MATH 2270: QUIZ 1

1. (2 points) Find the reduced echelon form of the matrix

$$\begin{pmatrix} 1 & 4 & 0 & 7 \\ 2 & 7 & 0 & 10 \end{pmatrix}$$

2. (3 points) Let $\mathbf{u} = \begin{pmatrix} 0 \\ -1 \\ -1 \end{pmatrix}$ and $A = \begin{pmatrix} 3 & -5 \\ -2 & 6 \\ 1 & 1 \end{pmatrix}$. Is $\mathbf{u}$ in the span of the columns of A? Show your work.

3. (1 point each) Short answer (no justification needed).
A) If A is a 3×5 matrix then is the product $A \cdot A$ is defined?

B) If A is row equivalent to the matrix $\begin{pmatrix} 1 & 3 & 2 & 7 \\ 0 & 7 & 3 & 6 \\ 0 & 0 & 3 & 3 \end{pmatrix}$, then the equation $A\mathbf{x} = \mathbf{0}$ has how many solutions? (zero, 1, or infinitely many?)

C) Let $\mathbf{b} = \begin{pmatrix} 3 \\ 5 \\ 7 \end{pmatrix}$ with A as in problem B). Does the equation $A\mathbf{x} = \mathbf{b}$ have at least one solution?

D) If $\mathbf{v} = \begin{pmatrix} 1 \\ 0 \\ -2 \end{pmatrix}$ then span$\{\mathbf{v}\}$ is a set containing infinitely many vectors in $\mathbb{R}^3$. (True/False)

E) If the columns of an $m \times n$ matrix A span $\mathbb{R}^m$, then the equation $A\mathbf{x} = \mathbf{b}$ is consistent for each $\mathbf{b}$ in $\mathbb{R}^m$.