MATH 369 Homework 7

Due: Tuesday March 26, in class.

1. Determine which of the following are subspaces of $\mathbb{R}^3$. If they are a subspace, state this (no work required). If they are not, explain why:
   (a) All vectors of the form $\begin{pmatrix} a \\ b \\ c \end{pmatrix}$ with $b = a + c$.
   (b) All vectors of the form $\begin{pmatrix} a \\ 1 \\ 1 \end{pmatrix}$.
2. Determine which of the following are subspaces of the set of 2×2 matrices. If they are, state this (no work required). If they are not, explain why:
   (a) The set of all 2×2 matrices A such that $Tr(A) = 0$.
   (b) The set of all 2×2 matrices A such that $\det(A) = 0$.
3. Which of the following are linear combinations of

$$\mathbf{u} = \begin{pmatrix} 0 \\ -2 \\ 2 \end{pmatrix} \quad \text{and} \quad \mathbf{v} = \begin{pmatrix} 1 \\ 3 \\ -1 \end{pmatrix}$$

   (a) $\begin{pmatrix} 2 \\ 2 \\ 2 \end{pmatrix}$
   (b) $\begin{pmatrix} 0 \\ 4 \\ 5 \end{pmatrix}$
   (c) $\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$