Linear - Quiz 3

Name: _____

1. (4 points) Let A be a 3×4 matrix with 2 pivot positions. Answer the following and explain (briefly) your reasoning:

   (a) Does $A\mathbf{x} = 0$ have a nontrivial solution?

   (b) Does $A\mathbf{x} = \mathbf{b}$ have at least one solution for every possible $\mathbf{b}$?

2. (4 points) Find the value(s) of h for which the vectors are linearly dependent. Justify (briefly) your answer.

$$\begin{bmatrix} 1 \\ 5 \\ -3 \end{bmatrix}, \begin{bmatrix} -2 \\ -9 \\ 6 \end{bmatrix}, \begin{bmatrix} 3 \\ h \\ -9 \end{bmatrix}$$

3. (2 points) Let T be defined by $T(x) = A\mathbf{x}$, where $A = \begin{bmatrix} 1 & -5 & -7 \\ -3 & 7 & 5 \end{bmatrix}$. Find a vector $\mathbf{x}$ whose image under T is $\mathbf{b} = \begin{bmatrix} 4 \\ 4 \end{bmatrix}$.