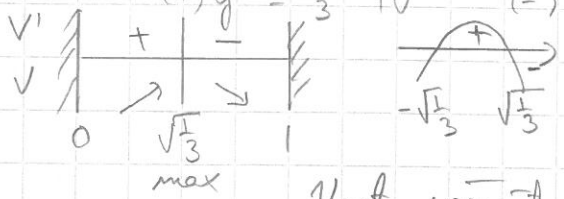
Särmiön tilavuus:

$V(y) = x \cdot 2x \cdot y = 2x^2 \cdot y = 2\left(\frac{1}{5} - \frac{1}{5}y^2\right) \cdot y = \frac{2}{5}y - \frac{2}{5}y^3$

V jatk. ja derivoit. real. $]0,1[$

$V'(y) = \frac{2}{5} - \frac{2}{5} \cdot 3y^2 = 0 \quad | \cdot 5 \Leftrightarrow 2 - 6y^2 = 0 \Leftrightarrow 2 = 6y^2 \quad | :6$

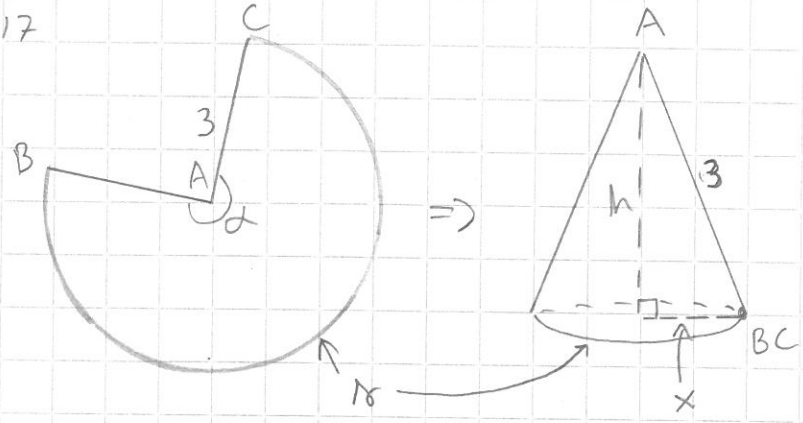
$\Leftrightarrow y^2 = \frac{1}{3} \quad | \sqrt{} \Leftrightarrow y = \pm\sqrt{\frac{1}{3}} \approx 0{,}57735$



$x^2 = \frac{1}{5} - \frac{1}{5}\left(\sqrt{\frac{1}{3}}\right)^2 \quad | \sqrt{} \Leftrightarrow x \approx 0{,}36515$

Varf. särmät $x \approx 37\,cm$, $2x \approx 73\,cm$, $y \approx 58\,cm$

13.17



Pythagoras: $x^2 + h^2 = 3^2$

$\Leftrightarrow x^2 = 9 - h^2$

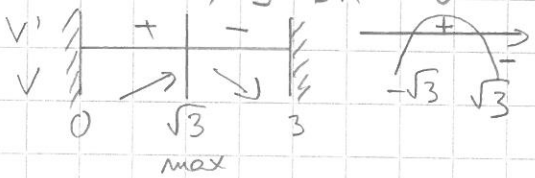
Kartion tilavuus:

$V(h) = \frac{1}{3}\pi x^2 \cdot h = \frac{1}{3}\pi(9 - h^2)h = \frac{1}{3}\pi(9h - h^3)$

V jatk. ja derivoit. real. $]0,3[$

$V'(h) = \frac{1}{3}\pi \cdot (9 - 3h^2) = 0 \quad | \cdot \frac{3}{\pi}$

$\Leftrightarrow 9 - 3h^2 = 0 \quad \Leftrightarrow h^2 = 3 \quad | \sqrt{} \Leftrightarrow h = \pm\sqrt{3}$



$x^2 = 9 - (\sqrt{3})^2 = 9 - 3 = 6 \quad | \sqrt{}$

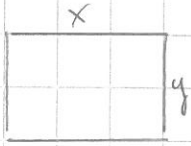
$\Leftrightarrow x = \pm\sqrt{6}$

$r = \frac{\alpha}{2\pi} \cdot 2\pi \cdot 3 = 2\pi x \quad | :3$

$\Leftrightarrow \alpha = \frac{2\pi x}{3} = \frac{2\pi\sqrt{6}}{3}$ (rad) $\quad (\approx 294^\circ)$

14. Kahden muuttujan funktio

Esim.



Suorakulmion pinta-ala:

$A(x,y) = xy$

on 2 muuttujan funktio

Funktion A määrittelyjoukko

$\begin{cases} x > 0 \\ y > 0 \end{cases} \Rightarrow$ I-neljännes