Question			Answer	Marks	AO	Guidance	
6	(a)		**DR**				
			$f\left(\frac{1}{4}\right)=4\left(\frac{1}{4}\right)^3-25\left(\frac{1}{4}\right)^2-58\left(\frac{1}{4}\right)+16$ $=\frac{1}{16}-\frac{25}{16}-\frac{29}{2}+16=0$	**B1**	**2.1**	Show $f\left(\frac{1}{4}\right)=0$, some detail required	**B0** for just f(0.25) = 0, but condone seeing either just the substitution or just the evaluated terms Could use division by $(4x - 1)$ or $(x - \frac{1}{4})$ but must identify remainder of 0
				[1]			
6	(b)		**DR**				
			$(4x - 1)(x^2 - 6x - 16)$	**B1**	**2.2a**	Identify factor of $(4x - 1)$	Allow factor of $(x - \frac{1}{4})$
				M1	**1.1**	Obtain complete division by $(4x - 1)$ or $(1 - 4x)$	Must be a complete method ie attempt all 3 terms to obtain x^2 and one other correct term (allow one slip in method) Could be implied by $A = 1$ and one other correct if using coefficient matching Condone division by $(x - \frac{1}{4})$, to obtain $4x^2$ and either $-24x$ or -64
				A1	**1.1**	Obtain correct product	Integer coefficients now required Must be written as a **product**, so cannot be implied by eg correct quotient appearing following division by $(4x - 1)$ but the two factors never combined Could be $(1 - 4x)(-x^2 + 6x + 16)$

Question			Answer	Marks	AO	Guidance	
				[3]			If division was used in part **(a)** then quotient must appear in part **(b)**, but evidence for **B1M1** could be in **(a)** If $(x-8)(x+2)$ seen **before** the quadratic factor then both roots must be justified (eg factor theorem), otherwise **M0** (but could still get **B1**)
6	**(c)**		**DR**				
			$(4e^y-1)(e^y-8)(e^y+2)$ $e^y=\frac{1}{4}$, $e^y=8$, $e^y=-2$ $y=\ln\frac{1}{4}$, $y=\ln 8$	**M1**	**3.1a**	Attempt to find y from at least one positive root for e^y	Attempt to link e^y to the root(s) of the cubic in x, and then solve $e^y=k$ to obtain $y=\ln k$, where k is one of their positive roots
			$y=-2\ln 2$, $y=3\ln 2$	**A1**	**1.1**	Obtain at least one correct solution in the required form	$y=-2\ln 2$ comes from the given root, but $y=3\ln 2$ must come from the correct solution of the correct quadratic
				A1	**1.1**	Obtain both correct solutions in required form	Must come from the correct solution of the correct quadratic Allow **BOD** if $\ln(-2)$ also seen
			$e^y=-2$ has no solutions as $e^y>0$ for all y	**B1**	**2.3**	Reject $e^y=-2$ with a reason	Must have some reason, eg 'e^y is always positive', 'e^y cannot be negative', 'cannot take log of a negative number', 'not defined', 'not real', 'no solutions' **B0** for 'math error', 'does not work', 'not possible', N/A etc $e^y=-2$ must come from the correct solution of the correct quadratic
				[4]			