

8	(a)	(i)	$f(x) \in \square$	B1 [1]	2.5	Allow alternative notation, or worded equivalent Allow y, or just f, but not x	Accept just $\square$ Allow $(-\infty, \infty)$
		(ii)	$g(x) \in (-\infty, -1] \cup [1, \infty)$	B1 [1]	2.5	Allow alternative notation, or worded equivalent Allow y, or just g, but not x	Or $(-\infty, \infty)$ with $(-1, 1)$ clearly excluded
	(b)	(i)	$\cos(0.6) = 0.8253$, so $\sec(0.6) = \frac{1}{0.8253} = 1.2116$ $2\tan(1.2116) = 2 \times 2.6634 = 5.3269$ hence $fg(0.6) = 5.33$ A.G.	M1 A1 [2]	2.1 2.1	Attempt correct composition of functions Conclude with 5.33	At least one interim value required SC B1 for stating $2\tan(1 \div \cos 0.6) = 5.33$
		(ii)	f(x) is a many to one function so has no inverse	B1	2.4	Must refer to inverse of f not existing, with reason	Must be clear that referring to the function f

Question			Answer	Marks	AO	Guidance	
				[1]			
	(c)		DR $4\tan^2x + 6\sec x = 0$ $4(\sec^2x - 1) + 6\sec x = 0$ $4\sec^2x + 6\sec x - 4 = 0$ $\sec x = -2, \sec x = \frac{1}{2}$ $x = \frac{2}{3}\pi, \frac{4}{3}\pi$	M1 A1 M1 A1	3.1a 1.1 1.1 1.1	Attempt use of identity in their equation to obtain quadratic Obtain correct equation in $\sec x$ – possibly still with brackets Solve 3 term quadratic and attempt to find at least one value for x Obtain at least one correct value	Allow $\tan^2x = \pm \sec^2x \pm 1$ Award M1 when reduced to single trig ratio Or correct quadratic in $\cos x$ – possibly still with brackets but with no fractions ($4\cos^2x - 6\cos x - 4 = 0$) Could solve quadratic BC Must be using root that would give solution for x Allow decimals or in degrees Must be from correct solution method of correct quadratic (condone second root not being seen – but must be correct if seen)

Question			Answer	Marks	AO	Guidance
			$\sec x = \frac{1}{2}$ has no solutions as $ \sec x \geq 1$	A1 [5]	2.3	Obtain both correct values, and no others, and explain that $\sec x = 0.5$ has no solutions as outside range Now exact and in radians Or equiv explanation for $\cos x$