

3 A cylindrical metal tin of radius r cm is closed at both ends. It has a volume of 16000π cm³.

(a) Show that its total surface area, A cm², is given by $A = 2\pi r^2 + 32000\pi r^{-1}$. [4]

(b) Use calculus to determine the minimum total surface area of the tin. You should justify that it is a minimum. [6]