

Question number	Scheme	Marks
7 (a)	$\frac{3 + (1 - \cos^2 \theta)}{\cos \theta - 2} = 3 \cos \theta$ $4 - \cos^2 \theta = 3 \cos^2 \theta - 6 \cos \theta$ $(2 \cos \theta + 1)(2 \cos \theta - 4) = 0$ $(\cos \theta = 2 \text{ does not exist so}) \cos \theta = -\frac{1}{2} \quad *$	M1 M1 M1 A1 cso (4)
(b)	$\cos 3x = -\frac{1}{2}$ $3x = 120^\circ, 240^\circ, 480^\circ$ $x = 40^\circ, 80^\circ, 160^\circ$	M1 A1 A1 A1 (4)
Total 8 marks		

Part	Mark	Notes
(a)	M1	For the correct use of $\sin^2 \theta + \cos^2 \theta = 1$
	M1	For multiplying both sides by $\cos \theta - 2$ and expanding brackets
	M1	For solving their 3TQ using any method. $4 \cos^2 \theta - 6 \cos \theta - 4 = 0 \Rightarrow 2(2 \cos \theta - 1)(\cos \theta - 2) = 0$ See General Guidance.
	A1cso	For obtaining the given equation: $\cos \theta = -\frac{1}{2}$ Must reject $\cos \theta = 2$
	ALT	
	M1	For the correct use of $\sin^2 \theta + \cos^2 \theta = 1$
	M1	Factorises LHS $\frac{4 - \cos^2 \theta}{\cos \theta - 2} = 3 \cos \theta \Rightarrow \frac{(2 - \cos \theta)(2 + \cos \theta)}{\cos \theta - 2} = 3 \cos \theta$
	M1	Cancels through by $\cos \theta - 2$ and solves their linear equation in terms of $\cos \theta$ $-(2 + \cos \theta) = 3 \cos \theta \Rightarrow \cos \theta = \dots$
	A1cso	For obtaining the given equation: $\cos \theta = -\frac{1}{2}$
(b)	M1	For $\cos 3x = -\frac{1}{2}$
	A1	For $3x = 120^\circ$ or any other correct angle, e.g. even $3x = -120^\circ$ Allow an angle in radians for this mark. E.g. $3x = \frac{2\pi}{3}$
	A1	For one from $x = 40^\circ, 80^\circ, 160^\circ$
	A1	For all angles correct with no additional angles within range. $x = 40^\circ, 80^\circ, 160^\circ$ Ignore any angles out of range.