



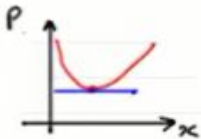
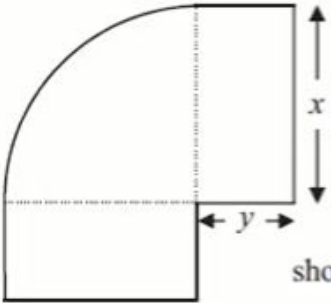
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The figure shows a flowerbed. Its shape is a quarter of a circle of radius x metres with two equal rectangles attached to it along its radii. Each rectangle has length equal to x metres and width equal to y metres.

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



show that

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

(c) Use calculus to find the minimum value of P .

$P = 8x^{-1} + 2x$	At a min $\frac{dP}{dx} = 0$	$\therefore 2x^2 = 8$	$\therefore x = 2$
$\therefore \frac{dP}{dx} = -8x^{-2} + 2$	$\therefore -\frac{8}{x^2} + 2 = 0$	$\therefore x^2 = 4$	$\therefore P = \frac{8}{2} + 2(2)$
$= -\frac{8}{x^2} + 2$	$\therefore -8 + 2x^2 = 0$	$\therefore x = \pm 2$	$= 8$
		Since $x > 0$	

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