

Q. Find the inverse of the following matrices, if they exist, by elementary transformations:

$$1. \begin{pmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & 2 & -2 \end{pmatrix}$$

$$2. \begin{pmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 3 & -2 & -1 \\ -4 & 1 & -1 \\ 2 & 0 & 1 \end{pmatrix}$$

$$3. \begin{pmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 0 & 1 & -2 \\ -2 & 9 & -23 \\ -1 & 5 & -13 \end{pmatrix}$$

$$4. \begin{pmatrix} 3 & 0 & -1 \\ 2 & 3 & 0 \\ 0 & 4 & 1 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 3 & -4 & 3 \\ -2 & 3 & -2 \\ 8 & -12 & 9 \end{pmatrix}$$

$$5. \begin{pmatrix} 2 & -1 & 4 \\ 4 & 0 & 2 \\ 3 & -2 & 7 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} -2 & 1/2 & 1 \\ 11 & -1 & -6 \\ 4 & -1/2 & -2 \end{pmatrix}$$

$$6. \begin{pmatrix} 5 & 7 & 0 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} -1/30 & 7/30 & 0 \\ 1/6 & -1/6 & 0 \\ -1/18 & 1/18 & 1/3 \end{pmatrix}$$

$$7. \begin{pmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 1 & 1 & 3 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 3/2 & -1/2 & 1/2 \\ -3 & 2 & -1 \\ 1/2 & -1/2 & 1/2 \end{pmatrix}$$

$$8. \begin{pmatrix} 2 & 5 & 3 \\ 3 & 4 & 1 \\ 1 & 6 & 3 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 3/7 & 3/14 & -1/2 \\ -4/7 & 3/14 & 1/2 \\ 1 & -1/2 & -1/2 \end{pmatrix}$$

$$9. \begin{pmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 1 & -2/5 & -3/5 \\ -2/5 & 4/25 & 11/25 \\ -3/5 & 1/25 & 9/25 \end{pmatrix}$$

$$10. \begin{pmatrix} 2 & 3 & 1 \\ 2 & 4 & 7 \\ 3 & 7 & 2 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 41/29 & -1/29 & -17/29 \\ -17/29 & -1/29 & 12/29 \\ -2/29 & 5/29 & -2/29 \end{pmatrix}$$

$$11. \begin{pmatrix} 2 & 5 & 3 \\ 3 & 4 & 1 \\ 1 & 6 & 2 \end{pmatrix} \quad \text{ans.} \quad \begin{pmatrix} 2/21 & 8/21 & -1/3 \\ -5/21 & 1/21 & 1/3 \\ 2/3 & -1/3 & -1/3 \end{pmatrix}$$

12.  $\begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{pmatrix}$

ans.  $\begin{pmatrix} 1/2 & -1/2 & 1/2 \\ -4 & 3 & -1 \\ 5/2 & -3/2 & 1/2 \end{pmatrix}$

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