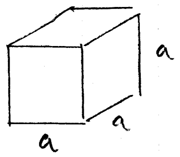
Kortfattad lösningsskiss

$\boxed{26}$

Bl. övn 3

Micke (kub)

(cm)



$\frac{z}{5}$

$5a = 200 \Rightarrow a = 40$

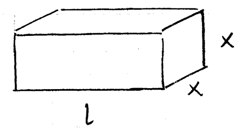
$\boxed{V(a) = a^3}, \quad 0 < a \leq 40$

Störst volym om $a = 40$

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

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

Peter (rätblock)



z

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

z

$\boxed{V(x)} = x^2 \cdot l = x^2(200 - 4x)$

$= \boxed{200x^2 - 4x^3}, \quad 0 < x < 50$

z

Derivataundersökning

z

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

z

$V'(x) = 0$ ger $2 \; 200x - 12x^2 = 0$

$\downarrow$

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

z

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

$= \frac{200}{6}$

Max eller min? Teckentabell!

x	0		$\boxed{\frac{200}{6}}$		50
V'		$+$		$-$	
V		$\nearrow$	MAX	$\searrow$	

z

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

$\approx \underline{74074}$ (cm^3)

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

$= \frac{z^2}{36} \frac{z}{3} = \frac{z^3}{108}$

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

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