eller min? Teckentabell!

x	0	$\frac{200}{6}$	50
V'	+	-	
V	↗	MAX	↘

$$x = \frac{200}{6} \text{ ger } V_{\max} = \left(\frac{200}{6}\right)^2 \left(200 - \frac{4 \cdot 200}{6}\right) \approx 74074 \text{ (cm}^3\text{)}$$

Svar: Peters paket ger största möjliga volym, oavsett begränsningen.

$$(ty \ 74074 > 64000 \text{ och } \frac{z^3}{108} > \frac{z^3}{125})$$

$$x = \frac{z}{6} \text{ ger } V_{\max} = \left(\frac{z}{6}\right)^2 \left(z - \frac{4z}{3}\right) = \frac{z^2}{36} \cdot \frac{z}{3} = \frac{z^3}{108}$$