inverse of a matrix

The general rule:

inverse of a matrix

Let A be an $n \times n$ matrix. It is invertible if if one can find a second $n \times n$ matrix, X, such that the product AX and the product XA both produce the $n \times n$ the identity matrix $I_{n \times n}$.

X is then the inverse of A, denoted by $A^{-1} \implies A \cdot A^{-1} = A^{-1} \cdot A = I$

Let A be an 2×2 matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$. A is invertible if and only if $ad - bc \neq 0$, If it is invertible then

$$A^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

The general rule: $A^{-1} = \frac{1}{|A|} C^T$ where C^T is the transpose of the matrix of cofactors of A.

Each element of C is the cofactor of the corresponding element of A.

inverse of a matrix

exercise 4

Find the inverse of $A = \begin{bmatrix} 3 & 2 \\ -1 & 9 \end{bmatrix}$ if it exists.

more hands on exercises on the inverse during your tutorial