Question	Scheme	Marks	AOs
3(a)	$18\mathbf{i} - 18\mathbf{j}$ (m s^{-1})	B1	3.4
		(1)	
3(b)	Differentiate **v** wrt *t*	M1	3.1a
	$2\mathbf{i} - 3t^{-\frac{1}{2}}\mathbf{j}$ (m s^{-2})	A1	1.1b
		(2)	
3(c)	Integrate **v** wrt *t*	M1	3.1a
	$\mathbf{r} = t^2\mathbf{i} - 4t^{\frac{3}{2}}\mathbf{j}$ $(+\mathbf{C})$	A1	1.1b
	Use of $t = 1$ to find **C**: $\mathbf{i} - 2\mathbf{j} = \mathbf{i} - 4\mathbf{j} + \mathbf{C} \Rightarrow \mathbf{C} = 2\mathbf{j}$	M1	2.1
	$\mathbf{r} = t^2\mathbf{i} - 4t^{\frac{3}{2}}\mathbf{j} + 2\mathbf{j}$ (m)	A1	1.1b
		(4)	
3(d)	Use of ratios to set up an equation in *T* only	M1	3.1a
	$\frac{2T}{-6T^{\frac{1}{2}}} = \frac{4}{-1}$	A1	1.1b
	Solve for *T*	M1	1.1b
	$T = 144$	A1	1.1b
		(4)	
			(11 marks)

Notes: Allow column vectors in working but if used in final answer(s) penalise once only for whole question

(a)	B1	cao
(b)	M1	Both powers decreasing by 1
	A1	cao
(c)	M1	Both powers increasing by 1
	A1	Correct expression
	M1	Use of $t = 1$, to find **C**
	A1	cao
(d)	M1	Condone sign errors and reciprocal
	A1	Correct equation in *T* only
	M1	Solve for *T*
	A1	cao