Key Takeaways

Properties of Inverse of a matrix

If A is a non – singular matrix ,

$(A^{-1})^{-1} = A$

If $A = \text{diag}\,(a_1, a_2, \ldots, a_n)$, then $A^{-1} = \text{diag}\,(a_1^{-1}, a_2^{-1} \ldots\ldots a_n^{-1})$

Proof : $A = \begin{pmatrix} a_1 & 0 & 0 \\ 0 & a_2 & 0 \\ 0 & 0 & a_3 \end{pmatrix}$ $\quad |A| = a_1 \cdot a_2 \cdot a_3 \ , |A| \neq 0 \quad \Rightarrow A^{-1} = \frac{adj\,(A)}{|A|}$

$$\Rightarrow adj\,(A) = \begin{pmatrix} a_2a_3 & 0 & 0 \\ 0 & a_1a_3 & 0 \\ 0 & 0 & a_2a_1 \end{pmatrix} \Rightarrow A^{-1} = \frac{1}{a_1a_2a_3}\begin{pmatrix} a_2a_3 & 0 & 0 \\ 0 & a_1a_3 & 0 \\ 0 & 0 & a_2a_1 \end{pmatrix} \Rightarrow A^{-1} = \begin{pmatrix} \frac{1}{a_1} & 0 & 0 \\ 0 & \frac{1}{a_2} & 0 \\ 0 & 0 & \frac{1}{a_3} \end{pmatrix}$$

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