Quiz 13 Determinants II.

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You are given

$$A = \begin{bmatrix} 1 & 2 & 1 & 1 \\ 0 & 2 & 3 & -1 \\ 0 & 0 & 7 & 7 \\ 0 & 0 & 0 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 2 & 1 & 1 \\ 3 & 2 & 0 & -1 \\ 0 & 0 & 0 & 5 \\ 7 & 0 & 0 & 7 \end{bmatrix} \quad \text{and } C = \begin{bmatrix} 4 & 2 & 1 & 1 \\ 8 & 4 & 2 & 2 \\ 13 & 0 & 9 & 7 \\ 17 & 2 & 3 & 5 \end{bmatrix}.$$

Answer the following questions. It is important to use the rules of the determinants rather than straight calculations.

1. Find the determinants of each of A, B, C.

   Answer: The triangular A has determinant 70. B is obtained from A by two swaps, so the same answer. In C, the first two rows are dependent, hence the answer is zero.

2. Which of A, B, C are invertible? Why

   Answer: Due to non zero determinants, A, B are invertible and C is not.