

Equality of matrix

$$\textcircled{1} \text{ Given } \begin{bmatrix} 3 & x+1 \\ y & 5 \end{bmatrix} = \begin{bmatrix} x-1 & 5 \\ x-3y & 5 \end{bmatrix}$$

then $x = ?$ & $y = ?$

→ According to equality -

$$\therefore 3 = x - 1$$

$$\therefore x - 1 = 3$$

$$\therefore x = 3 + 1$$

$$\therefore x = 4$$

and, $y = x - 3y$

$$\therefore y + 3y = x$$

$$\therefore 4y = x$$

$$\therefore y = \frac{x}{4}$$

$$\therefore y = \frac{4}{4} = 1$$

$$\therefore x = 4 \text{ \& } y = 1 \quad \checkmark$$

$$(2) \text{ If } \begin{bmatrix} 2x-y & 5 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 3 & -2 \end{bmatrix} \text{ then}$$

find $x = ?$ & $y = ?$

$$\rightarrow \therefore 2x - y = 6 \quad \& \quad y = -2$$

$$\text{So, } 2x - (-2) = 6$$

$$\therefore 2x + 2 = 6$$

$$\therefore 2x = 6 - 2$$

$$\therefore 2x = 4$$

$$\therefore x = 4/2 = 2$$

$$\therefore x = 2$$

$$\therefore x = 2 \quad \& \quad y = -2 \quad \star$$

$$\textcircled{3} \text{ If } \begin{bmatrix} x+4 & x+3y \\ z+1 & 3t-4 \end{bmatrix} = \begin{bmatrix} 0 & 8 \\ 2 & 1 \end{bmatrix} \text{ then}$$

$$x, y, z, t = ?$$



$$\therefore x+4=0$$

$$\therefore x = -4 \text{ A}$$

$$\therefore x+3y=8$$

$$\therefore 3y = 8 - x$$

$$\therefore 3y = 8 - (-4)$$

$$\therefore 3y = 8 + 4 = 12$$

$$\therefore y = 12/3 = 4 \text{ A}$$

$$\therefore z+1=2$$

$$\therefore z = 2-1$$

$$\therefore z = 1 \text{ A}$$

$$\therefore 3t-4=1$$

$$\therefore 3t = 1+4$$

$$\therefore 3t = 5$$

$$\therefore t = 5/3 \text{ A}$$

$$\textcircled{4} \text{ If } \begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

then find a, b, c, d

$$\rightarrow \therefore a-b = -1$$

$$\therefore a = b - 1$$

$$\therefore a = 2a - 1$$

$$\therefore a - 2a = -1$$

$$\therefore -a = -1$$

$$\therefore \underline{\underline{a = 1}}$$

$$\therefore 2a + c = 5$$

$$\therefore 2 \times 1 + c = 5$$

$$\therefore c = 5 - 2$$

$$\therefore \underline{\underline{c = 3}}$$

$$\therefore 2a - b = 0$$

$$\therefore 2a = b$$

$$\therefore b = 2a$$

$$\therefore b = 2 \times 1$$

$$\therefore \underline{\underline{b = 2}}$$

$$\therefore 3c + d = 13$$

$$\therefore 3 \times 3 + d = 13$$

$$\therefore 9 + d = 13$$

$$\therefore d = 13 - 9$$

$$\therefore \underline{\underline{d = 4}}$$

⑤

$$\text{If } 3 \begin{bmatrix} x & y \\ z & t \end{bmatrix} = \begin{bmatrix} 4 & 3 \\ 5 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 6 \\ 4 & 12 \end{bmatrix}$$

then $(x, y, z, t) = ?$

→ Given;

$$3 \begin{bmatrix} x & y \\ z & t \end{bmatrix} = \begin{bmatrix} 4 & 3 \\ 5 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 6 \\ 4 & 12 \end{bmatrix}$$

$$\begin{bmatrix} 3x & 3y \\ 3z & 3t \end{bmatrix} = \begin{bmatrix} 6 & 9 \\ 9 & 12 \end{bmatrix}$$

$$\therefore 3x = 6 \Rightarrow x = 6/3 = 2$$

$$\therefore 3y = 9 \Rightarrow y = 9/3 = 3$$

$$\therefore 3z = 9 \Rightarrow z = 9/3 = 3$$

$$\therefore 3t = 12 \Rightarrow t = 12/3 = 4$$

$$\therefore (x, y, z, t) = (2, 3, 3, 4) \text{ A}$$

6

Find the value of x, y

$$\text{If } \begin{bmatrix} x+y & 3 \\ 2 & x-1 \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ 2 & 1 \end{bmatrix}$$

$$\rightarrow \therefore x+y=5$$

$$\therefore 2+y=5$$

$$\therefore y=5-2$$

$$\therefore y=3$$

$$\therefore x-1=1$$

$$\therefore x=1+1$$

$$\therefore x=2$$

$$\therefore x=2 \text{ \& } y=3 \text{ } \star$$

(7)

Find the value of x, y, z & a

$$\text{if } \begin{bmatrix} x+3 & 2y+x \\ z-1 & 4a-6 \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2a \end{bmatrix}$$

$$\rightarrow \therefore x+3=0$$

$$\therefore x = -3 \text{ A}$$

$$\therefore 2y+x = -7$$

$$\therefore 2y + (-3) = -7$$

$$\therefore 2y - 3 = -7$$

$$\therefore 2y = 3 - 7$$

$$\therefore 2y = -4$$

$$\therefore y = -\frac{4}{2} = -2 \text{ A}$$

$$\therefore z-1=3$$

$$\therefore z = 3+1$$

$$\therefore z = 4 \text{ A}$$

$$\therefore 4a-6=2a$$

$$\therefore 4a-2a=6$$

$$\therefore 2a=6$$

$$\therefore a = 6/2$$

$$\therefore a = 3 \text{ A}$$

⑧

Find the value of a & b

$$\text{if } \begin{bmatrix} a+b & 1 \\ -5 & ab \end{bmatrix} = \begin{bmatrix} 10 & 1 \\ -5 & 16 \end{bmatrix}$$

$$\rightarrow \therefore a+b=10$$

$$\therefore a=10-b$$

$$\text{Now } b=2$$

$$\therefore a=10-2$$

$$\therefore a=8$$

$$\text{and } b=8$$

$$\therefore a=10-8$$

$$\therefore a=2$$

$$\therefore \left. \begin{array}{l} a=2 \neq 8 \\ b=8 \neq 2 \end{array} \right\} \star$$

$$\therefore ab=16$$

$$\therefore b = \frac{16}{a}$$

$$\therefore b = \frac{16}{10-b}$$

$$\therefore 10b - b^2 = 16$$

$$\therefore 10b - b^2 - 16 = 0$$

$$\therefore b^2 - 10b + 16 = 0$$

$$\therefore b^2 - 8b - 2b + 16 = 0$$

$$\therefore b(b-8) - 2(b-8) = 0$$

$$\therefore (b-8)(b-2) = 0$$

$$\therefore b=8 / b=2$$