2a			Allow column vectors throughout
	Use $\mathbf{a}=\dfrac{\mathrm{d}\mathbf{v}}{\mathrm{d}t}$	M1	Differentiate – at least 3 powers going down by 1
	$\mathbf{a}=\left(10t-3t^2\right)\mathbf{i}+\left(6t^2-8\right)\mathbf{j}$	A1	
	$\mathbf{F}=1.5\times\left(\left(20-12\right)\mathbf{i}+\left(24-8\right)\mathbf{j}\right)$	DM1	Substitute $t=2$ and use $\mathbf{F}=m\mathbf{a}$ Dependent on preceding M1
	$=12\mathbf{i}+24\mathbf{j}$	A1	Ignore magnitude of **F** if found
		(4)	
2b	$5t^2-t^3=0 \quad \Rightarrow t=5$	B1	(Not moving when $t=0$ so no need to mention $t=0$)
	Use of $\mathbf{r}=\int\mathbf{v}\mathrm{d}t$	M1	Integrate to find **r** – at least 3 powers going up by 1.
	$\mathbf{r}=\left(\dfrac{5}{3}t^3-\dfrac{1}{4}t^4\right)\mathbf{i}+\left(\dfrac{1}{2}t^4-4t^2\right)\mathbf{j}$	A1	Condone if no constant of integration seen (since $t=0,\mathbf{r}=\mathbf{0}$)
	$\mathbf{r}=\left(\dfrac{625}{12}\right)\mathbf{i}+\left(\dfrac{425}{2}\right)\mathbf{j}$	A1	Final answer $52\mathbf{i}+210\mathbf{j}$ or better $\left(52.08\dot{3}\mathbf{i}+212.5\mathbf{j}\right)$
		(4)	
		[8]	