

b) Tilavuuden summa: ($V_g = \frac{4}{3}\pi r^3$)

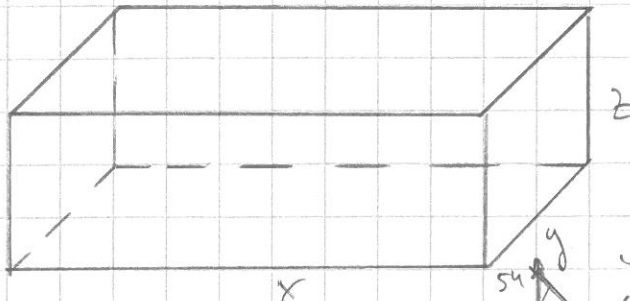
$$\frac{4}{3}\pi \left(\frac{1}{2}\right)^3 + \frac{4}{3}\pi \left(\frac{1}{2} \cdot \frac{1}{\sqrt{2}}\right)^3 + \frac{4}{3}\pi \left(\frac{1}{2} \cdot \left(\frac{1}{\sqrt{2}}\right)^2\right)^3 + \dots$$

$$= \frac{\frac{4}{3}\pi \left(\frac{1}{2}\right)^3}{1 - \left(\frac{1}{\sqrt{2}}\right)^3} = \dots = \frac{\pi(\sqrt{2}+4)}{21}$$

geom. sarja suppenee koska

$$|q| = \left|\left(\frac{1}{\sqrt{2}}\right)^3\right| < 1$$

10.



$$\underbrace{2x+2y}_{\text{pohjan piiri}} + z = 108$$

$$\Rightarrow z = 108 - 2x - 2y$$

tilavuus maks. iso

$$\downarrow = 108$$

Pakettin tilavuus:

$$V(x,y) = xyz = xy(108 - 2x - 2y) = 108xy - 2x^2y - 2xy^2$$

V jalk. jo deriiv. alueessa A

1° sisäpisteet

$$\begin{cases} V'_x(x,y) = 108y - 4xy - 2y^2 = 0 & | :y \neq 0 \\ V'_y(x,y) = 108x - 2x^2 - 4xy = 0 & | :x \neq 0 \end{cases}$$

$$\Rightarrow x = y = 18$$

$$\Rightarrow z = 36$$

$$V(18, 18) = 18 \cdot 18 \cdot 36 = \underline{\underline{11\ 664}}$$

2° Rannat $x=0$ tai $y=0$ tai $z=0 \Rightarrow V = \underline{\underline{0}}$

1° - 2° \Rightarrow leveyt = pituus = 18 tummaa, korkeus = 36 tummaa