Math 54 Quiz 2
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Name: ______________________________

1. True or False? You **must** justify your answer. *(2 points each).*

   (a) If A is a 3×4 matrix whose columns span $\mathbb{R}^3$, then $Ax = 0$ has only the trivial solution.

   (b) If A is a 4×3 matrix, then A has linearly independent columns.

   (c) If $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$ are vectors in $\mathbb{R}^3$ and $\text{Span}\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\} = \mathbb{R}^3$, then $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$ are linearly independent.

   (d) If A is a 2×3 matrix with 2 pivot positions, then there exists a solution to $Ax = b$ for every $b \in \mathbb{R}^2$.

2. Let $v_1 = \begin{pmatrix} 1 \\ 1 \\ -3 \end{pmatrix}, v_2 = \begin{pmatrix} 3 \\ 4 \\ -7 \end{pmatrix}, v_3 = \begin{pmatrix} -5 \\ -8 \\ 9 \end{pmatrix}$, and $b = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}$. Determine if b is in the span of v_1, v_2, v_3. If so, describe in parametric form all the vectors $\begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix}$ such that $c_1 v_1 + c_2 v_2 + c_3 v_3 = b$. *(2 points.)*