

$$|A \pm B| \neq |A| \pm |B|$$

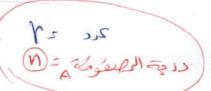
$$|A^n| = (|A|)^n$$

$$|A^{-1}| = \frac{1}{|A|}$$

$$5)|A^t| = |A|$$

7)
$$|I| = 1$$





خواص المعكوس:

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

2)
$$(rA)^{-1} = \frac{1}{r} A^{-1}$$

3)
$$(AB)^{-1} = \mathbb{R}^{-1} A^{-1}$$

4)
$$(A \pm B)^{-1} \neq \hat{A} \pm \hat{B}$$

خواص المنقول:

$$1) (A^T)^T = \bigcap$$

$$2) (rA)^T = \Upsilon \quad A^T$$

3)
$$(AB)^T = \mathcal{F} A^T$$

$$4) (A \pm B)^{T} = A^{T} \pm B^{T}$$

تمرین:عین قیمة β بحیث

$$\left| \frac{\beta - 1}{2} , \frac{1}{\beta} \right| = 0$$

$$\beta(\beta-1) = 2 = 0$$
 $\beta^{2} - \beta - 2 = 0$
 $(\beta-2)(\beta+1) = 0$
 $\beta=2$

تمرین: عین قیمة لم بحیث

$$\begin{vmatrix} \lambda & 4 \\ 1 & \lambda \end{vmatrix} = \begin{vmatrix} 1 & 0 & -3 \\ 2 & \lambda & -6 \\ 1 & 3 & \lambda - 5 \end{vmatrix}$$

$$\begin{vmatrix} \lambda & 4 \\ 1 & 3 & \lambda - 5 \end{vmatrix}$$

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$$\begin{vmatrix} \lambda & 1 \\ 1 & 3 & \lambda - 5 \end{vmatrix}$$

$$\begin{vmatrix} \lambda^{2} - 4 \\ 1 & 3 & \lambda - 5 \end{vmatrix}$$

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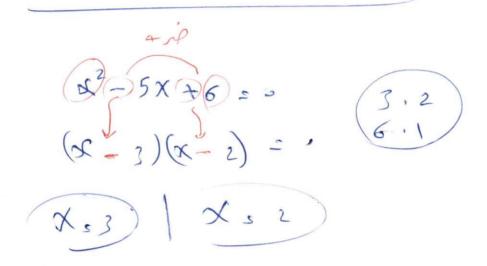
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$$\begin{vmatrix} \lambda^{2} -$$

توهيج



$$(x+8)(x-1) = 0$$

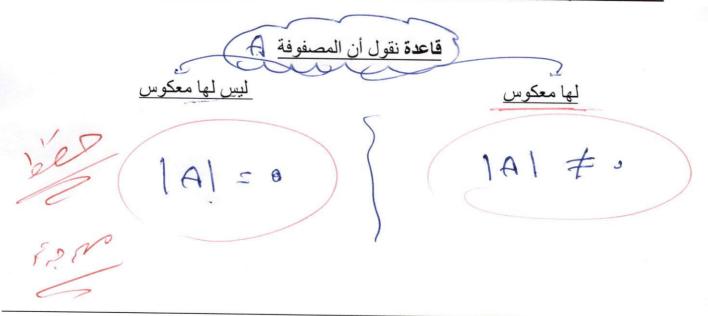
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الالكانت مصفوفة من الدرجة (A) = 2 و كان (A) = 2 فاحسب (A) = 2 و كان (

<u>تمرين</u>:

 $|B^{t}| = 4 \quad \text{o} \quad \det(A) = 2 \quad \text{o} \quad \det(2A^{-2}(BA^{t})^{-1})$ $|A^{-1}| \quad \text{o} \quad \det(2A^{-2}(BA^{t})^{-1})$ $|A^{-1}| \quad \text{o} \quad \det(2A^{-2}(BA^{t})^{-1})$ $|A^{-1}| \quad \text{o} \quad \text{o}$



تمرين: إذا كانت المصفوفة

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & a \\ -1 & a^3 & 16 \end{bmatrix}$$

A = \begin{align*} 1 & 0 & 0 \\ 1 & 1 & a \\ -1 & a^3 & 16 \end{align*}

أوجد قيمة (6) التي تجعل المصفوفة اليس لها معكوس المحكوس المح

|A| = 0 |A|

 $+1 \begin{vmatrix} a & a & b \\ a & 16 \end{vmatrix} = 0$ $\begin{vmatrix} a & c & c \\ a & c & c \\ a & c & c \end{vmatrix}$ $\begin{vmatrix} a & c & c \\ a & c & c \\ a & c & c \end{vmatrix}$

أو جد قيم الثابت a الذي يحقق

$$\begin{vmatrix} 2 & 1 & 0 \\ 0 & -1 & 3 \\ 0 & 1 & a \end{vmatrix} + \begin{vmatrix} 0 & a & 1 \\ 1 & 3a & 0 \\ -2 & a & 2 \end{vmatrix} = 6.$$

$$-2a - 6 + 4 + 4a = 6$$

$$3a = 6 + 6$$

$$3a = 12$$

المصفوفة المرافقة

Adjoint Matrix

$$A = \begin{bmatrix} a & d \\ b & c \end{bmatrix}$$



$$adj(A) = \begin{bmatrix} e - d \\ -b & a \end{bmatrix}$$

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

$$C_{11} = + \begin{vmatrix} a_{12} & a_{13} \\ a_{32} & a_{13} \end{vmatrix}$$

$$C_{12} = -\begin{vmatrix} a_{11} & a_{13} \\ a_{21} & a_{23} \end{vmatrix}$$

$$C_{12} = + \begin{vmatrix} c_{12} & c_{13} & c_{13} \\ c_{22} & c_{23} & c_{23} & c_{23} \end{vmatrix}$$

$$C_{21} = + \begin{vmatrix} c_{22} & c_{23} & c_{23} & c_{23} \\ c_{23} & c_{23} & c_{23} & c_{23} & c_{23} & c_{23} \\ c_{23} & c_{23} \\ c_{23} & c_{23} \\ c_{23} & c_{23} \\ c_{23} & c_{23}$$

adj A, adj B تمرين: أوجد

$$A = \begin{bmatrix} 1 & -3 \\ 6 & -5 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & -1 & 2 \\ 2 & -1 & 3 \\ 1 & 1 & 2 \end{bmatrix}$$

gar 1)

$$C_{11} = + \begin{vmatrix} -1 & 3 \\ 1 & 2 \end{vmatrix} \qquad C_{12} = - \begin{vmatrix} 2 & 3 \\ 1 & 2 \end{vmatrix} \qquad C_{13} = + \begin{vmatrix} 2 & -1 \\ 1 & 2 \end{vmatrix}$$

$$= + (2+1)$$

$$= -(-2-3)$$

$$= -(-2-2)$$

$$= + (2-2)$$

$$= + (2-2)$$

$$= -(1+1)$$

$$= (-3+2)$$

$$= -(3-4)$$

$$= -(3-4)$$

$$= -(3-4)$$

$$= -(1+2)$$

$$= -(3-4)$$

$$C = \begin{bmatrix} -5 - 13 \\ 4 & 0 - 2 \\ -1 & 1 & 1 \end{bmatrix}$$
 => $ali(A) = \begin{bmatrix} -5 & 4 - 17 \\ -1 & 0 & 1 \\ 3 - 2 & 1 \end{bmatrix}$

$$A^{-1} = \frac{1}{|A|} \text{ adj } A$$



نستنتج

$$\operatorname{adj} A = |A| A$$

$$A \text{ adj } A = A T$$

اوجد معكوس المصفوفة A (باستخدام ال adj

$$A = \begin{bmatrix} -3 & 6 \\ -2 & 3 \end{bmatrix}$$

$$\vec{A}' = \frac{1}{101} dj(A)$$

$$A = \frac{1}{1A1} ab J(A)$$

$$= \frac{1}{\begin{vmatrix} -36 \\ -23 \end{vmatrix}} \cdot \begin{bmatrix} 3-6 \\ 2-3 \end{bmatrix} = \frac{1}{-9+12} \begin{bmatrix} 3-6 \\ 2-3 \end{bmatrix} = \frac{1}{2} \begin{bmatrix} 3-6 \\ 2-3 \end{bmatrix} = \begin{bmatrix} 1-1 \\ 2 \\ 3-1 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 2 & -2 \\ 2 & 2 & -1 \end{bmatrix}$$

. adj(A) احسب (أ

ب) احسب ا- A باستخدام (أ).

تمرين: إذاكانت A مصفوفة من الدرجة ع وكان det A = -2 فاحسب قيمة

|A|=3, |B|=2 ليكن كل من A, B مصفوفة من درجة (3×3) بحيث A, B

 $|2B^TA^2adj(A)B^{-2}|$

$$|2B^{T}A^{2} \text{ alj'(A)} B^{2}|$$

$$= |2B^{T}A^{2} |A| A^{T} B^{2}|$$

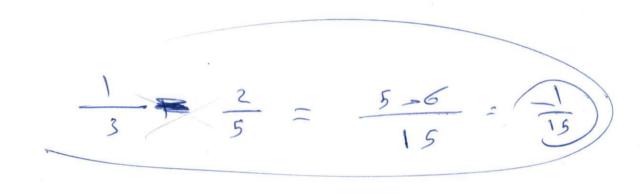
$$= |2B^{T}A^{2} |A| A^{T} B^{2}|$$

$$= |2B^{T}A^{2} |A| A^{T} B^{2}|$$

$$= |2B^{T}A^{2} |A^{2} |A| A^{T} B^{2}|$$

$$= |2B^{T}A^{2} |A^{2} |A^{$$

ABO MOHANNAD/0509891763/0542243219 math 140/150/106/111/151/200/244/204/sta324 Page 16



$$\frac{1}{3} - \frac{2}{3} = \frac{-1}{3}$$

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

$$A : \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$$

$$A : \begin{bmatrix} 1 & -2 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$$

$$A : \begin{bmatrix} 1 & -2 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

$$A : \begin{bmatrix} 1 & -2 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

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$$A : \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

Elècies (, B, A

AB = C

B modelist

Basis

ا دراه

 $A \quad B \quad B = C \quad B$

A = C8