

PAKET I Matriks

NAMA :

Kelas :

No. Absen :

1. Diketahui matriks $M = \begin{bmatrix} 2 & 5a + b \\ 4 & 5 \end{bmatrix}$ dan $B = \begin{bmatrix} 2 & 7 \\ 4 & b + 3 \end{bmatrix}$. Jika $M = B$, tentukan nilai $a \times b$!

Jawab:

- $M = B \rightarrow \begin{bmatrix} 2 & 5a + b \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 2 & 7 \\ 4 & b + 3 \end{bmatrix}$
- $5a + b = \dots$
- $b + 3 = \dots \rightarrow b = \dots - 3 \rightarrow b = \dots$
- $5a + b = \dots, \rightarrow 5a + \dots = \dots \rightarrow 5a = \dots + \dots \rightarrow 5a = \dots$
 $\rightarrow a = \dots / \dots \rightarrow a = \dots$
- $a = \dots, b = \dots \rightarrow a \times b = \dots \times \dots = \dots$

2. Tentukan invers dari matriks $D = \begin{bmatrix} 3 & -6 \\ -7 & 11 \end{bmatrix}$

Jawab:

- $\det D = \begin{vmatrix} 3 & -6 \\ -7 & 11 \end{vmatrix} = 3(\dots) - (-7)(\dots) = \dots - \dots = \dots$
- $D^{-1} = \frac{1}{\det A} \begin{bmatrix} 11 & \dots \\ \dots & 3 \end{bmatrix}$
 $= \frac{1}{\dots} \begin{bmatrix} 11 & \dots \\ \dots & 3 \end{bmatrix}$
 $= \begin{bmatrix} \frac{11}{\dots} & -\frac{\dots}{\dots} \\ \dots & \frac{3}{\dots} \end{bmatrix}$

$$= \begin{bmatrix} \frac{11}{\dots} & -\dots \\ \dots & \dots \\ -\dots & -\dots \\ \dots & \dots \end{bmatrix}$$

3. Diketahui matriks $A = \begin{bmatrix} -3 & 4 & 2 \\ 2 & 1 & 3 \\ 1 & 0 & -1 \end{bmatrix}$ Tentukan nilai determinan matriks A .

Jawab:

$$\det A = \begin{vmatrix} -3 & 4 & 2 \\ 2 & 1 & 3 \\ 1 & 0 & -1 \end{vmatrix} \begin{matrix} \dots & \dots \\ \dots & \dots \\ \dots & \dots \end{matrix}$$

$$= (-3 \times \dots \times \dots) + (\dots \times \dots \times \dots) + (\dots \times \dots \times \dots) - (\dots \times \dots \times \dots) - (\dots \times \dots \times \dots) - (\dots \times \dots \times \dots)$$

$$= (\dots + \dots + \dots - \dots - \dots - \dots) = \dots$$

Jadi, nilai determinan matriks A adalah

4. Tuliskan SPLDV berikut dalam bentuk matriks, lalu cari nilai (x, y) invers matriks !
- $$\begin{cases} 3x + y = 6 \\ 5x + 2y = 11 \end{cases}$$

Jawab:

- $\begin{cases} 3x + y = 6 \\ 5x + 2y = 11 \end{cases}$

- $\begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 6 \\ 11 \end{pmatrix}$

$$\rightarrow AX = B \rightarrow X = A^{-1} \cdot B$$

Misalnya: $A = \begin{pmatrix} 3 & \dots \\ 5 & \dots \end{pmatrix}$, $x = \begin{pmatrix} x \\ \dots \end{pmatrix}$, $B = \begin{pmatrix} 6 \\ \dots \end{pmatrix}$

- Kita cari dulu invers matriks A, rumusnya:

$$A^{-1} = \frac{1}{\det A} \begin{pmatrix} \dots & \dots \\ -5 & 3 \end{pmatrix}$$

$$\det A = \dots \times \dots - \dots \times \dots = \dots - \dots = \dots$$

$$A^{-1} = \frac{1}{\det A} \begin{pmatrix} \dots & \dots \\ -5 & 3 \end{pmatrix} = \frac{1}{\dots} \begin{pmatrix} \dots & \dots \\ -5 & 3 \end{pmatrix} = \begin{pmatrix} \dots & \dots \\ -5 & 3 \end{pmatrix}$$

- $X = A^{-1}B$

$$\begin{aligned} \begin{pmatrix} x \\ y \end{pmatrix} &= \begin{pmatrix} \dots & \dots \\ -5 & 3 \end{pmatrix} \begin{pmatrix} 6 \\ \dots \end{pmatrix} \\ &= \begin{pmatrix} \dots \times 6 + \dots \times \dots \\ -5 \times \dots + 3 \times \dots \end{pmatrix} \\ &= \begin{pmatrix} \dots + \dots \\ \dots + \dots \end{pmatrix} \\ &= \begin{pmatrix} \dots \\ \dots \end{pmatrix} \end{aligned}$$

Jadi nilai $x = \dots$ dan $y = \dots$