

Question	Scheme	Marks	AOs
6.	Integrate $\mathbf{v}$ w.r.t. time	M1	1.1a
	$\mathbf{r} = 2t^{\frac{1}{2}}\mathbf{i} - 2t^2\mathbf{j} \text{ (+ C)}$	A1	1.1b
	Substitute $t = 4$ and $t = 1$ into their $\mathbf{r}$	M1	1.1b
	$t = 4, \mathbf{r} = 4\mathbf{i} - 32\mathbf{j} \text{ (+ C)}; t = 1, \mathbf{r} = 2\mathbf{i} - 2\mathbf{j} \text{ (+ C)}$ or $(4, -32); (2, -2)$	A1	1.1b
	$\sqrt{2^2 + (-30)^2}$	M1	1.1b
	$\sqrt{904} = 2\sqrt{226}$	A1	1.1b
		(6)	

(6 marks)

**Notes: Allow column vectors throughout**

**M1:** At least one power increasing by 1.

**A1:** Any correct (unsimplified) expression

**M1:** Must have attempted to integrate  $\mathbf{v}$ . Substitute  $t = 4$  and  $t = 1$  into their  $\mathbf{r}$  to produce 2 vectors (or 2 points if just working with coordinates).

**A1:**  $4\mathbf{i} - 32\mathbf{j} \text{ (+ C)}$  and  $2\mathbf{i} - 2\mathbf{j} \text{ (+ C)}$  or  $(4, -32)$  and  $(2, -2)$ . These can be seen or implied.

**M1:** Attempt at distance of form  $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$  for their points. Must have 2 non zero terms.

**A1:**  $\sqrt{904} = 2\sqrt{226}$  or any equivalent surd (exact answer needed)