

Question	Scheme	Marks	AOs
<b>6 (a)</b>	$5 \sin 2\theta = 9 \tan \theta \Rightarrow 10 \sin \theta \cos \theta = 9 \times \frac{\sin \theta}{\cos \theta}$ $A \cos^2 \theta = B$ or $C \sin^2 \theta = D$ or $P \cos^2 \theta \sin \theta = Q \sin \theta$	M1	3.1a
	For a correct simplified equation in one trigonometric function Eg $10 \cos^2 \theta = 9$ $10 \sin^2 \theta = 1$ oe	A1	1.1b
	Correct order of operations For example $10 \cos^2 \theta = 9 \Rightarrow \theta = \arccos(\pm) \sqrt{\frac{9}{10}}$	dM1	2.1
	Any one of the four values awrt $\theta = \pm 18.4^\circ, \pm 161.6^\circ$	A1	1.1b
	All four values $\theta =$ awrt $\pm 18.4^\circ, \pm 161.6^\circ$	A1	1.1b
	$\theta = 0^\circ, \pm 180^\circ$	B1	1.1b
		<b>(6)</b>	
	<b>(b)</b>	Attempts to solve $x - 25^\circ = -18.4^\circ$	M1
	$x = 6.6^\circ$	A1ft	2.2a
		<b>(2)</b>	
			<b>(8 marks)</b>

**(a)**

**M1:** Scored for the whole strategy of attempting to form an equation in one function of the form given in the scheme. For this to be awarded there must be an attempt at using  $\sin 2\theta = \dots \sin \theta \cos \theta$ ,  $\tan \theta = \frac{\sin \theta}{\cos \theta}$  and possibly  $\pm 1 \pm \sin^2 \theta = \pm \cos^2 \theta$  to form an equation in one "function" usually  $\sin^2 \theta$  or  $\cos^2 \theta$

Allow for this mark equations of the form  $P \cos^2 \theta \sin \theta = Q \sin \theta$  oe

**A1:** Uses the correct identities  $\sin 2\theta = 2 \sin \theta \cos \theta$  **and**  $\tan \theta = \frac{\sin \theta}{\cos \theta}$  to form a correct simplified equation in one trigonometric function. It is usually one of the equations given in the scheme, but you may see equivalent correct equations such as  $10 = 9 \sec^2 \theta$  which is acceptable, but in almost all cases it is for a correct equation in  $\sin \theta$  or  $\cos \theta$

**dM1:** Uses the correct order of operations for their equation, usually in terms of just  $\sin \theta$  or  $\cos \theta$ , to find at least one value for  $\theta$  (Eg. square root before invcos). It is dependent upon the previous M.

Note that some candidates will use  $\cos^2 \theta = \frac{\pm \cos 2\theta \pm 1}{2}$  and the same rules apply.

Look for correct order of operations.

**A1:** Any one of the four values awrt  $\pm 18.4^\circ, \pm 161.6^\circ$ . Allow awrt 0.32 (rad) or 2.82 (rad)

**A1:** All four values awrt  $\pm 18.4^\circ, \pm 161.6^\circ$  and no other values apart from  $0^\circ, \pm 180^\circ$

**B1:**  $\theta = 0^\circ, \pm 180^\circ$  This can be scored independent of method.

**(b)**

**M1:** Attempts to solve  $x - 25^\circ = \theta$  where  $\theta$  is a solution of their part (a)

**A1ft:** For awrt  $x = 6.6^\circ$  but you may ft on their  $\theta + 25^\circ$  where  $-25 < \theta < 0$

If multiple answers are given, the correct value for their  $\theta$  must be chosen