

☐ 1. tentukan mana yang merupakan matriks elementer?

☐  $\begin{bmatrix} -5 & 1 \\ 1 & 0 \end{bmatrix}$  termasuk matriks elementer karena matriks tersebut memperoleh matriks identitas.

☐  $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$  Bukan matriks elementer karena matriks tersebut tidak memperoleh matriks identitas.

☐ 2. tentukan Sistem persamaan linear berikut dengan Invers Matriks

☐ (Gunakan rumus  $\mathbf{u} = \mathbf{A}^{-1} \mathbf{b}$ )

☐ 
$$\begin{aligned} u + y + z &= 5 \\ u + y - 4z &= 10 \\ -4u + y + z &= 3 \end{aligned} \quad \mathbf{A} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & -4 \\ -4 & 1 & 1 \end{bmatrix} \quad \mathbf{B} = \begin{bmatrix} 5 \\ 10 \\ 3 \end{bmatrix}$$

☐ 
$$\left[ \begin{array}{ccc|ccc} 1 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & -4 & 0 & 1 & 0 \\ -4 & 1 & 1 & 0 & 0 & 1 \end{array} \right] \quad \mathbf{B}_2 - \mathbf{B}_1, \quad \left[ \begin{array}{ccc|ccc} 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & -5 & -1 & 1 & 0 \\ -4 & 1 & 1 & 0 & 0 & 1 \end{array} \right] \quad \mathbf{B}_3 + 4\mathbf{B}_1$$

☐ 
$$\left[ \begin{array}{ccc|ccc} 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & -5 & -1 & 1 & 0 \\ 0 & 5 & 5 & 4 & 0 & 1 \end{array} \right] \quad \text{Swap Row } \mathbf{B}_2 \rightarrow \mathbf{B}_3 \quad \left[ \begin{array}{ccc|ccc} 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 5 & 5 & 4 & 0 & 1 \\ 0 & 0 & -5 & -1 & 1 & 0 \end{array} \right] \quad \mathbf{B}_2 / 5$$



No. \_\_\_\_\_

Date: \_\_\_\_\_

$$B_1 - 1B_2 \quad \left[ \begin{array}{ccc|ccc} 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 4/5 & 0 & 1/5 \\ 0 & 0 & -5 & -1 & 1 & 0 \end{array} \right] \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & 1/5 & 0 & -1/5 \\ 0 & 1 & 1 & 4/5 & 0 & 1/5 \\ 0 & 0 & -5 & -1 & 1 & 0 \end{array} \right] \quad B_3 \times 1/5$$

$$B_2 - 1B_3 \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & 1/5 & 0 & -1/5 \\ 0 & 1 & 1 & 4/5 & 0 & 1/5 \\ 0 & 0 & 1 & 1/5 & 0 & 0 \end{array} \right] \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & 1/5 & 0 & -1/5 \\ 0 & 1 & 0 & 3/5 & 1/5 & 1/5 \\ 0 & 0 & 1 & 1/5 & 0 & 0 \end{array} \right]$$

$$A^{-1} \left[ \begin{array}{ccc|ccc} 1 & 1 & 5 & 0 & -1/5 & 1/5 \\ -3/5 & 1/5 & 1/5 & 1/5 & 0 & 1/5 \\ 1/5 & -1/5 & 0 & 1/5 & 1/5 & 0 \end{array} \right] \quad A^{-1}B \quad \left[ \begin{array}{ccc|ccc} 1/5 & 0 & -1/5 & 5 & 2/5 & 1/5 \\ 3/5 & 1/5 & 1/5 & 10 & 28/3 & 1/5 \\ 1/5 & -1/5 & 0 & 3 & -1 & 0 \end{array} \right]$$

$$A = \left[ \begin{array}{ccc|ccc} -6 & 0 & 0 & 1 & 0 & 0 \\ 0 & 3 & 0 & 0 & 1 & 0 \\ 0 & 0 & 5 & 0 & 0 & 1 \end{array} \right] \quad B_1 \times -6 \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & -1/6 & 0 & 0 \\ 0 & 3 & 0 & 0 & 1 & 0 \\ 0 & 0 & 5 & 0 & 0 & 1 \end{array} \right] \quad B_2 \times 1/3 \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & -1/6 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1/3 & 0 \\ 0 & 0 & 5 & 0 & 0 & 1 \end{array} \right] \rightarrow A^{-1} \quad \left[ \begin{array}{ccc|ccc} -1/6 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/5 \end{array} \right]$$

$$A = \left[ \begin{array}{ccc|ccc} 1/2 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1/2 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1/4 & 0 & 0 & 1 \end{array} \right] \quad B_1 \times 1/2 \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & 2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 & 4 \end{array} \right] \quad B_3 \times 1/4 \quad \left[ \begin{array}{ccc|ccc} 1 & 0 & 0 & 2 & 0 & 0 \\ 0 & 1 & 0 & 0 & 2 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array} \right] \rightarrow A^{-1} \quad \left[ \begin{array}{ccc|ccc} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{array} \right]$$



$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix} \rightarrow A^{-1} = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix}$$

$A^{-k} = \text{misal } k=1$

$$A = \begin{bmatrix} -6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix} \begin{array}{l} B_1 / \frac{1}{6} \\ B_2 / 3 \\ B_3 / 5 \end{array} \rightarrow A^{-1} = \begin{bmatrix} -\frac{1}{6} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$$

$$\begin{bmatrix} -\frac{1}{6} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$$

$$A = \begin{bmatrix} -6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix} \begin{array}{l} B_1 / \frac{1}{2} \\ B_2 / \frac{1}{3} \\ B_3 / \frac{1}{4} \end{array} \rightarrow A^{-1} = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix}$$

$$A = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix} \begin{array}{l} B_1 / \frac{1}{2} \\ B_2 / \frac{1}{3} \\ B_3 / \frac{1}{4} \end{array} \rightarrow A^{-1} = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

3.

Operasi matrik 1-4 dapat dibalik?

$$1. \begin{bmatrix} 2 & 0 \\ 0 & -5 \end{bmatrix} \checkmark$$

$$2. \begin{bmatrix} 9 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 5 \end{bmatrix}$$

$$3. \begin{bmatrix} -1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & \frac{1}{3} \end{bmatrix} \checkmark$$

$$4. \begin{bmatrix} -1 & 0 & 0 & 0 \\ 6 & 3 & 0 & 0 \\ 0 & 0 & -3 & 0 \\ 6 & 0 & 0 & 0 \end{bmatrix} \checkmark$$



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☐ A Tentukan  $A^2$ ,  $A^{-2}$ ,  $A^{-k}$  (dimana k bilangan bulat)

$$A = \begin{bmatrix} -6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix}$$

$$B = \begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix}$$

$$A^{-2} \begin{bmatrix} -6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix} \begin{bmatrix} -6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix} = \begin{bmatrix} 36 & 0 & 0 \\ 0 & 9 & 0 \\ 0 & 0 & 25 \end{bmatrix} = A$$

$$A^{-2} \begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix} \begin{bmatrix} 1/4 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix} = \begin{bmatrix} 1/4 & 0 & 0 \\ 0 & 1/9 & 0 \\ 0 & 0 & 1/6 \end{bmatrix}$$