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$$Ax = b$$
$$A^{-1}Ax = A^{-1}b$$
$$Ix = A^{-1}b$$
$$x = A^{-1}b$$

$$y = X\beta$$
$$X'y = (X'X)\beta$$
$$X'y = I\beta$$
$$X'y = \beta$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 9 & 8 & 7 \end{pmatrix} =$$

$35-48=-13 \quad 28-54=26 \quad 32-45=-13$

$14-24=-10 \quad 7-18=-20 \quad 8-12=-10$

$12-15=-3 \quad 6-12=-6 \quad 5-8=-3$

Matrix of minors

$$= \begin{pmatrix} -13 & -26 & -13 \\ -10 & -20 & -10 \\ -3 & -6 & -3 \end{pmatrix}$$

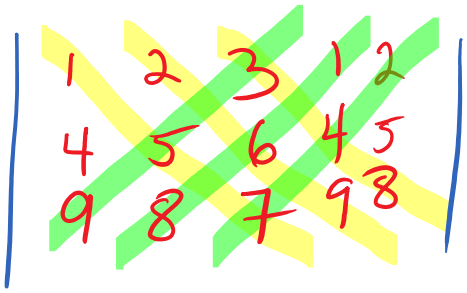
Matrix of Cofactors

$$\begin{matrix} + & - & + \\ - & + & - \\ + & - & + \end{matrix}$$

$$\begin{pmatrix} -13 & 26 & -13 \\ 10 & -20 & 10 \\ -3 & 6 & -3 \end{pmatrix}$$

matrix of minors after applying matrix of Cofactors

$$\begin{pmatrix} -13 & 10 & -3 \\ 26 & -20 & 6 \\ -13 & 10 & -3 \end{pmatrix}$$




$= 1(5)7 + 2(6)9 + 3(4)8 - [9(5)3 + 8(6)1 + 7(4)2]$

$= 239 - [135 + 48 + 56]$

$= 239 - 239 = 0!$

## Final Step

$$\frac{1}{|A|}\begin{pmatrix} -13 & 10 & -3 \\ 26 & -20 & 6 \\ -13 & 10 & -3 \end{pmatrix}$$

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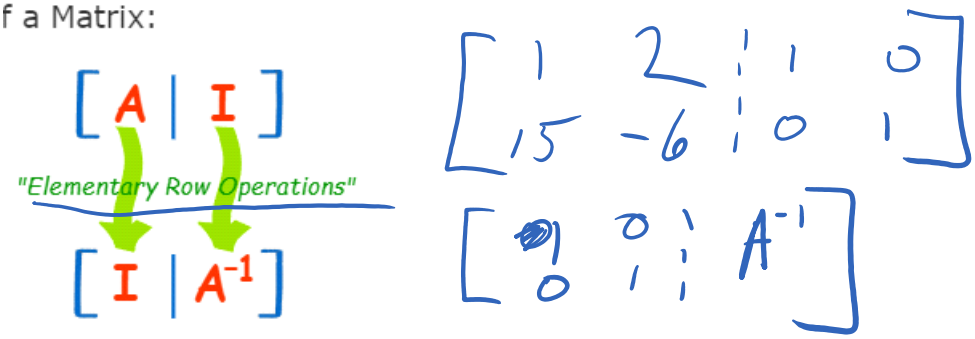
f a Matrix:

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But we can only do these **"Elementary Row Operations"**:

- **swap** rows
- **multiply** or divide each element in a a row by a constant
- replace a row by **adding** or subtracting a multiple of another row to it

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Add row 2 to row 1,

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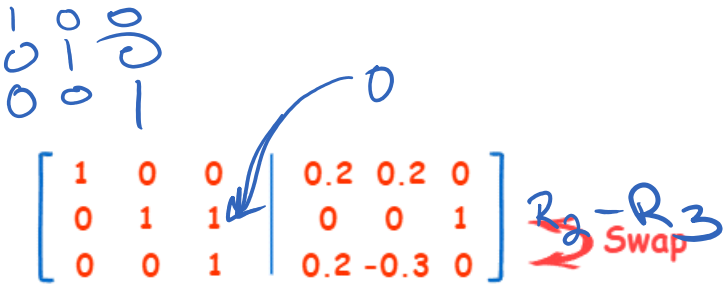


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