MAT204

$$X = \begin{vmatrix} 1 & 2 & 8 \\ 4 & 7 & 6 \\ 9 & 5 & 3 \end{vmatrix}$$

$$Y = \begin{vmatrix} 0 & 5 & 0 \\ -3 & -7 & -1 \\ 2 & 1 & 4 \end{vmatrix}$$

i. $\begin{vmatrix} 1 & 2 & 8 \\ 4 & 7 & 6 \\ 9 & 5 & 3 \end{vmatrix} = X$

$$1\begin{vmatrix} 7 & 6 \\ 5 & 3 \end{vmatrix} - 2\begin{vmatrix} 4 & 6 \\ 9 & 3 \end{vmatrix} + 8\begin{vmatrix} 4 & 7 \\ 9 & 5 \end{vmatrix}$$

$= 1(21 - 30) - 2(12 - 54) + 8(20 - 63)$

$= -269$

This is a non-singular matrix

ii. $Y = \begin{vmatrix} 0 & 5 & 0 \\ -3 & -7 & -1 \\ 2 & 1 & 4 \end{vmatrix}$

$= 0 - 5\begin{vmatrix} -3 & -1 \\ 2 & 4 \end{vmatrix} + 0$

$= -5(-27 + 2)$

$= 125$

This is a non-singular matrix

$(X+Y)$

$$= \begin{vmatrix} 1 & 2 & 8 \\ 4 & 7 & 6 \\ 9 & 5 & 3 \end{vmatrix} + \begin{vmatrix} 0 & 5 & 0 \\ -3 & -7 & -1 \\ 2 & 1 & 4 \end{vmatrix}$$

$$= \begin{vmatrix} 1 & 7 & 8 \\ 1 & 0 & 5 \\ 11 & 6 & 12 \end{vmatrix}$$

$= 1(0 - 30) - 7(12 - 55) + 8(6 - 0)$

$= 319$

This is a non-singular matrix

$5Y = 5\begin{vmatrix} 0 & 5 & 0 \\ -3 & -7 & -1 \\ 2 & 1 & 4 \end{vmatrix}$

$$= \begin{vmatrix} 0 & 25 & 0 \\ -15 & -35 & -5 \\ 10 & 5 & 20 \end{vmatrix}$$

$= 0 - 25(-300 + 50)$

$= 6250$

This is a non-singular matrix.

Q