Q	Marking instructions	AO	Marks	Typical solution
12(a)	Explains that there are more intersections/solutions Must be definite AND that would be seen on the graph if it was extended or that lie outside of the range of values shown	2.3	E1	The graphs will continue to intersect for values of $x < 0$ and $x > 4$. The equation will have lots of solutions.
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
12(b)	Uses sin $2a \approx 2a$ Or Uses $\sin 2a = 2\sin a \cos a$ AND $\sin a \approx a$ AND $\cos a \approx 1 - \frac{a^2}{2}$	3.1a	M1	$\frac{1}{\sin 2a} = 4 - a$ $\frac{1}{2a} \approx 4 - a$ $1 \approx 8a - 2a^2$ $2a^2 - 8a + 1 \approx 0$
	Completes reasoned argument to show the given result. If $\sin 2a = 2\sin a \cos a$ approach is used they must explain that higher powers can be ignored for small values. Condone equality throughout Must have conclusion in terms of a Condone α	2.1	R1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
12(c)	Obtains at least one solution to $2a^2 - 8a + 1 = 0$ $\frac{4 \pm \sqrt{14}}{2}$, 3.87(0…), 0.129(1…)	1.1a	M1	$2a^2 - 8a + 1 = 0$ $a = \frac{4 \pm \sqrt{14}}{2}$ $a = 0.129$
	Infers the correct decimal value AWRT 0.129	2.2b	R1	
	Subtotal		**2**	

	Question 12 Total		**5**	