



Algebra of Matrices Ex 5.1 Q19

Given,

$$A = B$$

$$\begin{bmatrix} 2x+1 & 2y \\ 0 & y^2-5y \end{bmatrix} = \begin{bmatrix} x+3 & y^2+2 \\ 0 & -6 \end{bmatrix}$$

Since equal matrices has all corresponding entries equal,

So,

$$2x+1 = x+3 \quad \text{---(i)}$$

$$2y = y^2+2 \quad \text{---(ii)}$$

$$y^2-5y = -6 \quad \text{---(iii)}$$

Solving equation (i)

$$2x+1 = x+3$$

$$2x-x = 3-1$$

$$x = 2$$

Solving equation (ii)

$$2y = y^2+2$$

$$y^2-2y+2 = 0$$

$$D = b^2-4ac$$

$$= (-2)^2 - 4(1)(2)$$

$$= 4-8$$

$$= -2$$

So, There is no real value of y from equation (ii).

Solving equation (iii)

$$y^2-5y = -6$$

$$y^2-5y+6 = 0$$

$$y^2-3y-2y+6 = 0$$

$$y(y-3)-2(y-3) = 0$$

$$(y-3)(y-2) = 0$$

$$y = 3 \quad \text{or} \quad y = 2$$

From solution of equation (i), (ii) and (iii), We can say that A and B can not be equal for any value of y .

Algebra of Matrices Ex 5.1 Q20

Given,

$$\begin{bmatrix} x+10 & y^2+2y \\ 0 & -4 \end{bmatrix} = \begin{bmatrix} 3x+4 & 3 \\ 0 & y^2-5y \end{bmatrix}$$

Since corresponding entries of equal matrices are equal, So

$$x+10 = 3x+4 \quad \text{---(i)}$$

$$y^2+2y = 3 \quad \text{---(ii)}$$

$$-4 = y^2-5y \quad \text{---(iii)}$$

Solving equation (i),

$$x+10 = 3x+4$$

$$x-3x = 4-10$$

$$-2x = -6$$

$$x = \frac{6}{2}$$

Solving equation (ii),

$$y^2+2y = 3$$

$$y^2+2y-3 = 0$$

$$y^2+3y-y-3 = 0$$

$$y(y+3)(y-1) = 0$$

$$\Rightarrow y = -3 \text{ and } y = 1$$

Solving equation (iii)

$$-4 = y^2-5y$$

$$y^2-5y+4 = 0$$

$$y^2-4y-y+(y-4) = 0$$

$$y(y-4)-1(y-4) = 0$$

$$(y-4)(y-1) = 0$$

$$\Rightarrow y = 4 \text{ and } y = 1$$

From equation (ii) and (iii),

The common value of $y = 1$

So, $x = 3, y = 1$

Algebra of Matrices Ex 5.1 Q21

$$A = \begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix}, B = \begin{bmatrix} 2a+2 & b^2+2 \\ 8 & b^2-5b \end{bmatrix}$$

Given that $A = B$

Corresponding element of two equal matrices are equal

$$\Rightarrow a+4 = 2a+2, 3b = b^2+2 \text{ and } -6 = b^2-5b$$

$$\Rightarrow a-2a = 2-4, b^2-3b+2 = 0 \text{ and } b^2-5b+6 = 0$$

$$\Rightarrow -a = -2, (b-1)(b-2) = 0 \text{ and } (b-2)(b-3) = 0$$

$$\Rightarrow a = 2, b = 1, 2 \text{ and } b = 2, 3$$

So value of $a = 2, b = 2$ respectively.

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