Q	Marking instructions	AO	Mark	Typical solution
12(a)	Uses appropriate trig identity to form quadratic equation **in single trigonometrical** term. Condone $2\left(\pm1\pm\operatorname{cosec}^2 x\right)+2\operatorname{cosec}^2 x=1+4\operatorname{cosec}x$	1.1a	M1	$2\cot^2 x+2\operatorname{cosec}^2 x=1+4\operatorname{cosec}x$ $2\left(\operatorname{cosec}^2 x-1\right)+2\operatorname{cosec}^2 x=1+4\operatorname{cosec}x$ $4\operatorname{cosec}^2 x-4\operatorname{cosec}x-3=0$
	Completes rigorous argument to show the required result	2.1	R1	
12(b)	Solves quadratic and Obtains one of $\operatorname{cosec}x=\frac{3}{2}$ or $\operatorname{cosec}x=-\frac{1}{2}$ OE	1.1b	B1	$\operatorname{cosec}x=\frac{3}{2}$ or $\operatorname{cosec}x=-\frac{1}{2}$ reject since $\lvert\operatorname{cosec}x\rvert\geq1$ $\cot^2 x=\left(\frac{3}{2}\right)^2-1=\frac{5}{4}$ $\tan x=-\frac{2\sqrt{5}}{5}$ Since *x* is obtuse
	Explains why their spurious solution(s) is rejected referring to the range of cosec or sine with explicit comparison to ±1 May accept later rejection for valid reason ie sq root of negative OE	2.4	E1F	
	Uses trig identity or right-angled triangle/Pythagoras or given equation with their exact value of cosec *x or sin x to obtain an exact value of tan x* value used must satisfy $\lvert\operatorname{cosec}x\rvert\geq1$ OE	1.1a	M1	
	Completes rigorous argument to find correct exact magnitude of tan *x* *ACF*	2.1	R1	
	Deduces tan x is negative. May be seen anywhere without contradiction by a positive final answer.	2.2a	B1	
	Total		7	