Mathematics 227
Review

1. Beginning with a matrix A, we perform the following row operations:

   - row replacement: add 3 times row 1 to row 2.
   - scaling: scale row 3 by $1/4$.
   - interchange: interchange rows 2 and 3
   - row replacement: add -2 times row 2 to row 3.

   and obtain theh matrix $U = \begin{bmatrix} 2 & 1 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & -7 \end{bmatrix}$. What is $\det(A)$?

2. Consider the matrix $A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix} \sim \begin{bmatrix} 1 & -2 & 0 & -1 & 3 \\ 0 & 0 & 1 & 2 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$.

   Nul(A) is a _____-dimensional subspace of $\mathbb{R}$——.

   Col(A) is a _____-dimensional subspace of $\mathbb{R}$——.

   Find a basis for Col(A) and a basis for Nul(A).