

14. A company decides to manufacture a soft drinks can with a capacity of 500 ml.

The company models the can in the shape of a right circular cylinder with radius r cm and height h cm.

In the model they assume that the can is made from a metal of negligible thickness.

(a) Prove that the total surface area, S cm², of the can is given by

$$S = 2\pi r^2 + \frac{1000}{r} \quad (3)$$

Given that r can vary,

(b) find the dimensions of a can that has minimum surface area. (5)

(c) With reference to the shape of the can, suggest a reason why the company may choose not to manufacture a can with minimum surface area. (1)