Name: _soln_   ID #:_____

Fill in all the gaps

Q1) For the AM $\begin{pmatrix} 1 & 0 & 0 & 3 & 4 & 5 \\ 1 & 1 & 3 & 4 & 6 & 5 \\ 3 & 0 & 2 & 1 & 4 & 1 \\ 0 & 0 & 2 & 1 & 1 & 4 \end{pmatrix}$ the sol is $x = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} -1 \\ -5 \\ 1 \\ 2 \\ 0 \end{pmatrix} + x_5 \begin{pmatrix} -1 \\ -1 \\ 0 \\ -1 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 1 & 0 & 0 & 3 & 4 & 5 \\ 0 & 1 & 3 & 1 & 2 & 0 \\ 0 & 0 & 2 & -8 & -8 & -14 \\ 0 & 0 & 2 & 1 & 1 & 4 \end{pmatrix}$ $\begin{array}{l} row_1 \\ row_2 \to row_2 + (\ -1\ row_1) \\ row_3 \to row_3 + (\ -3\ row_1) \\ row_4 \end{array}$

$\begin{pmatrix} 1 & 0 & 0 & 3 & 4 & 5 \\ 0 & 1 & 3 & 1 & 2 & 0 \\ 0 & 0 & 2 & -8 & -8 & -14 \\ 0 & 0 & 0 & 9 & 9 & 18 \end{pmatrix}$ $\begin{array}{l} row_1 \\ row_2 \\ row_3 \\ row_4 \to row_4 + (\ -1\ row_3) \end{array}$

$\begin{pmatrix} 1 & 0 & 0 & 3 & 4 & 5 \\ 0 & 1 & 3 & 1 & 2 & 0 \\ 0 & 0 & 2 & -8 & -8 & -14 \\ 0 & 0 & 0 & 1 & 1 & 2 \end{pmatrix}$ $\begin{array}{l} row_1 \\ row_2 \\ row_3 \\ row_4 \to \frac{1}{9}\ row_4 \end{array}$

$\begin{pmatrix} 1 & 0 & 0 & 0 & 1 & -1 \\ 0 & 1 & 3 & 0 & 1 & -2 \\ 0 & 0 & 2 & 0 & 0 & 2 \\ 0 & 0 & 0 & 1 & 1 & 2 \end{pmatrix}$ $\begin{array}{l} row_1 \to row_1 + (\ -3\ row_4) \\ row_2 \to row_2 + (\ -1\ row_4) \\ row_3 \to row_3 + (\ 8\ row_4) \\ row_4 \end{array}$

$\begin{pmatrix} 1 & 0 & 0 & 0 & 1 & -1 \\ 0 & 1 & 3 & 0 & 1 & -2 \\ 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 2 \end{pmatrix}$ $\begin{array}{l} row_1 \\ row_2 \\ row_3 \to \frac{1}{2}\ row_3 \\ row_4 \end{array}$

$\begin{pmatrix} 1 & 0 & 0 & 0 & 1 & -1 \\ 0 & 1 & 0 & 0 & 1 & -5 \\ 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 2 \end{pmatrix}$ $\begin{array}{l} row_1 \\ row_2 \to row_2 + (\ -3\ row_3) \\ row_3 \\ row_4 \end{array}$

↑
x_5 free

$x_1 + x_5 = -1$
$x_2 + x_5 = -5$
$x_3 = 1$
$x_4 + x_5 = 2$

$x_1 = -1 - x_5$
$x_2 = -5 - x_5$
$x_3 = 1$
$x_4 = 2 - x_5$
$x_5 = x_5$

Q2) Is {1, 2, 3} in the span of {3, 1, 2} and {1, −4, 2}. You do not need to show arithmetic. You do need to show your set up and explain what you are doing using standard terminology.

$$\begin{bmatrix} 3 & 1 & 1 \\ 1 & -4 & 2 \\ 2 & 2 & 3 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

inconsistent
no solution

{1, 2, 3} is **not** in the span of {3, 1, 2} and {1, −4, 2}