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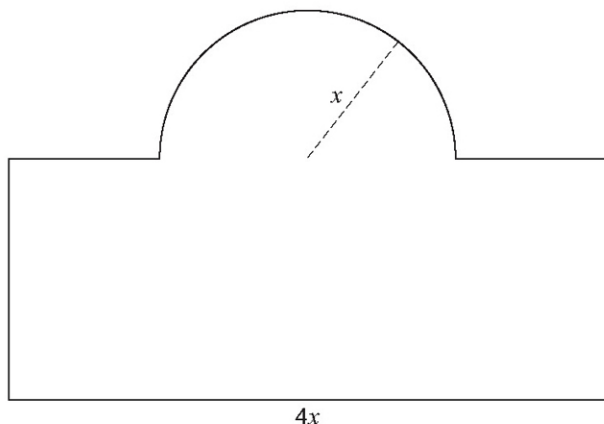
A gardener wants to create a symmetrical flowerbed.

The shape of the flowerbed will be constructed from a rectangle and a semi-circle.

The rectangle has length $4x$ metres.

The semi-circle has radius x metres.

These dimensions are shown in the diagram.



13 (a) The total area of the flowerbed will be 100 m^2

13 (a) (i) By considering the total area of the flowerbed, show that the width, w metres, of the rectangular part of the flowerbed is given by

$$w = \frac{200 - \pi x^2}{8x}$$

[2 marks]

13 (a) (ii) Hence show that the perimeter, P metres, of the flowerbed is given by

$$P = \left(6 + \frac{3\pi}{4}\right)x + \frac{50}{x}$$

[3 marks]

13 (b) The gardener is going to purchase a decorative material to go around the perimeter of the flowerbed.

The decorative material costs £12.75 per metre.

13 (b) (i) Find the minimum total cost of the decorative material.

Fully justify your answer.

[6 marks]

13 (b) (ii) Explain why the cost of the decorative material is likely to be greater than the value you found in part **(b)(i)**.

[1 mark]