Question	Answer	Marks	Guidance
5(b)	$^{12}C_8\left(8y^2\right)^4\left(-\frac{1}{2y}\right)^8$ or $^{12}C_4\left(8y^2\right)^4\left(-\frac{1}{2y}\right)^8$	**M1**	
	7920	**A1**	
6	$b=12$	**2**	**M1** for attempt at differentiation
	$-27a+99-3b+c=0$ $a+11+b+c=16$	**2**	**M1** for attempt at $\mathrm{p}(-3)=0$ or $\mathrm{p}(1)=16$
	$a=2$ $c=-9$	**2**	**M1** for attempt to solve *their* equations
7(a)	$\mathrm{e}^{5y}=mx^3+c$ soi	**B1**	
	$4.38=-2.56m+c$ $9.84=6.54m+c$	**M1**	Must be using the coordinates correctly
	$m=0.6,\ c=5.92$	**2**	**M1 dep** for solution of *their* equations
	$y=\frac{1}{5}\ln\left(0.6x^3+5.92\right)$	**A1**	
	Alternative		
	$\mathrm{e}^{5y}=mx^3+c$ soi	**B1**	
	Gradient = $\frac{5.46}{9.1}\ (=m)$	**M1**	Must be using the coordinates correctly
	$4.38=-2.56m+c$ or $9.84=6.54m+c$	**M1**	Must be using the coordinates correctly
	$m=0.6,\ c=5.92$	**A1**	
	$y=\frac{1}{5}\ln\left(0.6x^3+5.92\right)$	**A1**	
7(b)	$0.6x^3+5.92>0$	**M1**	Allow use of *their* $\frac{1}{5}\ln\left(0.6x^3+5.916\right)$
	$x>-2.14$	**2**	**M1 dep** for a correct method of solution to obtain $x>\ldots$

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Question	Answer	Marks	Guidance
8	$\left(\text{f}'(x)=\right)\ k(3x+5)^{\frac{1}{3}}\ (+c)$	**M1**	
	$\left(\text{f}'(x)=\right)\ (3x+5)^{\frac{1}{3}}\ (+c)$	**A1**	Allow unsimplified
	$\left(\text{f}'(1)=\right)\ 6=(3+5)^{\frac{1}{3}}+c$	**M1**	**Dep M1** for use of given condition
	$\text{f}'(x)=(3x+5)^{\frac{1}{3}}+4$ soi	**A1**	
	$m(3x+5)^{\frac{4}{3}}$	**M1**	
	$\left(\text{f}(x)=\right)\ m(3x+5)^{\frac{4}{3}}+cx+d$	**M1**	**Dep M1, FT** on t*heir c*
	$\left(\text{f}(1)=\right)\ 20 = m(8)^{\frac{4}{3}}+c+d$	**M1**	**Dep M1, FT** on t*heir c*
	$\left(\text{f}(x)=\right)\ \frac{1}{4}(3x+5)^{\frac{4}{3}}+4x+12$	**A1**	
9(a)	$\frac{\text{d}y}{\text{d}x}=\frac{(x+1)\left(-3\text{e}^{-3x+2}\right)-\text{e}^{-3x+2}}{(x+1)^2}$	**3**	**B1** for -3e^{-3x+2} **M1** for correct attempt at differentiation of a quotient **A1** all terms apart from -3e^{-3x+2} correct
	$\frac{\text{e}^{-3x+2}(-3x-4)}{(x+1)^2}$	**2**	**M1 dep** for attempt to obtain the given form, allow sign errors
9(b)	$\text{e}^{-3x+2}\neq 0$	**B1**	
	$x=-\frac{4}{3}$	**B1**	**FT** on *their* $-3x-4$ $\frac{\text{d}y}{\text{d}x}$ must be in the correct form
	$y=-3\text{e}^{6}$	**B1**	
10(a)	$ar^2=6$ $ar^7=1458$ soi	**B1**	
	$r^5=243$	**B1**	
	$r=3$	**B1**	
	$a=\frac{2}{3}$	**B1**	

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