

QUESTION	Answer	MAX	SCORE
1	$[10, -2, 7]$	3	
2	$\mathbf{w} = \mathbf{v} - \mathbf{u}$	4	
3	$x_1 \begin{bmatrix} 3 \\ 0 \\ 4 \end{bmatrix} + x_2 \begin{bmatrix} -1 \\ 2 \\ -2 \end{bmatrix} + x_3 \begin{bmatrix} 4 \\ -5 \\ 1 \end{bmatrix} = \begin{bmatrix} 9 \\ -12 \\ 10 \end{bmatrix}$	4	
4	(a) \mathbf{u} (b) \mathbf{u} and \mathbf{x}	2 2	
5	$\begin{bmatrix} 1 & 0 & 4/5 & 0 \\ 0 & 1 & 7/5 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$	5	
6	$\mathbf{x} = \begin{bmatrix} 2 \\ 0 \\ -2 \\ 0 \end{bmatrix} + a \begin{bmatrix} -3 \\ 1 \\ 0 \\ 0 \end{bmatrix} + b \begin{bmatrix} 1 \\ 0 \\ -5 \\ 1 \end{bmatrix} \quad (a, b \in \mathbb{R})$	5	
7	$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$	5	
8	$\{[-5, -2, 1, 0], [3, 1, 0, 1]\}$	5	
9	Yes, vectors are a basis of their span <input type="checkbox"/> No, they are not <input checked="" type="checkbox"/> Brief reason: the reduced row-echelon form of $[\mathbf{v}_1^T \ \mathbf{v}_2^T \ \mathbf{v}_3^T]$ does not have a pivot in every column; alternatively, observe that $4\mathbf{v}_1 - 3\mathbf{v}_2 - \mathbf{v}_3 = \mathbf{0}$.	5	

TOTAL