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 matrics has all corresponding entries equal,
So,

$$2x + 1 = x + 3 \qquad \text{---(i)}$$
$$2y = y^2 + 2 \qquad \text{--- (ii)}$$
$$y^2 - 5y = -6 \qquad \text{--- (iii)}$$

Solving equation (i)

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

Solving equation (ii)

$$2y = y^2 + 2$$
$$y^2 - 2y + 2 = 0$$
$$D = b^2 - 4ac$$
$$= (-2)^2 - 4(i)(ii)$$
$$= 4 - 8$$
$$= -2$$

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

Solving equation (iii)

$$y^2 - 5y = -6$$
$$y^2 - 5y + 6 = 0$$
$$y^2 - 3y - 2y + 6 = 0$$
$$y(y - 3) - 2(y - 3) = 0$$
$$(y - 3)(y - 2) = 0$$
$$y = 3 \qquad or \qquad y = 2$$

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

$$x+10 = 3x+4 \qquad\qquad ---(i)$$

$$y^2+2y = 3 \qquad\qquad ---(ii)$$

$$-4 = y^2 - 5y \qquad\qquad ---(iii)$$

Solving equation (i),

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

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

$$-2x = -6$$

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

Solving equation (ii),

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

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

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

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

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

Solving equation (iii)

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

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

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

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

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

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

From equation (ii) and (iii),

The common value of y = 1

So, $\quad x = 3, y = 1$

Algebra of Matrices Ex 5.1 Q21

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

Given that A = B

Corresponding element of two equal matrices are equal

$\Rightarrow \quad$ a + 4 = 2a + 2 , 3b = b² + 2 $\quad$ and -6 = b² – 5b

$\Rightarrow \quad$ a - 2a = 2 - 4 , b² – 3b + 2 = 0 and b² – 5b + 6 = 0

$\Rightarrow \quad$ -a = -2 , (b -1) (b-2) = 0 and (b - 2) (b - 3) = 0

$\Rightarrow \quad$ a = 2 , b = 1,2 $\quad$ and b = 2,3

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

********** END *********