Practice #10 - Linear Algebra

1. Let A be the following 2×2 matrix

$$A = \begin{bmatrix} 1 & 3 \\ -1 & 5 \end{bmatrix}$$

(a) What is $\det(A)$?

(b) What is $\det(-3A)$?

(c) Swap rows 1 and 2 of A to get a matrix B. What is the determinant of the matrix B?

(d) Multiply row 2 of A by 5 to get matrix B. What is $\det(B)$?

(e) Carry out a single row operation on A to get an upper triangular matrix B. What is $\det(B)$?

(f) Factorize A as $A = LU$. What would be an easy way to compute $\det(A)$ using this factorization?

2. (Review) Answer the following True/False questions. If your answer is False, explain why.

(a) Let A be a 5×7 matrix and let B be an echelon matrix formed from A. If B has no rows of zeros, the linear system $A\mathbf{x} = \mathbf{b}$ has a unique solution. (T/F)

(b) Let A be a 4×13 matrix with rank 4. The linear system $A\mathbf{x} = \mathbf{b}$ may be inconsistent for some $\mathbf{b}$. (T/F)

(c) Let A be a 13×4 matrix whose column space has dimension 4. Then the linear system $A\mathbf{x} = \mathbf{b}$ has a unique solution. (T/F).