|Mij| > delete ith now jth column

1. For each of the following, compute (i) $\frac{\det(A)}{A}$.

(ii) $\frac{\det(A)}{A}$ and (iii) $\frac{A^{-1}}{A^{-1}}$:

(b) $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$

(ii) adj
$$A$$
 and (iii) A^{-1} :
(a) $A = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$ (b) $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$

(c)
$$A = \begin{bmatrix} 3 & -1 \\ 1 & 3 \\ 2 & 1 & 1 \\ -2 & 2 & -1 \end{bmatrix}$$

cofactor
$$A_{ij} = (-1)^{i+j} | M_{ij} |$$

determinant = any row/column
cofactor
expansion

$$adj(A) = \begin{bmatrix} A_{II} & A_{21} & A_{nI} \\ A_{12} & A_{12} & A_{nI} \\ A_{1n} & A_{2n} & A_{nI} \end{bmatrix}$$

$$A^{-1} = \frac{1}{\det(A)} \cdot adj(A)$$

$$A^{-1} = \frac{1}{\det(A)} \cdot adj(A)$$

$$A^{-1} = \frac{1}{\det(A)} \cdot adj(A)$$

$$\frac{\det(A)}{\det(A)} = \underbrace{a_{11} A_{11} + a_{12} A_{12} + ... + a_{10} A_{10}}_{\uparrow}$$

$$A^{-1} = \frac{1}{\det(A)}$$
 adj(A)

$$A_{11} = (-1)^{1+1} |M_{11}| = 1 | 1 | 1 | 2 | 1 | = 1$$

$$A_{21} = (-1)^{2+1} |M_{21}| = 1 | 2 | 1 | = 1$$

$$A_{21} = (-1)^{2+1} |M_{21}| = 1 | 2 | 1 | = 1$$

$$A_{21} = (-1)^{2+1} |M_{21}| = 1 | 2 | 1 | = 1$$

$$A_{21} = (-1)^{2+1} |M_{21}| = 1 | 2 | 1 | = 1$$

$$A_{12} = (-1)^{1+2} |M_{12}| = -1 \cdot \begin{vmatrix} 2 & 1 \\ -2 & -1 \end{vmatrix} = 0 \quad A_{22} = (-1)^{2} |M_{22}| = 1 \cdot \begin{vmatrix} 1 & 1 \\ -2 & -1 \end{vmatrix} = 1 \quad A_{32} = (-1)^{3+2} |M_{32}| = -1 \cdot \begin{vmatrix} 1 & 1 \\ 2 & 1 \end{vmatrix} = 1$$

$$A_{13} = (-1)^{1+3} |M_{13}| = 1 \cdot \begin{vmatrix} 2 & 1 \\ -2 & 2 \end{vmatrix} = 6 \quad A_{23} = (-1)^{1} |M_{23}| = -1 \cdot \begin{vmatrix} 1 & 3 \\ -2 & 2 \end{vmatrix} = -8 \quad A_{33} = (-1)^{1} |M_{23}| = 1 \cdot \begin{vmatrix} 1 & 3 \\ 2 & 1 \end{vmatrix} = -5$$

$$A^{-1} = (-1)^{1} |M_{23}| = 1 \cdot |M_{23}| = -1 \cdot |M_{23}|$$

$$A^{-1} = \begin{bmatrix} -1 & 5/3 & 2/3 \\ 0 & 1/3 & 1/3 \\ 2 & -8/3 & -1/3 \end{bmatrix}$$

$$A^{-1} = \begin{bmatrix} -1 & 5/3 & 2/3 \\ 0 & 1/3 & 1/3 \\ 2 & -8/3 & -1/3 \end{bmatrix}$$

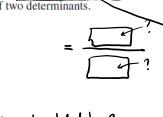
$$A_{32} = (-1) |M_{32}| = -1 |1 \\ 2 \\ 1 = 1$$

$$A^{-1} = \begin{bmatrix} -1 & 5/3 & 2/3 \\ 0 & 1/3 & 1/3 \\ 2 & -8/3 & -1/3 \end{bmatrix}$$

3. Given

$$A = \left(\begin{array}{c|c} 1 & 2 & 1 \\ \hline 0 & 4 & 3 \\ \hline 1 & 2 & 2 \end{array}\right)$$

quotient of two determinants.



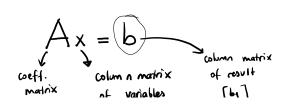
$$|M_{32}| = \begin{vmatrix} 1 & 1 \\ 0 & 3 \end{vmatrix} = 3$$

$$= \frac{1}{\det(A)} \operatorname{det}(A)$$

$$= \begin{bmatrix} A_{11} & A_{21} & A_{31} \\ A_{12} & A_{22} & A_{32} \end{bmatrix} \xrightarrow{\det(A)}$$

$$\frac{1}{1} \int_{-1}^{2} \frac{1}{1} \int_$$

 $det(A) = a_{11} A_{11} + a_{21} A_{21} + a_{31} A_{31} \rightarrow 1^{st} column$ cofactor



>(A-1 exists)

