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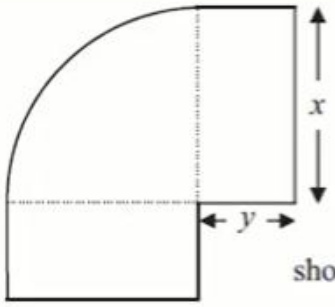
Interact, engage and perform

Calculus - Min Value | Past Paper Question | C2 Edexcel January 2012 Q8(d)



The figure shows a flowerbed. Its shape is a quarter of a circle of radius x metres with two equal rectangles attached to it along its radii. Each rectangle has length equal to x metres and width equal to y metres.

Given that the area of the flowerbed is $4\ m^2$,

show that

(a) $y = \dfrac{16 - \pi x^2}{8x}$ (b) the perimeter P metres is given by $P = \dfrac{8}{x} + 2x$

(c) Use calculus to find the minimum value of P. $x = 2 \Rightarrow P = 8$

(d) Find the width of each rectangle when the perimeter is a minimum. Give your answer to the nearest centimetre.

when $x = 2$, width $y = \dfrac{16 - \pi(2)^2}{8(2)} = 0.2146\ldots m = 21\ cm$ (to nearest cm)

With the acknowledgement of Exam Solutions.

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