Question	Answer	Marks	Partial marks
8(a)	$[x =]\ \frac{\pi}{24}, \frac{5\pi}{24}$ and no extras in range	**2**	**B1** for $[x =]\ \frac{\pi}{24}$ or $\frac{5\pi}{24}$ ignoring extras or for $4x = \frac{\pi}{6}$ **and** $\frac{5\pi}{6}$ soi
8(b)	Correct and complete plan soi e.g. $\int_{their\frac{\pi}{24}}^{their\frac{5\pi}{24}}\left(\sin(4x)-\frac{1}{2}\right)\mathrm{d}x$ or $2\int_{their\frac{\pi}{24}}^{\frac{\pi}{8}}\left(\sin(4x)-\frac{1}{2}\right)\mathrm{d}x$	**M1**	**FT** *their* limits in radians from part (a) or $\int_{their\frac{\pi}{24}}^{their\frac{5\pi}{24}}\sin 4x\,\mathrm{d}x\ -\frac{1}{2}\left(their\frac{5\pi}{24}-their\frac{\pi}{24}\right)$
	Integrates sin 4*x*: $-\frac{1}{4}\cos 4x$	**B2**	**B1** for $k\cos 4x$ where $k < 0$ or $k = \frac{1}{4}$
	Substitutes exact limits in correct order: $-\frac{1}{4}\cos 4\left(\frac{5\pi}{24}\right)-\left[-\frac{1}{4}\cos 4\left(\frac{\pi}{24}\right)\right]$ oe soi	**M1**	**FT** *their* exact limits and *their* $-\frac{1}{4}\cos 4x$ providing at least **B1** awarded
	$\frac{\sqrt{3}}{4}-\frac{\pi}{12}$ or exact equivalent	**A1**	
9	$\frac{18+12\sqrt{10}}{2+\sqrt{10}}$	**B1**	
	$\frac{their18+(their12)\sqrt{10}}{2+\sqrt{10}}\times\frac{2-\sqrt{10}}{2-\sqrt{10}}$	**M1**	**FT** $\frac{a+b\sqrt{10}}{2+\sqrt{10}}$ where *a* and *b* are integers
	$\frac{36-18\sqrt{10}+24\sqrt{10}-120}{-6}$	**A1**	
	$14-\sqrt{10}$ nfww	**A1**	**dep** on all previous marks awarded
	Alternative		
	$\frac{16+11\sqrt{10}}{2+\sqrt{10}}\times\frac{2-\sqrt{10}}{2-\sqrt{10}}$ [+1]	**(M1)**	
	$\frac{32-16\sqrt{10}+22\sqrt{20}-110}{-6}$ [+1]	**(A1)**	
	$\frac{-78+6\sqrt{10}\ [-6]}{-6}$ oe	**(A1)**	e.g. $13-\sqrt{10}$ [+1]
	$14-\sqrt{10}$ nfww	**(A1)**	**dep** on all previous marks awarded

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Question	Answer	Marks	Partial marks
10(a)	$1.1^n * 3$	**B2**	where * is any inequality sign or = **B1** for $\frac{10\left(1.1^n-1\right)}{1.1-1} * 200$ or $\frac{10\left(1-1.1^n\right)}{1-1.1} * 200$ or for $r = 1.1$ soi
	$n\log 1.1 * \log 3$ oe or $\log_{1.1} 3$ [* n]	**M1**	**FT** $1.1^n * \textit{their}3$ providing **B1** has been awarded for a correct sum to n terms **and** (*their* 3) > 0
	[n =]12	**A1**	**dep** on all previous marks awarded
10(b)	$r = 2$ only nfww	**B4**	**B3** for a correct equation or equations which can be solved directly for r e.g. $[d =]\frac{[a](r-1)}{2} = \frac{[a]r(r-1)}{4}$ or $[d =]\frac{[a](r-1)}{2} = \frac{[a](r^2-1)}{6}$ or $[a](r^2 - 3r + 2)$ [= 0] oe or $\frac{2(r+1)(r-1)}{(r-1)} = 6$ or $r = \frac{4d}{2d}$ or $[r =]\frac{a+2d}{a}$ or $[r =]\frac{a+6d}{a+2d}$ **and** $a = 2d$ or **B2** for a correct equation or equations which need to be rearranged to find r e.g. $[d =]\frac{ar-a}{2} = \frac{ar^2-ar}{4}$ or $[d =]\frac{ar-a}{2} = \frac{ar^2-a}{6}$ or $[a =]\frac{6[d]}{r^2-1} = \frac{2[d]}{r-1}$ or $a(r-1) = 2d$ and $ar(r-1) = 4d$ or **either** $[r =]\frac{a+2d}{a}$ or $[r =]\frac{a+6d}{a+2d}$ **and** $4d^2 - 2ad$ [= 0] or **B1** for $ar = a + 2d$ oe and **B1** for $ar^2 = a + 6d$ oe

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