

Question	Scheme	Marks	AOs
1 (a)	Differentiate v to obtain a	M1	3.4
	$\mathbf{a} = (6t - 12)\mathbf{i} + (18t - 3)\mathbf{j}$	A1	1.1b
		(2)	
(b)	Integrate v to obtain r	M1	3.4
	$\mathbf{r} = \left(t^3 - 6t^2 (+C_1)\right)\mathbf{i} + \left(3t^3 - \frac{3t^2}{2} (+C_2)\right)\mathbf{j}$	A1	1.1b
		(2)	
(c)	Solve $\mathbf{a} = \lambda\mathbf{j}$ to obtain t	M1	3.1a
	$6t - 12 = 0 \Rightarrow t = 2$	A1	1.1b
	Substitute their t	M1	1.1b
	$\mathbf{r} = -16\mathbf{i} + 18\mathbf{j}$	A1	2.2a
		(4)	

(8 marks)

Notes:	
(a)	
M1	Powers going down by 1
A1	Correct only
(b)	
M1	Powers going up by 1. Condone missing constants of integration
A1	Correct only
(c)	
M1	Set coefficient of i equal to zero and solve for t
A1	Correct only
M1	Substitute their t in an expression of the form $\mathbf{r} = (at^3 - bt^2 + c)\mathbf{i} + (dt^3 - et^2 + f)\mathbf{j}$ where $abde \neq 0$
A1	Correct only