Question	Answer	Marks	Partial Marks
4	$27m - 153 + 3n + 6 = 0$ or better	**B1**	
	$-m - 17 - n + 6 = -12$ or better	**B1**	
	Eliminates one unknown for a pair of linear equations in m and n and solves for one unknown	**M1**	
	$m = 6$, $n = -5$	**A2**	**A1** for either
	-24 cao	**A1**	
5(a)(i)	$1 + 4nx + 8n(n-1)x^2$	**B2**	**B1** for any two correct terms or all 3 correct but listed not summed
5(a)(ii)	$8n(n-1) - 16n$	**M1**	**FT** from (i) identifying correct terms and combining *their* coefficient of $x^2 - 4 \times$ *their* coefficient of x
	Solves or factorises *their* 3-term quadratic in n only	**M1**	Forms a 3-term quadratic = 0 and solves except allow '= a constant' if they go on to complete to square
	$n = 29$ only	**A1**	
5(b)	${}^{10}C_2 \times \left(\frac{x}{2}\right)^8 \times \left(-\frac{8}{x^4}\right)^2$ soi	**M1**	Must be clearly identified not in expansion
	11.25 or $\frac{45}{4}$	**A1**	
6(a)(i)	$6 \times 6 \times 5 \times 4 \times 3$ oe	**M1**	
	2160	**A1**	
6(a)(ii)	Full correct calculation (360 + 900) 'how many end with 0'+ 'how many end with 2, 4, 6' oe	**M2**	**M1** for any correct product soi Eg $(6 \times 5 \times 4 \times 3 \times 1)$ or 360 $(5 \times 5 \times 4 \times 3 \times 1)$ or 300 $(5 \times 5 \times 4 \times 3 \times 3)$ or 900
	1260 cao	**A1**	
6(b)	${}^{15}C_7 - {}^{9}C_7$	**M1**	
	6399	**A1**	

Question	Answer	Marks	Partial Marks
6(c)(i)	$\frac{n!}{(n-3)!3!}+\frac{n!}{(n-2)!2!}$	**B2**	**B1** for either expression correct
	$\frac{n(n-1)(n-2)}{6}+\frac{n(n-1)}{2}$	**M2**	**M1** for either expression correct
	$\frac{n(n-1)(n-2+3)}{6}$ or $\frac{n^3-3n^2+2n}{6}+\frac{3n^2-3n}{6}$ leading to $\frac{1}{6}(n^3-n)$	**A1**	
6(c)(ii)	$n(n^2-25)=0$ oe	**M1**	
	$n = 5$ as the only solution	**A1**	
7	$\frac{\mathrm{d}}{\mathrm{d}x}(\sin 3x)=3\cos 3x$ soi	**B1**	
	$u=(1+\sin 3x)^4$ $\frac{\mathrm{d}u}{\mathrm{d}x}=4(1+\sin 3x)^3(3\cos 3x)$ soi	**M1**	**FT** *their* $3\cos 3x$
	$\frac{\mathrm{d}y}{\mathrm{d}x}=\frac{\sqrt{x}\left(4(1+\sin 3x)^3(3\cos 3x)\right)-(1+\sin 3x)^4\times\frac{1}{2}x^{-\frac{1}{2}}}{\left(\sqrt{x}\right)^2}$	**M1**	FT *their* $\frac{\mathrm{d}u}{\mathrm{d}x}$ *or their* $\frac{\mathrm{d}v}{\mathrm{d}x}$ but not both
	Correct derivative	**A1**	
	Evaluates *their* derivative at $x = 1.9$ and multiplies by h	**M1**	
	$0.651h$	**A1**	
8(a)	$x=6\sqrt{3}\sin 60 \quad y=-6\sqrt{3}\cos 60$ oe and completion to $9\mathbf{i}-3\sqrt{3}\mathbf{j}$	**B2**	**B1** for either x or y correct Allow **SC1** for verification that $9\mathbf{i}-3\sqrt{3}\mathbf{j}$ has a bearing of 120° and that $9\mathbf{i}-3\sqrt{3}\mathbf{j}$ has a magnitude of $6\sqrt{3}$
8(b)	$(5\mathbf{i}+16\mathbf{j})+3\left(9\mathbf{i}-3\sqrt{3}\mathbf{j}\right)$ oe, isw	**B1**	
8(c)	$29\mathbf{i}+16\mathbf{j}+t(-12\sqrt{3}\mathbf{j})$ oe, isw	**B1**	