(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

Question Number	Scheme	Notes	Marks
8(a)	$S_n = a + ar + \ldots + ar^{n-1}$ $rS_n = ar + ar^2 + \ldots + ar^n$ Writes down at least 3 correct terms of a geometric series and multiplies their sequence by *r*. There may be extra incorrect terms but allow this mark if there are 3 correct terms in both sequences and at least one "+" in both sequences **but see special case below**		M1
	$S_n - rS_n = a - ar^n$ or $rS_n - S_n = ar^n - a$ Obtains either equation where both S_n and rSn had the correct first and last terms and at least one other correct term but no incorrect terms. Both sides must be seen unfactorised.		A1**(M1 on EPEN)**
	$(1-r)S_n = a(1-r^n) \Rightarrow S_n = \frac{a(1-r^n)}{1-r}$ * Factorises both sides and divides by $1 - r$ to obtain the printed answer Should be as printed but allow e.g. $S_n = \frac{a(1-r^n)}{(1-r)}$ but not $S_n = \frac{a(r^n-1)}{(r-1)}$ unless followed by correct version		A1*
	Special case: If terms are listed rather than added and the working is otherwise correct score 110 **See next page for proof by induction.**		
			(3)
	Alternative for (a):		
	$S_n = a + ar + \ldots + ar^{n-1}$ $(1-r)S_n = (1-r)(a + ar + \ldots + ar^{n-1})$ or $S_n = \frac{(1-r)(a + ar + \ldots + ar^{n-1})}{(1-r)}$ Writes down at least 3 correct terms of a geometric series and multiplies both sides by $1 - r$ or multiplies the right hand side by $\frac{1-r}{1-r}$ There may be extra incorrect terms but allow this mark if there are 3 correct terms		M1
	$(1-r)S_n = a - ar^n$ or $S_n = \frac{a-ar^n}{1-r}$ Obtains the above equation where S_n had the correct first and last terms and at least one other correct term and no incorrect terms. Right hand side must be seen unfactorised unless the "*a*" was factored out earlier		A1 **(M1 on EPEN)**
	$(1-r)S_n = a - ar^n = a(1-r^n) \Rightarrow S_n = \frac{a(1-r^n)}{1-r}$ * or $S_n = \frac{a-ar^n}{1-r} \Rightarrow S_n = \frac{a(1-r^n)}{1-r}$ * Should be as printed but allow e.g. $S_n = \frac{a(1-r^n)}{(1-r)}$ but not $S_n = \frac{a(r^n-1)}{(r-1)}$ unless followed by correct version		A1*

(b)	**Mark (b) and (c) together**		
	$r^3 = -\frac{20.48}{320} \Rightarrow r = \sqrt[3]{-\frac{20.48}{320}}$	Correct strategy for *r*. Allow for dividing the 2 given terms **either way round** and attempting to cube root.	M1
	$= -0.4$	Correct value (and no others) but allow equivalents e.g. -2/5. Correct answer only scores both marks.	A1
	Note that some candidates take $ar^2 = -320$ and $ar^5 = \frac{512}{25}$ and use these correctly to give $r^3 = -\frac{20.48}{320} \Rightarrow r = \sqrt[3]{-\frac{20.48}{320}} = -0.4$ **In such cases you can allow full marks for (b) but see note * in (c)**		
			(2)

(c)	$r = -0.4 \Rightarrow a = \frac{-320}{-0.4}(= 800)$ or $r = -0.4 \Rightarrow a = \frac{512}{25} \div \left(-\frac{2}{5}\right)^4 (= 800)$	Correct attempt at the first term using ± **their *r*** and the –320 or the $\frac{512}{25}$. May be implied by their *a* but must be using e.g. $ar = -320$ or $ar^4 = \frac{512}{25}$ **not** $ar^2 = -320$ or $ar^5 = \frac{512}{25}$ *	M1
	$S_{13} = \frac{"800"\left(1-"-0.4"^{13}\right)}{1-"-0.4"}$ Correct attempt at the sum using their *a* and **their *r*** and *n* = 13 to find a value for S_{13}. **Must be a fully correct attempt at the sum here using *n* = 13, their *a* and their *r*.** Note that $\frac{800\left(1+0.4^{13}\right)}{1+0.4}$ is equivalent to $\frac{800\left(1-(-0.4)^{13}\right)}{1-(-0.4)}$ and is acceptable for this mark.		M1
	$= 571.43$	Correct value. Note that S_∞ is also 571.43 so working must be seen i.e. correct answer only scores no marks.	A1
			(3)
			Total 8