Question	Scheme	Mark	Notes
1	Accept column vectors throughout this question		
1a	Differentiate **r** (both components)	M1	In each component at least one power going down by 1
	$\mathbf{v}=\left(4t^3-16t\right)\mathbf{i}+\left(12t-3\sqrt{t}\right)\mathbf{j}$	A1	Accept as two separate components
	Equate **i** component of **v** to zero and solve for *t*	DM1	Dependent on the first M1. Must start with a component of the vector for **v** Can have more than one value at this stage.
	Obtain $\left(24-3\sqrt{2}\right)\mathbf{j}\ \left(\text{m s}^{-1}\right)$	A1	Accept $20\mathbf{j}\left(\text{m s}^{-1}\right)$ or better. (19.757359…) Correct answer only Answer must be a vector
		[4]	
1b	Differentiate **v** (both components)	M1	For differentiating their **v**, even if the method for obtaining it was incorrect. Their **v** must be a vector. In each component at least one power going down by 1
	Obtain $\mathbf{a}=\left(12t^2-16\right)\mathbf{i}+\left(12-\frac{3}{2}t^{-\frac{1}{2}}\right)\mathbf{j}$	A1	Any equivalent form for acceleration
	Obtain $176\mathbf{i}+\frac{45}{4}\mathbf{j}\left(\text{m s}^{-2}\right)$	A1	Accept $180\mathbf{i}+11\mathbf{j}\left(\text{m s}^{-2}\right)$ or better ISW
		[3]	
		(7)	