

For full credit, you must show all work and circle your final answer.

1 Find the solution set to the following system of equations. (Write it in parametric form.)

$$\begin{array}{rclcl} x_1 & + & 2x_2 & - & 3x_3 & = & 5 \\ 2x_1 & + & x_2 & - & 3x_3 & = & 13 \\ -x_1 & + & x_2 & & & = & -8 \end{array}$$

2 Determine which of the following sets of vectors are linearly independent.

$$(a) \left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \\ 9 \end{bmatrix}, \begin{bmatrix} 8 \\ 9 \\ 0 \\ -3 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} -1 \\ 5 \\ 2 \\ 7 \end{bmatrix} \right\}$$

$$(b) \left\{ \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}, \begin{bmatrix} 7 \\ 9 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 5 \\ 2 \end{bmatrix} \right\}$$

$$(c) \left\{ \begin{bmatrix} 0 \\ 2 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} -3 \\ 1 \\ 4 \\ -4 \end{bmatrix}, \begin{bmatrix} 9 \\ -7 \\ -5 \\ -2 \end{bmatrix}, \right\}$$

3 Write the following vector equation as a matrix equation

$$x_1 \begin{bmatrix} 4 \\ -1 \\ 7 \\ -4 \end{bmatrix} + x_2 \begin{bmatrix} -5 \\ 3 \\ -5 \\ 1 \end{bmatrix} + x_3 \begin{bmatrix} 7 \\ -8 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} 6 \\ -8 \\ 0 \\ -7 \end{bmatrix}$$