Chapter 7 The inverse of a matrixQ

Answer the following designed questions. These questions are designed in accordance to the subsections as sequentially presented in Ayers. Try to identify the questions below with the corresponding subsection from which these questions are based on as it will definitely help while answering these questions.

1. For the following two questions, please refer to the designed questions (12), (13), (14), in Chapter 5. There, $E_{A\to I_3}A = I_3$. Now, what would you get when if $E_{A\to I_3}$ is operated on I_3 instead of on A? In other words, ask yourself, what is $E_{A\to I_3}I_3$?

2. So, by now, have you learnt how to find the inverse of a matrix? Find A^{-1}, where A is as defined in DQ (12), Chapter 5, $A=\begin{pmatrix}1&3&2\\0&2&0\\5&0&1\end{pmatrix}$.

3. Now carry out the $E_{A\to I_3}A=$ and $E_{A\to I_3}I_3$ operations in a "two-in-one" manner, i.e. if the augmented matrix form. First form the augmented matrix of the form $\left(A\middle|I\right)=\left(\begin{array}{ccc|ccc}1&3&2&1&0&0\\0&2&0&0&1&0\\5&0&1&0&0&1\end{array}\right)$. Carrying out $E_{A\to I_3}$ on both sides to arrive at $\left(I\middle|A^{-1}\right)$.

4. In the designed questions (12), (13), (14) of Chapter 5, you are asked to find a sequence of elementary transformations that transform a generic matrix A into a unit matrix. Now, if A were our old friend $\begin{pmatrix}1&2&3\\4&5&6\\7&8&9\end{pmatrix}$, what would happen if you were to attempt to reduce it into an identity matrix via a sequence of elementary transformations? Explain.

5. Deduce A^{-1}, where A is as defined (2), using $A^{-1}=\text{adj}A/|A|$. Do you get the same answer as in (2) where the inverse is obtained using row reduced echelon form method?