Chapter 4- Answers to even problems.

Section 4.3

2. Consider

$$a\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}+b\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}+c\begin{bmatrix}2 & 3\\ 5 & 7\end{bmatrix}+d\begin{bmatrix}1 & 4\\ 6 & 8\end{bmatrix}=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}.$$

This leads to the homogeneous system of linear equations $A\begin{bmatrix}a\\ b\\ c\\ d\end{bmatrix}=\vec{0}$ where

$$A=\begin{bmatrix}1 & 1 & 2 & 1\\ 1 & 2 & 3 & 4\\ 1 & 3 & 5 & 6\\ 1 & 4 & 7 & 8\end{bmatrix}$$

The Gauss-Jordan elimination gives

$$A\Longrightarrow\cdots\Longrightarrow I_4$$

So $\vec{0}$ is the only solution and the matrices are linearly independent.