Question	Answer	Marks	Partial Marks
3(a)	$\frac{3(x+2)}{x(x+3)}$ or $\frac{3x+6}{x^2+3x}$ or simplified equivalent;	**2**	mark final answer **B1** for $\frac{3x^2+6x}{x^3+3x^2}$ oe
3(b)	$\frac{1}{3}\ln(x^3+3x^2)\ +c$	**2**	**B1** for $\frac{1}{3}\ln(x^3+3x^2)$
4(a)	$2(-4)^3+11(-4)^2+22(-4)+40=0$ oe	**1**	
4(b)	$(x+4)(2x^2+3x+10)$	**B2**	**B1** for $2x^2+3x+10$ with two terms out of three correct
	Correct use of b^2-4ac for *their* 3-term quadratic factor	**M1**	
	$3^2-4(2)(10)<0$ isw or $3^2-4(2)(10)=-71$ oe, cao	**A1**	
5(a)(i)	35700	**2**	**M1** for ${}^{20}C_6-{}^{18}C_4$ or ${}^{18}C_6+{}^{18}C_5\times{}^{2}C_1$ oe
5(a)(ii)	32400	**2**	**M1** for ${}^{6}P_4\times{}^{10}P_2$ or (6 × 5 × 4 × 3) × (10 × 9) oe
5(b)(i)	Correct algebraic method to show $(n-3)\,{}^{n}C_3$ is the same as $4\times{}^{n}C_4$ oe	**2**	**B1** for ${}^{n}C_3=\frac{n!}{3!(n-3)!}$ or ${}^{n}C_4=\frac{n!}{4!(n-4)!}$
5(b)(ii)	$\frac{n(n-1)(n-2)}{6}=5n$ or $n(n-1)(n-2)=30n$ and completion to given answer: $n^2-3n-28=0$	**B2**	**B1** for $\left[{}^{n}C_3=\right]\frac{n(n-1)(n-2)}{6}$ or $n(n-1)(n-2)=30n$ seen
	$(n-7)(n+4)=0$ oe	**M1**	
	$n=7$	**A1**	

Question	Answer	Marks	Partial Marks
6	$\frac{dy}{dx} = 10e^{2x}$	**B1**	
	[At A, m =] 10	**B1**	
	[At A, y =] 2	**B1**	
	[Equation tangent is] $y = 10x + 2$ oe	**B1**	
	$AB^2 = \left(\frac{-their2}{their10}\right)^2 + (their\,2)^2$ oe	**M1**	providing *their* 10 is derived using differentiation
	[AB =] 2.01 or 2.009[9…] nfww, isw	**A1**	
7	$\frac{d(4x^3 + 2\sin 8x)}{dx} = 12x^2 + 16\cos 8x$ soi	**B2**	**B1** for $12x^2 + k\cos 8x$, where $k > 0$
	Correct quotient rule: $\frac{(1-x)\left(their\left(12x^2 + 16\cos 8x\right)\right) - (4x^3 + 2\sin 8x)(-1)}{(1-x)^2}$	**M1**	or applies correct product rule to $(4x^3 + 2\sin 8x)(1-x)^{-1}$: $(4x^3 + 2\sin 8x)\left(-(1-x)^{-2} \times -1\right) +$ $\left(their(12x^2 + 16\cos 8x)\right)(1-x)^{-1}$
	Fully correct derivative; isw	**A1**	**FT** *their* $12x^2 + 16\cos 8x$
	$\frac{\delta y}{h} = their\left(\left.\frac{dy}{dx}\right\|_{x=0.1}\right)$	**M1**	
	14.3h or 14.29[54...]h with coefficient rot to 4 or more figs isw	**A1**	
8(a)(i)	$f \leqslant -1$	**1**	