

Q7	Model Solution – 50 Marks	Marking Notes
(a)		
(i)	$9^2 = 4^2 + 6^2 - 2 \times 4 \times 6 \cos \alpha$ $\cos \alpha = \frac{4^2 + 6^2 - 9^2}{2 \times 4 \times 6} = -\frac{29}{48} = -0.604\dots$ $\alpha = 2.22 \text{ radians}$	<p>MS (0, 4, 8, 10)</p> <p>LPC: Work of merit eg some substitution into the cosine rule</p> <p>HPC: Correct use of cosine rule without getting the correct answer</p> <p>** 9 marks for answer rounded incorrectly **</p>
(ii)	$2\pi - 2.22 = 4.06366 \dots\dots$ $\text{Area} = \frac{1}{2} \times 4^2 \times 4.06$ $= 32.5 \text{ cm}^2$	<p>MS (0, 4, 8, 10)</p> <p>LPC: Work of merit eg finding the angle or substitution into the area formula</p> <p>HPC: Correct method with 1 mistake</p> <p>** 9 marks for rounding and or units error**</p>
(iii)	$\text{Area of triangle} = \frac{1}{2} \times 4 \times 6 \times \sin(2.22)$ $= 9.56$ $\text{Area required} = 9.56 + 32.5$ $\text{Area} = 42.1 \text{ cm}^2$	<p>MS (0, 4, 8, 10)</p> <p>LPC: Work of merit e.g. finding the area of the triangle</p> <p>HPC: Correct method with 1 mistake</p> <p>** 9 marks for rounding and or units error**</p>
(iv)	$\text{Arc length} = 4 \times 4.06 = 16.24$ $\text{Perimeter} = ZY + WY + \text{Arc length}$ $\text{Perimeter} = 27 \text{ cm}$	<p>MS (0, 4, 8, 10)</p> <p>LPC: Work of merit eg finding the arc length</p> <p>HPC: Correct method with 1 mistake</p>

(b)

$$\text{Using } \left(\frac{\pi}{10}, 0\right) \Rightarrow \sin\left(a\frac{\pi}{10} - b\right) = 0$$

$$\left(a\frac{\pi}{10} - b\right) = \sin^{-1}(0)$$

$$\left(a\frac{\pi}{10} - b\right) = 0$$

$$a\frac{\pi}{10} = b$$

$$\text{Using } \left(\frac{3\pi}{5}, 0\right) \Rightarrow \sin\left(a\frac{3\pi}{5} - b\right) = 0$$

$$\left(a\frac{3\pi}{5} - b\right) = \sin^{-1}(0)$$

$$\left(a\frac{3\pi}{5} - b\right) = \pi$$

$$a\frac{3\pi}{5} - \pi = b$$

$$\text{Equating } \Rightarrow a\frac{3\pi}{5} - \pi = a\frac{\pi}{10}$$

$$\frac{3a}{5} - 1 = \frac{a}{10}$$

$$\frac{-5a}{10} = -1$$

$$a = 2$$

$$b = \frac{2\pi}{10} = \frac{\pi}{5}$$

MS (0, 4, 8, 10)

LPC: Work of merit eg correct substitution of a coordinate into the sin equation

HPC: Finds either a or b correctly