Question	Answer	Marks	Guidance
6(b)	-8	**B1**	**FT** on *their* **integer** b
6(c)	$\mathrm{p}'(x) = 18x^2 + 34x + 6$ $\mathrm{p}''(x) = 36x + 34$	**M1**	For attempt to differentiate *their* p(x), may be implied by correct **FT** answer
	$\mathrm{p}''(0) = 34$	**A1**	**FT** on $2\times$ *their* **integer** a
7(a)	$\dfrac{2(x-1)^2 - (x-1)(2x+3) + (2x+3)}{(x-1)^2(2x+3)}$	**M1**	Attempt at a fraction, allow with an extra $(x-1)$ term in each term of the numerator and the denominator
	$= \dfrac{8-3x}{(x-1)^2(2x+3)}$	**A1**	**AG** – must see sufficient detail to justify the given result, if an extra $(x-1)$ term involved, it must be dealt with correctly
7(b)	$\left[\ln(2x+3) - \ln(x-1) - \dfrac{1}{(x-1)}\right]_2^a$	**3**	**B1** for each correct term
	$\left(\ln(2a+3) - \ln(a-1) - \dfrac{1}{a-1}\right) - (\ln 7 - 1)$	**M1**	**Dep** on at least one ln term from integration, for applying limits correctly in *their* integral
	$\dfrac{a-2}{a-1} + \ln\left(\dfrac{2a+3}{7(a-1)}\right)$ oe	**2**	**A1** for $\dfrac{a-2}{a-1}$ or $1 - \dfrac{1}{a-1}$ **A1** for $\ln\left(\dfrac{2a+3}{7(a-1)}\right)$
	Alternative 1 final 2 marks $\dfrac{-1}{a-1} + \ln\left(\dfrac{\mathrm{e}(2a+3)}{7(a-1)}\right)$ oe	**(2)**	**A1** for $\dfrac{-1}{a-1}$ **A1** for $\ln\left(\dfrac{\mathrm{e}(2a+3)}{7(a-1)}\right)$
	Alternative 2 final 2 marks $\dfrac{a-2}{a-1} - \ln 7 + \ln\left(\dfrac{2a+3}{(a-1)}\right)$ oe	**(2)**	**A1** for $\dfrac{a-2}{a-1} - \ln 7$ or $1 - \dfrac{1}{a-1} - \ln 7$ Allow 1.946 or better for ln 7 **A1** for $\ln\left(\dfrac{2a+3}{(a-1)}\right)$

Question	Answer	Marks	Guidance
7(b)	**Alternative 3** final 2 marks $\frac{-1}{a-1} - \ln 7 + \ln\left(\frac{e(2a+3)}{(a-1)}\right)$ oe	**2**	**A1** for $\frac{-1}{a-1} - \ln 7$ Allow 1.946 or better for ln 7 **A1** for $\ln\left(\frac{e(2a+3)}{(a-1)}\right)$
8(a)	With the sisters: 70 or ${}^{8}C_{4}$ oe	**B1**	
	Without the sisters: 28 or ${}^{8}C_{6}$ oe	**B1**	
	Total: 98	**B1**	
8(b)(i)	60480	**B1**	
8(b)(ii)	The start of the password and the end of the password can each be chosen 6 ways	**B1**	6 or ${}^{3}P_{2}$ oe seen twice
	The remaining characters can be chosen in 20 ways	**B1**	20 or ${}^{5}P_{2}$ oe seen
	Total number of ways: 720	**B1**	

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