Question	Answer	Marks	Partial Marks
4(b)	$e^{4x} - 4e^{2x} + 3 = 0$ or $(e^{2x})^2 - 4e^{2x} + 3 = 0$ oe	**M1**	condone one error
	Factorises: $(e^{2x} - 1)(e^{2x} - 3)$ oe or solves $e^{4x} - 4e^{2x} + 3 = 0$ oe	**M1**	**FT** $a(e^{2x})^2 + be^{2x} + c[= 0]$
	$e^{2x} = 1, \quad e^{2x} = 3$	**A1**	
	$x = 0$, $x = \frac{1}{2}\ln 3$ or exact equivalent	**A1**	
5	$\frac{dV}{dr} = 4\pi r^2$ **oe and** $\left.\frac{dV}{dr}\right\|_{r=6} = 144\pi$	**B1**	
	$\frac{dr}{dt} = \frac{dV}{dt} \times \frac{dr}{dV}$ **soi**	**B1**	Not if chain rule for $\frac{dt}{dr}$ unless answer is inverted
	$\frac{24}{\text{their } 144\pi}$	**M1**	*their* 144π must come from an attempt at differentiation
	0.0531 or 0.05305[16….] rot to 4 or more sig figs	**A1**	
6(a)	$3\begin{pmatrix} x-8 \\ y-5 \end{pmatrix} = 2\begin{pmatrix} x-4 \\ y-7 \end{pmatrix}$ oe OR $\overrightarrow{QR} = \begin{pmatrix} x-8 \\ y-5 \end{pmatrix}$ and $\overrightarrow{PR} = \begin{pmatrix} x-4 \\ y-7 \end{pmatrix}$ and $3x - 24 = 2x - 8$ and $3y - 15 = 2y - 14$	**M1**	
	$x = 16$	**A1**	**dep** on vector method
	$y = 1$	**A1**	**dep** on vector method