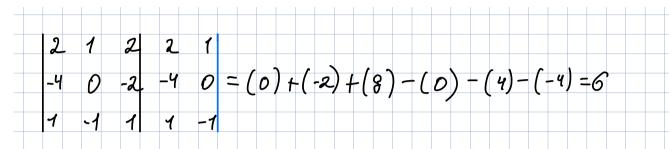
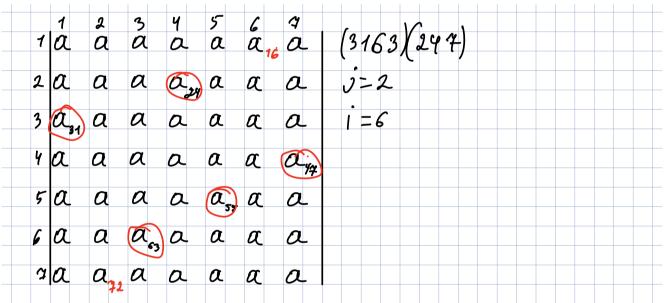
1. (1 point) Using Sarrus' Rule or Triangle Rule, evaluate the following determinant:

$$\left| \begin{array}{ccc} 2 & 1 & 2 \\ -4 & 0 & -2 \\ 1 & -1 & 1 \end{array} \right|.$$



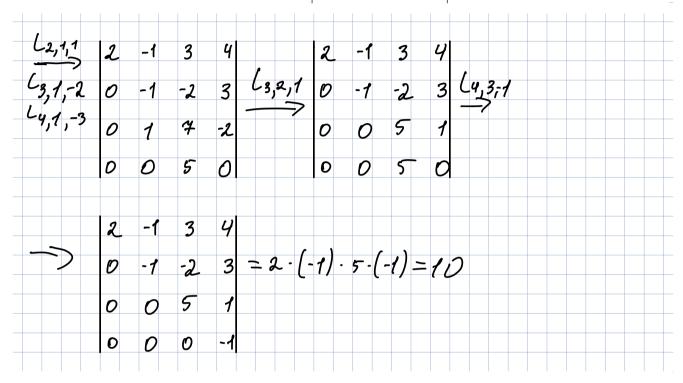
2. (1 point) Choose the values of i and j so that the product $a_{47}a_{63}a_{1i}a_{55}a_{7j}a_{24}a_{31}$ enters into a 7-th order determinant (see Definition 1) with the plus sign.



3. (2 point) Find the value of the determinant of a matrix whose sum of rows is equal to a zero row. [hint: use $l_{r,s,\lambda}(A)$.]

Because $L_{r,s,\lambda}(A)$ doesn't affect IAI and sum of rows gives 0, we can use L to get a zero row, then 1A1=0

4. (2 points) Transforming the matrix into Row Echelon Form, evaluate the following determinant



5. (1 points) Find the value of the following determinant

$$\begin{vmatrix} 0 & 0 & \dots & 0 & 0 & a_{1,n} \\ 0 & 0 & \dots & 0 & a_{2,n-1} & a_{2,n} \\ 0 & 0 & \dots & a_{3,n-2} & a_{3,n-1} & a_{3,n} \\ \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 0 & a_{n-1,2} & \dots & a_{n-1,n-2} & a_{n-1,n-1} & a_{n-1,n} \\ a_{n,1} & a_{n,2} & \dots & a_{n,n-2} & a_{n,n-1} & a_{n,n} \end{vmatrix}$$

[hint: use $t_{r,s}(A)$.]

Consider 2 cases:

$$n\% 2 = 0$$

then we use $t_{r,s}(A)$ until we get an upper

triangular matrix, so $|A| = \alpha_n \cdot \alpha_{n-1} \dots \alpha_2 \cdot \alpha_1$ If $\alpha_n \cdot \alpha_n \cdot \alpha_n$

6. (2 points) For any $n \in \mathbb{N}$, evaluate $\det(A)$, where

$$A = \begin{bmatrix} 1 & 2 & 3 & \dots & n \\ n+1 & n+2 & n+3 & \dots & 2n \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ n^2-n+1 & n^2-n+2 & n^2-n+3 & \dots & n^2 \end{bmatrix}.$$

[hint: take a look at the solution of Problem 6 from Seminar 6, almost the same approach works in this case; do not forget about "small" values of n.]

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