

Question		Scheme	Marks	AOs
1(a)		Use of $\mathbf{v} = \mathbf{u} + \mathbf{a}t$ with $t = 2$: $\mathbf{v} = 4\mathbf{i} + 2(2\mathbf{i} - 3\mathbf{j})$ OR integration: $\mathbf{v} = (2\mathbf{i} - 3\mathbf{j})t + 4\mathbf{i}$, with $t = 2$	M1	3.1a
		$\mathbf{v} = 8\mathbf{i} - 6\mathbf{j}$	A1	1.1b
			(2)	
1(b)		Use of $\mathbf{r} = \mathbf{u}t + \frac{1}{2}\mathbf{a}t^2$ at $t = 3$: $(\mathbf{i} + \mathbf{j}) + \left[3 \times 4\mathbf{i} + \frac{1}{2} \times (2\mathbf{i} - 3\mathbf{j}) \times 3^2 \right]$ OR: find \mathbf{v} at $t = 3$: $4\mathbf{i} + 3(2\mathbf{i} - 3\mathbf{j}) = (10\mathbf{i} - 9\mathbf{j})$ then use $\mathbf{r} = \frac{1}{2}(\mathbf{u} + \mathbf{v})t$ $(\mathbf{i} + \mathbf{j}) + \left[\frac{1}{2} [4\mathbf{i} + (10\mathbf{i} - 9\mathbf{j})] \times 3 \right]$ or $\mathbf{r} = \mathbf{v}t - \frac{1}{2}\mathbf{a}t^2$ $(\mathbf{i} + \mathbf{j}) + \left[3 \times (10\mathbf{i} - 9\mathbf{j}) - \frac{1}{2} \times (2\mathbf{i} - 3\mathbf{j}) \times 3^2 \right]$ OR integration: $\mathbf{r} = (\mathbf{i} + \mathbf{j}) + \left[(2\mathbf{i} - 3\mathbf{j}) \frac{1}{2}t^2 + 4t\mathbf{i} \right]$, with $t = 3$	M1	3.1a
		$\mathbf{r} = 22\mathbf{i} - 12.5\mathbf{j}$	A1	2.2a
			(2)	

(4 marks)

Notes: Accept column vectors throughout

1a	M1	Complete method to find \mathbf{v} , using \mathbf{ruvat} or integration (M0 if \mathbf{i} and/or \mathbf{j} is missing)
	A1	Apply isw if they also find the speed
1b	M1	Complete method to find the p.v. but this mark can be scored if they omit $(\mathbf{i} + \mathbf{j})$ i.e. the M1 is for the expression in the square bracket If they integrate, the M1 is earned once the expression in the square bracket is seen with $t = 3$ (M0 if \mathbf{i} and/or \mathbf{j} is missing)
	A1	cao