

DO NOT WRITE IN THIS AREA

Question 10 continued

Handwriting practice area with 20 horizontal dotted lines.

(Total for Question 10 is 13 marks)



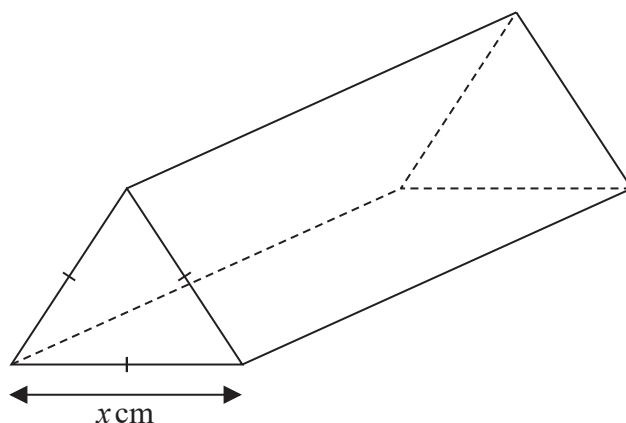


Diagram **NOT**
accurately drawn

Figure 4

A company manufactures chocolate bars that are inside packaging that is in the shape of a right triangular prism.

The cross section of the prism is an equilateral triangle with sides of length x cm, as shown in Figure 4.

The volume of the prism is 72 cm^3

The total surface area of the prism is $S \text{ cm}^2$

(a) Show that

$$S = \frac{\sqrt{3}x^2}{2} + \frac{288\sqrt{3}}{x} \quad (6)$$

Given that x can vary,

(b) use calculus to find, to 4 significant figures, the value of x for which S is a minimum, justifying that this value gives a minimum value of S .

(5)

(c) Find, to 3 significant figures, the minimum value of S .

(2)

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