Question	Answer	Marks	Partial Marks
10(b)	$\cos x = \frac{1}{\alpha}$	**B1**	could be implied by $\frac{1}{\alpha^2} = 1 - \sin^2 x$
	$\sin^2 x + \left(\frac{1}{\alpha}\right)^2 = 1$ oe OR [opposite ^{2}=] $\alpha^2 - 1$ soi and use of $\sin x = \frac{\text{opposite}}{\text{hypotenuse}}$ at some stage leading to $\sin x = [\pm]\sqrt{1 - \frac{1}{\alpha^2}}$ oe	**M1**	
	$\sin x = -\sqrt{1 - \frac{1}{\alpha^2}}$ oe	**A1**	
11(a)	$10 - 2d$ and $10 - d$	**B2**	**B1** for either ignore labels
11(b)	Squares each term and forms a sum e.g. $100 - 40d + 4d^2 + 100 - 20d + d^2 + 100$ $[= 140]$ or $100 - 40d + 4d^2 + 100 - 20d + d^2 [= 40]$ $a^2 + \frac{a^2 + 20a + 100}{4} = 40$ oe	**M1**	**FT** from *their* two terms in **(a),** must be both 2 terms expression in terms of d only or Correct expressions in terms of a only, must see substitution and expansion
	Correct equation in solvable form $5d^2 - 60d + 160 = 0$ oe $5a^2 + 20a - 60 = 0$	**A1**	
	Factorises *their* 3-term quadratic expression or solves *their* 3-term quadratic equation	**M1**	
	$d = 8$ $d = 4$	**A1**	
	Finds the first term when $d = 4$: $a = 2$	**M1**	**FT** $10 - 2$(*their d*)
	$[S_{200} =] \frac{200}{2}\{4 + 199 \times 4\}$ oe	**M1**	**FT** *their a* and *their d*
	80 000	**A1**	

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Question	Answer	Marks	Partial Marks
12	$\frac{n!}{(n-5)!5!} - \frac{(n-1)!}{(n-6)!5!}$ $\frac{(n-1)!\times[n-(n-5)]}{(n-5)!5!}$	**M1**	For substituting ${}^{n}C_5$ and ${}^{n-1}C_5$
	$\frac{(n-1)!}{(n-6)!5!}\left(\frac{n}{n-5}-1\right)$ oe	**M1**	**dep** on previous **M1** awarded For Factorising $\frac{(n-1)!}{(n-6)!5!}$ or $\frac{(n-1)!}{(n-5)!5!}$ Do not allow if using ${}^{n-1}C_4$ to simplify the left-hand side
	$\frac{(n-1)!}{(n-6)!5!}\left(\frac{5}{n-5}\right)$ oe	**M1**	**dep** on at least one previous **M1** awarded Simplifying fraction
	Completes argument: $\frac{(n-1)!}{(n-6)!5!}\left(\frac{5}{n-5}\right)=\frac{(n-1)!}{(n-1-4)!4!}={}^{n-1}C_4$	**A1**	
	Alternative 1		
	$\frac{n!}{(n-5)!5!} - \frac{(n-1)!}{(n-6)!5!}$	**(M1)**	For substituting ${}^{n}C_5$ and ${}^{n-1}C_5$
	$\frac{1}{(n-6)!}=\frac{n-5}{(n-5)!}$ or $n!=n\times(n-1)!$	**(B1)**	**dep** on previous **M1** awarded
	$\frac{(n-1)!\times[n-(n-5)]}{(n-5)!5!}$	**(M1)**	**dep** on previous **M1** awarded factorising $(n-1)!$ in the fraction
	$\frac{(n-1)!\times5}{(n-5)!5!}=\frac{(n-1)!}{(n-5)!4!}={}^{n-1}C_4$	**(A1)**	
	Alternative 2		
	$\frac{n!}{(n-5)!5!} - \frac{(n-1)!}{(n-6)!5!}$	**(M1)**	For substituting ${}^{n}C_5$ and ${}^{n-1}C_5$ could be implied by expansions of the factorial
	$\frac{n(n-1)(n-2)(n-3)(n-4)}{5!} - \frac{(n-1)(n-2)(n-3)(n-4)(n-5)}{5!}$	**(B1)**	**dep** on previous **M1** awarded
	$\frac{(n-1)(n-2)(n-3)(n-4)[n-(n-5)]}{5!}$	**(M1)**	**dep** on previous **M1** awarded factorising $(n-1)(n-2)(n-3)(n-4)$ in the fraction

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