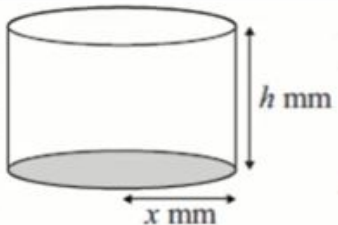




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Nature of Stationary Point | Past Paper Question | C2 Edexcel June 2012 Q8(e)



A manufacturer produces pain relieving tablets. Each tablet is in the shape of a solid circular cylinder with base radius x mm and height h mm, as shown.

Given that the volume of each tablet has to be 60 mm^3 ,

(b) show that the surface area, $A \text{ mm}^2$, of a tablet is given by

$$A = 2\pi x^2 + \frac{120}{x} \quad \text{①} \quad \frac{dA}{dx} = 4\pi x - 120x^{-2}$$

The manufacturer needs to minimise the surface area $A \text{ mm}^2$, of a tablet.

(c) Use calculus to find the value of x for which A is a minimum. (2.1215...) (5)

(d) Calculate the minimum value of A , giving your answer to the nearest integer. (85) (2)

(e) Show that this value of A is a minimum. (2)

$$\frac{d^2A}{dx^2} = 4\pi + 240x^{-3}$$
$$= 4\pi + \frac{240}{x^3}$$

when $x = 2.1215\dots$
 $\frac{d^2A}{dx^2} = 37.701\dots$
 > 0
 $\therefore A$ is a min

x	1	2.12...	3
$\frac{dA}{dx}$	-107..	0	24.3..
grad	\	—	/

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