5. (6 points) Show that the set of vectors {(1, −3, 2), (2, 1, −3), (−3, 2, 1)} are linearly independent using determinants. Justify your answer.

1 −3 2
2 1 −3
−3 2 1

By the properties of determinants when all 3 rows are independent determinant is not zero, but when dependent it's zero

~~Since determinant is 0 the rows are dependent~~

Using upper triangular form the det is product of diagonal elements

$$\begin{matrix} 1 & -3 & 2 \\ 2 & 1 & -3 \\ -3 & 2 & 1 \end{matrix} \Rightarrow \begin{matrix} 1 & -3 & 2 \\ 0 & 7 & -7 \\ 0 & -7 & 7 \end{matrix} \Rightarrow \begin{matrix} 1 & -3 & 2 \\ 0 & 7 & -7 \\ 0 & 0 & 0 \end{matrix}$$

determinant is $1 \times 7 \times 0 = 0$

Since determinant is 0 the rows are dependent

6. (10 points) TRUE or FALSE. You don't have to justify.

~~True~~ If AB and BA are defined then A and B are square matrices.

False If A is a 2×2 matrix, then $det(2A) = 2det(A)$.

True If the rows of a square matrix A are linearly independent, so are the rows of $A^2 = AA$.

False Any system of linear equations has at most one solution.

False If the entries of both A and A^{-1} are integers, it is possible that $detA = 3$.

$\det A \cdot \det A^{-1} = 1$

$\det A^{-1} = \frac{1}{3}$