$x \times \frac{1}{x} = 1$ — unit

main x inverse of x

একক ম্যাট্রিক্স $= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I_3$

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I_2$

$A A^{-1} = I_3$

3×3 3×3 3×3

type - 3

$$\begin{vmatrix} 2 & a & c \\ 1 & 2 & 3 \\ 4 & 7 & 8 \end{vmatrix} = 2(2\times 8 - 3\times 7) \rightarrow \text{বিস্তার,}$$

4. i) $\begin{vmatrix} 1 & x-a & y-b \\ 1 & x_1-a & y_1-b \\ 1 & x_2-a & y_2-b \end{vmatrix}$

$$\Rightarrow \begin{vmatrix} 1 & x & y-b \\ 1 & x_1 & y_1-b \\ 1 & x_2 & y_2-b \end{vmatrix} + \begin{vmatrix} 1 & -a & y-b \\ 1 & -a & y_1-b \\ 1 & -a & y_2-b \end{vmatrix}$$

$$\Rightarrow \begin{vmatrix} 1 & x & y \\ 1 & x_1 & y_1 \\ 1 & x_2 & y_2 \end{vmatrix} + \begin{vmatrix} 1 & x & -b \\ 1 & x_1 & -b \\ 1 & x_2 & -b \end{vmatrix} - a \begin{vmatrix} 1 & 1 & y-b \\ 1 & 1 & y_1-b \\ 1 & 1 & y_2-b \end{vmatrix}$$

$$\Rightarrow \begin{vmatrix} 1 & x & y \\ 1 & x_1 & y_1 \\ 1 & x_2 & y_2 \end{vmatrix} - b \begin{vmatrix} 1 & x & 1 \\ 1 & x_1 & 1 \\ 1 & x_2 & 1 \end{vmatrix} - a \times 0$$

$$= \begin{vmatrix} 1 & x & y \\ 1 & x_1 & y_1 \\ 1 & x_2 & y_2 \end{vmatrix} -b \times 0 - 0 \longrightarrow 0$$

Ans:

ii) $$\begin{vmatrix} 1 & bc & bc(b+c) \\ 1 & ca & ca(a+c) \\ 1 & ab & ab(a+b) \end{vmatrix}$$

$$= \frac{1}{abc}\begin{vmatrix} a & abc & abc(b+c) \\ b & abc & abc(a+c) \\ c & abc & abc(a+b) \end{vmatrix}$$

$$= \frac{abc \times a\cancel{b}c}{a\cancel{b}c}\begin{vmatrix} a & 1 & b+c \\ b & 1 & a+c \\ c & 1 & a+b \end{vmatrix}$$

$$= abc \begin{vmatrix} a & 1 & b+c \\ b & 1 & c+a \\ c & 1 & a+b \end{vmatrix} \rightarrow \text{Prove}$$

$$C_1' = C_1 + C_3$$

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

$$= abc(a+b+c) \begin{vmatrix} 1 & 1 & b+c \\ 1 & 1 & c+a \\ 1 & 1 & a+b \end{vmatrix}$$

$$= abc(a+b+c) \times 0 = 0 \quad \text{(Proved)}$$

Inverse matrix হওয়ার শর্ত:

1. Square matrix

2. নির্ণায়ক 0 হওয়া যাবে না

5. i)

type - VI

$$a_1 x + b_1 y + c_1 z = d_1$$

$$a_2 x + b_2 y + e_2 z = d_2$$

$$a_3 x + b_3 y + e_3 z = d_3$$

$$D = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} =$$

$$D_x = \begin{vmatrix} d_1 & b_1 & c_1 \\ d_2 & b_2 & c_2 \\ d_3 & b_3 & c_3 \end{vmatrix}$$

$$D_y = \begin{vmatrix} a_1 & d_1 & c_1 \\ a_2 & d_2 & c_2 \\ a_3 & d_3 & c_3 \end{vmatrix}$$

$$D_z = \begin{vmatrix} a_1 & b_1 & d_1 \\ a_2 & b_2 & d_2 \\ a_3 & b_3 & d_3 \end{vmatrix}$$

$$x = \frac{D_x}{D}$$

$$y = \frac{D_y}{D}$$

$$z = \frac{D_z}{D}$$

11. iii)

$$4x - y + 4z = 12$$
$$2x + 3y + 8z = 12$$
$$6x + 5y + 12z = 24$$

$$D = \begin{vmatrix} 4 & -1 & 4 \\ 2 & 3 & 8 \\ 6 & 5 & 12 \end{vmatrix} \qquad D_x = \begin{vmatrix} 12 & -1 & 4 \\ 12 & 3 & 8 \\ 24 & 5 & 12 \end{vmatrix}$$

$$D_y = \begin{vmatrix} 4 & 12 & 4 \\ 2 & 12 & 8 \\ 6 & 24 & 12 \end{vmatrix} \qquad D_z = \begin{vmatrix} 4 & -1 & 12 \\ 2 & 3 & 12 \\ 6 & 5 & 26 \end{vmatrix}$$

$$x = \frac{D_x}{D}, \quad y = \frac{D_y}{D}, \quad z = \frac{D_z}{D}$$