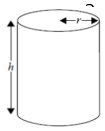
IB Calculus Problem 002

A closed cylindrical metal box has a radius of r centimetres and a height of h centimetres, with a volume of 2



is not to scale.

A. Express h as a function of r.

The metal for the base and lid of the box costs 10 cents per cm^2 and 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 that minimum value in terms of π.