

PLEASE WRITE YOUR NAME AT THE BOTTOM OF THE BACK OF THIS SHEET, NOT ON THE FRONT.

1. Mark each of the following as **True** or **False**. You may give reasoning to support your answer, which may give you partial credit. **To show a statement is false, a specific numerical counterexample is generally best!**

(a) The vector $2\mathbf{v}_1 + \sqrt{5}\mathbf{v}_3$ is a linear combination of $\mathbf{v}_1, \mathbf{v}_2$ and \mathbf{v}_3 .

(b) Asking whether the linear system corresponding to an augmented matrix $[\mathbf{a}_1 \ \mathbf{a}_2 \ \mathbf{a}_3 \ \mathbf{b}]$ has a solution amounts to asking whether \mathbf{b} is in $\text{Span}\{\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3\}$.

(c) Whenever a system has free variables, the solution set contains more than one solution.

2. Find the general solution of the system whose augmented matrix is as follows:

$$\begin{pmatrix} 0 & 1 & -6 & 5 \\ 1 & -2 & 7 & -6 \end{pmatrix}$$

3. Is the following matrix in reduced echelon form, echelon form, or neither? Explain!

$$\begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$