Name Key

Mathematics 1553

Quiz 6
Prof. Margalit
Section HP1 / HP2
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1. Is the following matrix invertible? Why or why not?

$$\begin{pmatrix} 7 & 100 & 107 \\ 8 & 100 & 108 \\ 9 & 100 & 109 \end{pmatrix}$$

No The 3rd col is the linear combination of ~~the~~ 1st col and 2nd col. Therefore the columns of the matrix are not linearly independent, which means the matrix is not invertible.

Is the following matrix invertible? Why or why not?

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 7 & 1 & 0 \\ 8 & 9 & 1 \end{pmatrix}$$

Yes $A^T = \begin{pmatrix} 1 & 7 & 8 \\ 0 & 1 & 9 \\ 0 & 0 & 1 \end{pmatrix}$ which is obviously invertible, as A^T has pivot in every column.

Therefore, A is also invertible.

Is every elementary matrix invertible? Why or why not?

Yes. Elementary matrix represents a row operation, which means one can always undo the operation by multiplying its inverse. So the inverse always exists.