Question Number	Scheme	Marks
	Allow working in column vectors and penalise answers to (a) and (b) in column vector form ONCE at the first time it occurs.	
8(a)	$\mathbf{v} = \dfrac{(9\mathbf{i} + 23\mathbf{j}) - (-2\mathbf{i} + \mathbf{j})}{11}$	M1
	Expression for $\mathbf{r}$ with correct structure	M1
	$\mathbf{r} = (-2\mathbf{i} + \mathbf{j}) + t(\mathbf{i} + 2\mathbf{j})$ or $\mathbf{r} = (t-2)\mathbf{i} + (2t+1)\mathbf{j}$	A1 cao
		(3)
8(b)	$\mathbf{s} = (25\mathbf{i} + 25\mathbf{j}) + t(-\mathbf{i} - \mathbf{j})$ **Or** $\mathbf{s} = (25-t)\mathbf{i} + (25-t)\mathbf{j}$	B1
		(1)
8(c)	**Either** $\mathbf{r} - \mathbf{s}$ **Or** $\mathbf{s} - \mathbf{r}$ with their $\mathbf{r}$ and $\mathbf{s}$ substituted	M1
	$\overrightarrow{SR} = \left[(2t-27)\mathbf{i} + (3t-24)\mathbf{j}\right]$m *	A1*
		(2)
8(d)	Distance $(d) = \sqrt{(2t-27)^2 + (3t-24)^2}$ $(d^2) = (2t-27)^2 + (3t-24)^2$	M1
	$(d^2) = 13t^2 - 252t + 1305$	A1
	$t = \dfrac{126}{13} = 9.7$ (s) or better	A1
		(3)
		(9)

Notes for Question 8	
(a)	
M1	Use of displacement/time to find velocity. Allow the difference either way round.
M1	Expression for $\mathbf{r}$ with correct structure using *their* $\mathbf{v}$ and the correct initial position vector.
A1	Correct expression in terms of t, $\mathbf{i}$ and $\mathbf{j}$
(b)	
B1	Any correct expression for $\mathbf{s}$ in terms of t, $\mathbf{i}$ and $\mathbf{j}$
(c)	
M1	(Their $\mathbf{r}$ – their $\mathbf{s}$) or vice versa, unsimplified
A1*	Correct answer correctly obtained. Allow missing square brackets and m, but rest must be identical to given answer.
(d)	
M1	Use of Pythagoras to find an expression for distance (or distance squared)
A1	Correct 3 term quadratic expression **N.B.** If no 3 term quadratic expression is seen but a correct derivative is, award this mark.
A1	9.7 or better. **N.B.** If a fraction is given as the answer, it must be the ratio of two positive integers or a mixed fraction.

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