

Question	Scheme	Marks	AOs
4 (a)	$\overline{OA} = \mathbf{i} + 7\mathbf{j} - 2\mathbf{k}, \overline{OB} = 4\mathbf{i} + 3\mathbf{j} + 3\mathbf{k}, \overline{OC} = 2\mathbf{i} + 10\mathbf{j} + 9\mathbf{k}$		
	$\overline{OD} = \overline{OC} + \overline{BA} = (2\mathbf{i} + 10\mathbf{j} + 9\mathbf{k}) + (-3\mathbf{i} + 4\mathbf{j} - 5\mathbf{k})$ or $\overline{OD} = \overline{OA} + \overline{BC} = (\mathbf{i} + 7\mathbf{j} - 2\mathbf{k}) + (-2\mathbf{i} + 7\mathbf{j} + 6\mathbf{k})$	M1	3.1a
	So $\overline{OD} = -\mathbf{i} + 14\mathbf{j} + 4\mathbf{k}$	A1	1.1b
		(2)	
(b)	$\left\{ \overline{AB} = 3\mathbf{i} - 4\mathbf{j} + 5\mathbf{k} \Rightarrow \right\} \left \overline{AB} \right = \sqrt{(3)^2 + (-4)^2 + (5)^2} \left\{ = \sqrt{50} = 5\sqrt{2} \right\}$	M1	1.1b
	As $\left \overline{AX} \right = 10\sqrt{2}$ then $\left \overline{AX} \right = 2 \left \overline{AB} \right \Rightarrow \overline{AX} = 2 \overline{AB}$		
	$\overline{OX} = \overline{OA} + 2\overline{AB} = (\mathbf{i} + 7\mathbf{j} - 2\mathbf{k}) + 2(3\mathbf{i} - 4\mathbf{j} + 5\mathbf{k})$ or $\overline{OX} = \overline{OB} + \overline{AB} = (4 + 3\mathbf{j} + 3\mathbf{k}) + (3\mathbf{i} - 4\mathbf{j} + 5\mathbf{k})$	M1	3.1a
	So $\overline{OX} = 7\mathbf{i} - \mathbf{j} + 8\mathbf{k}$ only	A1	1.1b
		(3)	

(5 marks)

Question 4 Notes:	
(a)	
M1:	A complete method for finding the position vector of D
A1:	$-\mathbf{i} + 14\mathbf{j} + 4\mathbf{k}$ or $\begin{pmatrix} -1 \\ 14 \\ 4 \end{pmatrix}$
(b)	
M1:	A complete attempt to find $\left \overline{AB} \right $ or $\left \overline{BA} \right $
M1:	A complete process for finding the position vector of X
A1:	$7\mathbf{i} - \mathbf{j} + 8\mathbf{k}$ or $\begin{pmatrix} 7 \\ -1 \\ 8 \end{pmatrix}$