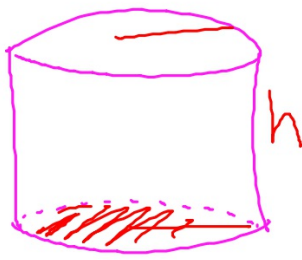


means $V = 1,000 \text{ cm}^3$

Ex: Design a 1 L (1000 cm^3) cylindrical shaped oil can. What dimensions will use the least amount of material?

$r = 5.42$
 $h = 10.84$



Base + LA
 $SA = 2\pi r^2 + 2\pi r h$

$SA = 2\pi r^2 + 2\pi r \left(\frac{1,000}{\pi r^2} \right)$

$SA = 2\pi r^2 + 2,000 r^{-1}$

$SA' = 4\pi r - 2,000 r^{-2} = 0$

$r^2 (4\pi r - \frac{2,000}{r^2} = 0) r^2$

$4\pi r^3 - 2,000 = 0$

$4\pi r^3 = 2,000$

$r^3 = \frac{2,000}{4\pi}$

$r = 5.42$

$V = \pi r^2 \cdot h$

$\frac{1,000}{\pi r^2} = \frac{\pi r^2 \cdot h}{\pi r^2}$

$\frac{1,000}{\pi r^2} = h$

$h = \frac{1,000}{\pi (5.42)^2}$

$h = 10.84$