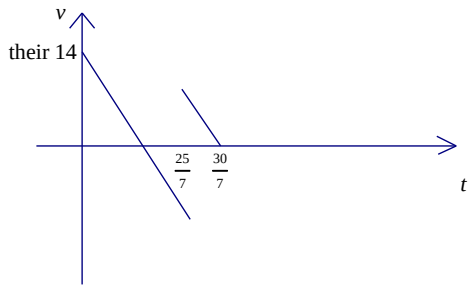
Question Number	Scheme	Marks	Notes
6(a)	$s = ut + \frac{1}{2}at^2$	M1	Complete method using *suvat* to **form** equation in U only
	$-12\frac{1}{2} = \frac{25}{7}U - 4.9(\frac{25}{7})^2$	A1	Correct unsimplified equation Allow $12\frac{1}{2} = \frac{25}{7}U + 4.9(\frac{25}{7})^2$ even if it is not clear that they know why it is true
	$U = 14$	A1	Must be positive
		(3)	
(b)	$s = vt - \frac{1}{2}at^2$	M1	Complete method using *suvat* to **form** equation in s only
	$s = 0 - \frac{1}{2}(-9.8)(\frac{5}{7})^2$	A1	Correct unsimplified equation
	$= 2\frac{1}{2}$ (m)	A1	
		(3)	
(b) alt	$0 = u - g(\frac{5}{7})$ $u = 7$ $s = ut + \frac{1}{2}at^2$	M1	Complete method using *suvat* to **form** equation in s
	$s = 7(\frac{5}{7}) - \frac{1}{2}9.8(\frac{5}{7})^2$	A1	Correct unsimplified equation
	$= 2\frac{1}{2}$ (m)	A1	
		(3)	
(c).		B1	1st line (existing for both +ve and –ve v) ignore figures
		B1	2nd line correct and stopping on the t axis. no other lines. Ignore figures. Parallel to upward portion of their first line if seen.
		B1 ft	Figs. In the right places. Allow U for their 14
		(3)	
			Accept mirror image in the t axis
		(9)	

Question Number	Scheme	Marks	Notes
7(a)	Use of $\mathbf{r} = \mathbf{r}_0 + \mathbf{v}t$	M1	At least once. Must be adding, not subtracting
	$\mathbf{r}_A = (8\mathbf{i} + 7\mathbf{j}) + t(2\mathbf{i} - 14\mathbf{j})$	A1	$\mathbf{r}_A$ correct $\begin{pmatrix} 8+2t \\ 7-14t \end{pmatrix}$
	$\mathbf{r}_B = (\mathbf{i} + 2\mathbf{j}) + t(12\mathbf{i} - 4\mathbf{j})$	A1	$\mathbf{r}_B$ correct $\begin{pmatrix} 1+12t \\ 2-4t \end{pmatrix}$
	$\overrightarrow{BA} = (8\mathbf{i} + 7\mathbf{j}) + t(2\mathbf{i} - 14\mathbf{j}) - \left[(\mathbf{i} + 2\mathbf{j}) + t(12\mathbf{i} - 4\mathbf{j})\right]$	M1	Need to see an indication of method as leading to a given answer
	$= (7 - 10t)\mathbf{i} + (5 - 10t)\mathbf{j}$	A1	Obtain **given answer** from correct working
		(5)	
(b)	Use of Pythagoras to equate distance to 2 km	M1	
	$(7 - 10t)^2 + (5 - 10t)^2 = 2^2$	A1	Correct unsimplified equation in t
	$20t^2 - 24t + 7 = 0$	M1	Form 3 term quadratic in t
	$(10t - 7)(2t - 1) = 0$	DM1	Solve for t. Dependent on the preceding M1. Must see working if using an incorrect quadratic
	$t = \frac{7}{10}$ or $\frac{1}{2}$	A1	
	Time $= \frac{7}{10} - \frac{1}{2}$	DM1	Correct method to find the time interval. Dependent on the preceding M1
	$= \frac{2}{10}$ h (12 min)	A1	
		(7)	
		(12)	