

Question			Answer	Marks	AO	Guidance	
6	(a)		$y = \ln\left(\frac{1}{3}x\right)$ or $y = \ln\frac{1}{3} + \ln x$ or $y = \ln x - \ln 3$	B2	1.1 1.1	B2 for a correct equation Condone $y = \ln\frac{1}{3}x$ B1 for $\ln\left(\frac{1}{3}x\right)$ (so ‘y =’ missing) or $(y =) \ln(3x)$ (oe) or $\ln\frac{1}{3}x$ or $\ln 3x$	Must be ‘y = ...’ oe e.g. $\ln\frac{1}{3} + \ln x$
				[2]			
6	(b)		$y = x^2 - 6x + 8 \Rightarrow y = (x \pm 3)^2 \pm 9 + 8$ $(x - 3)^2 - 1$ translation only $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$	M1	3.1a	Attempt to complete the square (oe)	e.g. attempt to differentiate and set equal to zero (to find the minimum point) or a minimum point shown in the 4 th quadrant on a graph with x-coordinate 3
				A1	1.1	Correct expression required May just see $f(x - 3) - 2$	$(3, -1)$ or $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ seen would imply M1 A1
				B1	1.2	Do not accept shift/move/transform etc.	Condone ‘translate’
				A1	2.2a	Or equivalent in words – the correct vector (oe) implies M1 A1 A1 Mark the vector before description/words cao	If using words do not accept in/on/along/to/about/across/through/towards the axes, not “to the right” only, not “down” only (must be ‘in the positive x-direction’ or ‘parallel to the positive x-axis’ etc.)
				[4]			