Show ALL your work CAREFULLY.

Let
\[ A = \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{bmatrix}. \]

(a) Solve the homogeneous equation \( Ax = 0 \).

(b) Based on your answer to (a), determine whether the columns of \( A \) are linearly independent? Justify your answer.

(c) Do the columns of \( A \) span \( \mathbb{R}^3 \)? Explain.