Question	Answer	Marks	Partial Marks
4(a)	$\frac{dy}{dx} = \frac{3}{x} + 2x - 7$	**B2**	**B1** for the first term correct and one other term correct or for all terms correct with extra terms seen
	Equates *their* $\frac{dy}{dx}$ to zero and rearranges to 3-term quadratic in x	**M1**	
	Solves *their* 3-term quadratic	**M1**	**Dep** on previous M1
	$x = 0.5,\ 3$ nfww isw	**A1**	no extra solutions
4(b)	$\frac{d^2y}{dx^2} = -\frac{3}{x^2} + 2$	**M1**	**FT** *their* $\frac{dy}{dx}$ providing B1 earned in **(a)**
	$x = 0.5$, $\frac{d^2y}{dx^2} < 0 \rightarrow \max$ or $\frac{d^2y}{dx^2} = -10 \rightarrow \max$	**A1**	
	$x = 3$, $\frac{d^2y}{dx^2} > 0 \rightarrow \min$ or $\frac{d^2y}{dx^2} = \frac{5}{3} \rightarrow \min$	**A1**	
	Alternative method		
	Considers gradient at $x - h$ and $x + h$ for $x = 0.5$ or $x = 3$ [where h is small] or Considers y-values at $x - h$ and $x + h$ for $x = 0.5$ or $x = 3$ [where h is small]	**(M1)**	**FT** *their* $\frac{dy}{dx}$ providing B1 earned in **(a)**
	Correct conclusion for one turning point max at $x = 0.5$ or min at $x = 3$	**(A1)**	
	Correct method and conclusion for second turning point	**(A1)**	

Question	Answer	Marks	Partial Marks
5(a)	Solves $3e^x + 3e^y = 15$ and $2e^x - 3e^y = 8$ oe by elimination as far as $3e^x + 2e^x = 23$ or substitutes $e^y = 5 - e^x$ into $2e^x - 3e^y = 8$ oe OR Solves $2e^x + 2e^y = 10$ and $2e^x - 3e^y = 8$ oe by elimination as far as $2e^y + 3e^y = 2$ or substitutes $e^x = 5 - e^y$ into $2e^x - 3e^y = 8$ oe	**M1**	
	$e^x = \frac{23}{5}$ or $e^y = \frac{2}{5}$ oe	**A1**	
	$x = \ln 4.6 [= 1.53]$ oe or $y = \ln 0.4 [= -0.916]$ oe	**A1**	If M0 scored **SC1** for using *their* expression of the form $ce^x = d$ to give $x = \ln\frac{d}{c}$ provided $\frac{d}{c} > 0$
	Finds the other value, e^y or e^x, by substituting *their* e^x or e^y	**M1**	**FT** *their* e^x or e^y
	$y = \ln 0.4 [= -0.916]$ oe or $x = \ln 4.6 [= 1.53]$ oe	**A1**	