13.

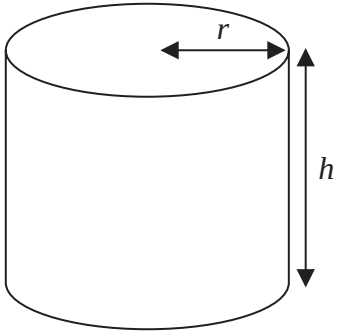

Figure 4

Figure 4 shows a closed cylindrical can of radius r cm and height h cm.

Given that the volume of the can is $400\,\text{cm}^3$

(a) show that the total surface area of the can, $A\,\text{cm}^2$, is given by

$$A = 2\pi r^2 + \frac{800}{r}$$

(4)

(b) Find the exact radius of the can for which A is a minimum.

(4)

(c) By finding $\frac{\mathrm{d}^2A}{\mathrm{d}r^2}$, show that the radius found in part (b) gives the minimum value of A

(2)

(d) Calculate the minimum value of A

(2)