Question	Answer	Marks	Guidance
6(b)	${}^8C_4\left(4x^2\right)^4\left(\frac{1}{2x^2}\right)^4$	**M1**	May be implied by working to obtain $r = 4$
	1120	**A1**	From correct working
7	$\left(\frac{\mathrm{d}y}{\mathrm{d}x} =\right)\frac{(x+2)\left(\frac{6x}{3x^2-1}\right)-\ln\left(3x^2-1\right)}{(x+2)^2}$ or $\frac{6x}{\left(3x^2-1\right)}(x+2)^{-1}-(x+2)^{-2}\ln\left(3x^2-1\right)$ oe	**3**	**B1** for $\frac{6x}{3x^2-1}$ **M1** for correct attempt at differentiation of a quotient or a correct product **A1** for all terms apart from $\frac{6x}{3x^2-1}$ correct.
	When $x = 1$, $\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{9-\ln 2}{9}$	**M1**	For use of $x = 1$ in *their* $\frac{\mathrm{d}y}{\mathrm{d}x}$, must see a substitution if in decimal form unless 0.923 obtained from a correct derivative
	$\frac{\mathrm{d}x}{\mathrm{d}t} = \frac{9h}{9-\ln 2}$ or exact equivalent	**2**	**M1** for $\frac{h}{\textit{their}\left(\frac{9-\ln 2}{9}\right)}$, with $x = 1$ substituted in **A0** if using small changes
8	$\frac{\mathrm{d}y}{\mathrm{d}x} = \mathrm{e}^x k(2x+5)^{-\frac{1}{2}} + \mathrm{e}^x(2x+5)^{\frac{1}{2}}$	**M1**	
	$\frac{\mathrm{d}y}{\mathrm{d}x} = \mathrm{e}^x(2x+5)^{-\frac{1}{2}} + \mathrm{e}^x(2x+5)^{\frac{1}{2}}$	**A1**	
	When $x = 2$, $\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{10\mathrm{e}^2}{3}$	**M1**	**Dep** allow unsimplified Allow for using *their* $\frac{\mathrm{d}y}{\mathrm{d}x}$
	When $x = 2$, $y = 3\mathrm{e}^2$	**B1**	
	Tangent: $y - 3\mathrm{e}^2 = \frac{10\mathrm{e}^2}{3}(x-2)$	**M1**	Allow for using *their* $\frac{\mathrm{d}y}{\mathrm{d}x}$ and *their y*
	When $y = 0$, $x = \frac{11}{10}$	**A1**	Must be simplified Must be from correct work
	When $x = 0$, $y = -\frac{11\mathrm{e}^2}{3}$	**A1**	
	$\left(\frac{11}{20}, -\frac{11\mathrm{e}^2}{6}\right)$	**A1**	**FT** on *their* coordinates for *x* and *y*, but must be exact and simplified

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Question	Answer	Marks	Guidance
9	$\frac{8}{2x+1} = 6x+1$ $12x^2 + 8x - 7 = 0$	**M1**	Attempt to obtain a 3-term quadratic in one variable equated to zero.
	$x = \frac{1}{2}$	**2**	**M1 dep** for solution, see guidance
	$k\ln(2x+1)$	**M1**	
	Area under curve = $\left[k\ln(2x+1)\right]_0^{their\frac{1}{2}}$ = $k\ln(2(their\ x)+1)\ (-0)$	**M1**	**Dep** on previous **M1** for correct application of limits using *their x*, *k* and zero Allow unsimplified
	Area under curve = 2ln 2	**A1**	Not from incorrect work
	Area under straight line = $\frac{5}{8}$ or 0.625 oe	**B1**	
	Shaded area = ln4 – $\frac{5}{8}$	**A1**	Not from incorrect work

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