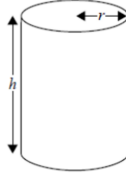


IB Calculus Problem 2

A closed cylindrical metal box has a radius of r centimetres and a height of h centimetres, with a volume of $20\pi \text{ cm}^3$.

The figure is not to scale.



A. Express h in terms of r .

The metal for the base and lid of the box costs 10 cents per cm^2 .

The metal for the curved side costs 8 cents per cm^2 .

The total cost of the metal, in cents, is C .

B. Show that $C = 20\pi r^2 + \frac{320\pi}{r}$

C. Given that a minimum value of C exists, find this minimum value in terms of π .