Quiz #2

Justify all your answers completely (Or with a proof or with a counter example) unless mentioned differently. No step should be a mystery or bring a question. The grader cannot be expected to work his way through a sprawling mess of identities presented without a coherent narrative through line. If he can’t make sense of it in finite time you could lose serious points. Coherent, readable exposition of your work is half the job in mathematics. You will lose serious points if your exposition is messy, incomplete, uses mathematical symbols not adapted...

Problems:

1. Compute the determinant of $A$ by cofactor expansions (choose the rows/columns wisely and start with giving the definition of determinant by cofactor expansion before computing).

$$A = \begin{pmatrix}
1 & -2 & 5 & 2 \\
0 & 0 & 3 & 0 \\
2 & -6 & -7 & 5 \\
5 & 0 & 4 & 4
\end{pmatrix}$$

2. (a) Compute the determinant of $A$ using row reduction (explain each steps of your work).

$$A = \begin{pmatrix}
1 & 5 & -6 \\
-1 & -4 & 4 \\
-2 & -7 & 9
\end{pmatrix}$$

   (b) Give the definition of $A^T$. Determine $det(A^T)$.

   (c) Determine if the row of $A$ are linear independent or not. Justify your answer.

3. Give the definition of a linear map $T : \mathbb{R} \to \mathbb{R}$. Determine whether the map $T : \mathbb{R} \to \mathbb{R}$ sending $x$ to $2x + 3$ is linear or not. (If it is give a full proof. If not give a specific precise counter example.)