1. Let $A = \begin{bmatrix} 1 & 3 & 5 \\ -2 & -6 & 7 \end{bmatrix}$

   (a) Find all solutions to the homogeneous system $A\vec{\mathbf{x}} = \vec{\mathbf{0}}$.

   (b) Find all solutions to $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$ where $\vec{\mathbf{b}} = \begin{bmatrix} -3 \\ 9 \end{bmatrix}$.

2. Find all solutions to $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$ where

$$A = \begin{bmatrix} 1 & 2 & 3 & 5 \\ 2 & 4 & 3 & 1 \\ -1 & -2 & -6 & -14 \end{bmatrix} \text{ and } \vec{\mathbf{b}} = \begin{bmatrix} -7 \\ -4 \\ 17 \end{bmatrix}$$

3. Create an example of a matrix A and vector $\vec{\mathbf{b}}$ such that $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$ has infinitely many solutions and $A\vec{\mathbf{x}} = \vec{\mathbf{0}}$ has only the trivial solution.