

Edexcel (U.K.) Pre 2017

Questions By Topic

FP2 Chap07 Polar Coordinates

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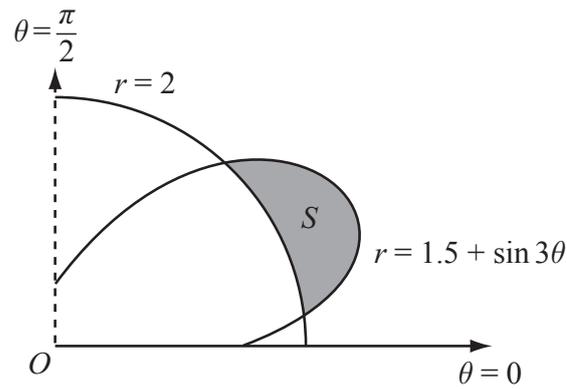


Figure 1

Figure 1 shows the curves given by the polar equations

$$r = 2, \quad 0 \leq \theta \leq \frac{\pi}{2},$$

$$\text{and } r = 1.5 + \sin 3\theta, \quad 0 \leq \theta \leq \frac{\pi}{2}.$$

(a) Find the coordinates of the points where the curves intersect.

(3)

The region S , between the curves, for which $r > 2$ and for which $r < (1.5 + \sin 3\theta)$, is shown shaded in Figure 1.

(b) Find, by integration, the area of the shaded region S , giving your answer in the form $a\pi + b\sqrt{3}$, where a and b are simplified fractions.

(7)

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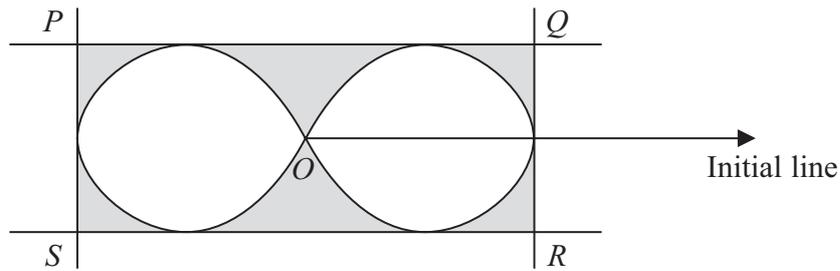


Figure 1

Figure 1 shows a closed curve C with equation

$$r = 3(\cos 2\theta)^{\frac{1}{2}}, \quad \text{where } -\frac{\pi}{4} < \theta \leq \frac{\pi}{4}, \quad \frac{3\pi}{4} < \theta \leq \frac{5\pi}{4}$$

The lines PQ , SR , PS and QR are tangents to C , where PQ and SR are parallel to the initial line and PS and QR are perpendicular to the initial line. The point O is the pole.

- (a) Find the total area enclosed by the curve C , shown unshaded inside the rectangle in Figure 1. (4)

- (b) Find the total area of the region bounded by the curve C and the four tangents, shown shaded in Figure 1. (9)
