(b)	$x^n \rightarrow x^{n+1}$	For increasing any power of x by 1 for C_1 or C_2 or for $\pm(C_1 - C_2)$	M1
	$\pm\int\left\{-2x^2+7x-1-\left(x^3-6x+9\right)\right\}\mathrm{d}x = \pm\int\left(-x^3-2x^2+13x-10\right)\mathrm{d}x$ $= \pm\left(-\frac{x^4}{4}-\frac{2x^3}{3}+\frac{13x^2}{2}-10x\right)$ or $\pm\left\{\int\left(-2x^2+7x-1\right)\mathrm{d}x-\int\left(x^3-6x+9\right)\mathrm{d}x\right\}$ $= \pm\left(-\frac{2x^3}{3}+\frac{7x^2}{2}-x-\left(\frac{x^4}{4}-\frac{6x^2}{2}+9x\right)\right)$ or $\int\left(-2x^2+7x-1\right)\mathrm{d}x = -\frac{2x^3}{3}+\frac{7x^2}{2}-x,\ \int\left(x^3-6x+9\right)\mathrm{d}x = \frac{x^4}{4}-\frac{6x^2}{2}+9x$ dM1: For correct integration of 1 term for C_1 **and** one term for C_2 or for correct integration for 2 terms of <u>their</u> $\pm(C_1 - C_2)$ A1: Fully correct integration of both C_1 and C_2 or for $\pm(C_1 - C_2)$. **Award this mark as soon as fully correct integration is seen and ignore subsequent work.**		dM1A1
	$= -\frac{2^4}{4}-\frac{2(2)^3}{3}+\frac{13(2)^2}{2}-10(2)-\left(-\frac{1^4}{4}-\frac{2(1)^3}{3}+\frac{13(1)^2}{2}-10(1)\right)$ Fully correct strategy for the area. Depends on both previous M marks. Uses the limits "2" and 1 in their "changed" expression(s) and subtracts either way round.		ddM1
	$= \frac{13}{12}$ If the attempt is correct apart from subtracting the wrong way round (for limits or functions) and $-\frac{13}{12}$ is obtained, allow recovery if they then make their answer positive.		A1
			(5)
			Total 9

<u>Some values for reference:</u>

$$\left[\frac{-2x^3}{3}+\frac{7x^2}{2}-x\right]_1^2 = \frac{20}{3}-\frac{11}{6}=\frac{29}{6} \qquad \left[\frac{x^4}{4}-\frac{6x^2}{2}+9x\right]_1^2 = 10-\frac{25}{4}=\frac{15}{4}$$

$$= -\frac{2^4}{4}-\frac{2(2)^3}{3}+\frac{13(2)^2}{2}-10(2)-\left(-\frac{1^4}{4}-\frac{2(1)^3}{3}+\frac{13(1)^2}{2}-10(1)\right) = -\frac{10}{3}-\left(-\frac{53}{12}\right)$$

Question Number	Scheme	Notes	Marks
7(i)	$\tan\theta+\frac{1}{\tan\theta}=\frac{\sin\theta}{\cos\theta}+\frac{1}{\frac{\sin\theta}{\cos\theta}}$ or $\tan\theta+\frac{1}{\tan\theta}=\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}$	Uses $\tan\theta\equiv\frac{\sin\theta}{\cos\theta}$ on both terms	M1
	$\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}=\frac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta}$ or $\frac{\sin^2\theta}{\sin\theta\cos\theta}+\frac{\cos^2\theta}{\sin\theta\cos\theta}$ Uses $\tan\theta\equiv\frac{\sin\theta}{\cos\theta}$ and $\frac{1}{\tan\theta}\equiv\frac{\cos\theta}{\sin\theta}$ and attempts common denominator of $\sin\theta\cos\theta$ with a 2 term numerator one of which is correct. Or attempts 2 separate fractions with a denominator of $\sin\theta\cos\theta$ one of which is correct. **Depends on the first mark.**		**d**M1
	$=\frac{1}{\sin\theta\cos\theta}$* or $\frac{1}{\cos\theta\sin\theta}$	Correct proof with no notation errors or missing variables but allow "≡" instead of "=". If there are any spurious "= 0"'s alongside the proof score A0.	A1*
			(3)
	Alternative 1 for (i)		
	$\tan\theta+\frac{1}{\tan\theta}=\frac{\tan^2\theta+1}{\tan\theta}\left(\text{or}\frac{\tan^2\theta}{\tan\theta}+\frac{1}{\tan\theta}\right)$	Attempts common denominator of $\tan\theta$	M1
	$=\frac{\sec^2\theta}{\tan\theta}=\frac{1}{\cos^2\theta}\times\frac{\cos\theta}{\sin\theta}$ Or $=\frac{\frac{\sin^2\theta}{\cos^2\theta}+1}{\frac{\sin\theta}{\cos\theta}}=\frac{1}{\cos^2\theta}\times\frac{\cos\theta}{\sin\theta}$	Applies appropriate and correct identities to obtain in terms of $\sin\theta$ and $\cos\theta$ only and eliminates "double decker" fractions if necessary	**d**M1
	$=\frac{1}{\sin\theta\cos\theta}$* or $\frac{1}{\cos\theta\sin\theta}$	Correct proof with no notation errors or missing variables but allow "≡" instead of "=". If there are any spurious "= 0"'s alongside the proof score A0.	A1*
	Alternative 2 for (i)		
	$\tan\theta+\frac{1}{\tan\theta}=\frac{1}{\sin\theta\cos\theta}\Rightarrow\frac{\sin^2\theta}{\cos\theta}+\cos\theta=\frac{1}{\cos\theta}$ Uses $\tan\theta\equiv\frac{\sin\theta}{\cos\theta}$ and multiplies through by $\sin\theta$ or $\cos\theta$		M1
	$\Rightarrow\sin^2\theta+\cos^2\theta=1$ Uses $\tan\theta\equiv\frac{\sin\theta}{\cos\theta}$ and multiplies through by $\sin\theta$ and $\cos\theta$		**d**M1
	$\sin^2\theta+\cos^2\theta=1$ is true hence proved	Fully correct work reaching a correct identity with a conclusion. If there are any spurious "= 0"'s alongside the proof score A0.	A1*

(ii)	$3\cos^2(2x+10°)=1 \Rightarrow \cos^2(2x+10°)=\frac{1}{3} \Rightarrow \cos(2x+10°)=(\pm)\sqrt{\frac{1}{3}}$ Divides by 3 and takes square root **<u>of both sides</u>**. The "±" is not required.		M1
	$2x+10°=\cos^{-1}\left("(\pm)\sqrt{\frac{1}{3}}"\right)$ $\Rightarrow x=\frac{\cos^{-1}\left("(\pm)\sqrt{\frac{1}{3}}"\right)-10°}{2}$	Applies $x=\frac{\cos^{-1}\left("(\pm)\sqrt{\frac{1}{3}}"\right)\pm 10°}{2}$ You may need to check their values if no working is shown.	M1
	For reference $2x+10°=54.735..., 125.264...$		
	$x=22.4°$ **or** $x=57.6°$	Awrt one of these	A1
	$x=22.4°$ **and** $x=57.6°$	Awrt both with no extras in range	A1
	If mixing degrees and radians allow the method marks.		
			(4)
	Alternative 1 for part (b)		
	$3\cos^2(2x+10°)=1 \Rightarrow 3\left(1-\sin^2(2x+10°)\right)=1 \Rightarrow$ $\Rightarrow \sin^2(2x+10°)=\frac{2}{3} \Rightarrow \sin(2x+10°)=(\pm)\sqrt{\frac{2}{3}}$ Uses a correct identity, rearranges and takes square root **<u>of both sides</u>**. The "±" is not required.		M1
	$2x+10°=\sin^{-1}\left("(\pm)\sqrt{\frac{2}{3}}"\right)$ $\Rightarrow x=\frac{\sin^{-1}\left("(\pm)\sqrt{\frac{2}{3}}"\right)-10°}{2}$	Applies $x=\frac{\sin^{-1}\left("(\pm)\sqrt{\frac{2}{3}}"\right)\pm 10°}{2}$ You may need to check their values if no working is shown.	M1
	$x=22.4°$ **or** $x=57.6°$	Awrt one of these	A1
	$x=22.4°$ **and** $x=57.6°$	Awrt both with no extras in range	A1
	Alternative 2 for part (b)		
	$3\cos^2(2x+10°)=3\left(\frac{1+\cos(4x+20)}{2}\right) \Rightarrow \cos(4x+20)=-\frac{1}{3}$ Uses a correct identity, rearranges to make $\cos(4x+20)$ the subject		M1
	$2x+10°=\cos^{-1}\left("-\frac{1}{3}"\right)$ $\Rightarrow x=\frac{\cos^{-1}\left("-\frac{1}{3}"\right)-20°}{4}$	Applies $\Rightarrow x=\frac{\cos^{-1}\left("-\frac{1}{3}"\right)-20°}{4}$ You may need to check their values if no working is shown.	M1
	For reference $4x+20°=109.47..., 250.52...$		
	$x=22.4°$ **or** $x=57.6°$	Awrt one of these	A1
	$x=22.4°$ **and** $x=57.6°$	Awrt both with no extras in range	A1
			Total 7