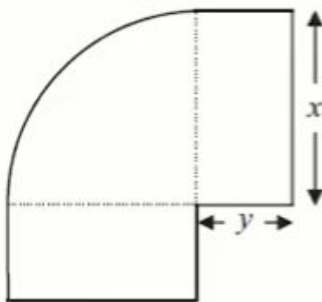




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## Diferentiation | Past Paper Question | C2 Edexcel January 2012 Q8(a)(b)



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  $4 \text{ m}^2$ ,

(a) show that  $y = \frac{16 - \pi x^2}{8x}$

(b) Hence show that the perimeter  $P$  metres of the flowerbed is given by  $P = \frac{8}{x} + 2x$

$$\text{a) } 2xy + \frac{\pi x^2}{4} = 4$$

$$\therefore 8xy + \pi x^2 = 16$$

$$\therefore 8xy = 16 - \pi x^2$$

$$\therefore y = \frac{16 - \pi x^2}{8x} \quad \textcircled{1}$$

$$\text{b) } P = 4y + 2x + \frac{2\pi x}{4} \quad \textcircled{2}$$

sub ① into ②

$$\therefore P = 4\left(\frac{16 - \pi x^2}{8x}\right) + 2x + \frac{\pi x}{2}$$

$$\therefore P = \frac{8}{x} - \frac{\pi x}{2} + 2x + \frac{\pi x}{2} = \frac{8}{x} + 2x \quad \blacktriangleright$$

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