ANSWER KEY FOR CLASS 12

EX -3.1

7i) a_{11} =2x1-1=1 a_{12}=2x1-2=0 a_{21}=2x2-1=3 a_{22} = 2x2-2 =2 so, $\begin{vmatrix} 1 & 0 \\ 3 & 2 \end{vmatrix}$ ans.

8i) a_{11}= 1-3x1=-2 a_{12}=1-3x2=-5 a_{13}=1-3x3=-8 a_{21}=2-3x1=-1 a_{22}=2-3x2=--4

a_{23}=2-3x3=-7. Thus, $\begin{vmatrix} -2 & -5 & -8 \\ -1 & -4 & -7 \end{vmatrix}$. Ans

9vii) Equating, x+2y= 0,3y=-3 or, y=-1 ; 4x=8 or,x=2 so, x-y =3.   Ans.

10. X+y+z=9…(1), x+z = 5….(2), y+z=7….(3) subtracting (2) from (1) we get y=4. Subtracting (3)from (1) we get x=2;putting the values of y,x in (1) we get z=3. X-y+z = 1 ans.

13. Equating, 2x-3y=1.. (1) ,x+4y=6…(2), a-b= -2…(3), 3a+4b=29…(4) solving (1) and (2),we get x=2, y= 1,.again, solving (3) and(4),we get, a=3,b=5.

EX – 3.2

7. KA = k $\begin{bmatrix} 2 & -3 \\ 5 & 0 \end{bmatrix}$ = $\begin{bmatrix} 8 & 3a \\ -2b & c \end{bmatrix}$ equating, 2k=8 or,k=4; -12=3a or,a=-4, 5k=-2b or, b=-10; c=0. Ans.

11. $\begin{bmatrix} 3a & 3b \\ 3c & 3d \end{bmatrix}$ = $\begin{bmatrix} a+4 & 6+a+b \\ -1+c+d & 2d+3 \end{bmatrix}$. Equating,3a=a+4,or, a=2; 3b=6+a+b or, b=4; 3d=2d+3 or, d=3; 3c=-1+c+d or,c=1. Ans

Now, subtracting, 2Y = $\begin{bmatrix} 7-3 & 0 \\ 2 & 5-3 \end{bmatrix}$ OR, Y = $\begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$

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

17. 5$\begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$ + 3$\begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ +2C =$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ or, C = $\begin{vmatrix} -24 & -10 \\ -28 & -38 \end{vmatrix}$ ans.

Ex-3.3

7. $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ $\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ =AB or, $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

BA = $\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ = $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

16ii) M(x). M(y) = $\begin{bmatrix} cosx & sinx \\ -sinx & cosx \end{bmatrix} . \begin{bmatrix} cosy & siny \\ -siny & cosy \end{bmatrix}$ =

$\begin{bmatrix} cosxcosy - sinxsiny & sinycosx + cosysinx \\ -sinxcosy - cosxsiny & -sinxsiny + cosxcosy \end{bmatrix}$

=$\begin{bmatrix} \cos(x+y) & \sin(x+y) \\ -\sin(x+y) & \cos(x+y) \end{bmatrix}$ = M (x+y) .

27i) A^2 = $\begin{bmatrix} 1+4 & 2+2 \\ 2+2 & 4+2 \end{bmatrix}$ so, x^2 = $\begin{bmatrix} 5 & 4 \\ 4 & 6 \end{bmatrix}$ 2x = $\begin{bmatrix} 2 & 4 \\ 4 & 2 \end{bmatrix}$ 3I = $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

x^2 -2x -3I = $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$. proved.

31i) (A+B)(A-B) = (A-B)A+(A-B)B = A^2 –BA +AB – B^2 OR, 0 = A^2 –BA+AB-A^2+B^2

or, -BA+AB=0 thus,AB=BA the condition is true.

EX- 3.4

5.. A = $\begin{bmatrix} -1 & 5 \\ 3 & 7 \end{bmatrix}$ then, A' = $\begin{bmatrix} -1 & 3 \\ 5 & 7 \end{bmatrix}$ therefore, A+A' = $\begin{bmatrix} -2 & 8 \\ 8 & 14 \end{bmatrix}$

(A+A')' = $\begin{bmatrix} -2 & 8 \\ 8 & 14 \end{bmatrix}$ which is symmetric.

15. (A')' = $\begin{bmatrix} -2 & 1 \\ 3 & 2 \end{bmatrix}$ = A so, A+2B = $\begin{bmatrix} -4 & 1 \\ 5 & 6 \end{bmatrix}$, so, (A+2B)' = $\begin{bmatrix} -4 & 5 \\ 1 & 6 \end{bmatrix}$

13iii) A-B = $\begin{bmatrix} 3 & -2 \\ 3 & 3 \end{bmatrix}$, (A-B)' = $\begin{bmatrix} 3 & 3 \\ -2 & 3 \end{bmatrix}$, A' = $\begin{bmatrix} 5 & 6 \\ -1 & 7 \end{bmatrix}$, B' = $\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

A' – B' = $\begin{bmatrix} 3 & 3 \\ -2 & 3 \end{bmatrix}$. Hence, (A-B)' = A' – B'. proved.

25. A' = $\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$, A- A' = $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ = - $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ Thus, it is a skew-symmetric matrix.

27i) Let A = $\begin{bmatrix} 3 & 5 \\ 1 & -1 \end{bmatrix}$, A' = $\begin{bmatrix} 3 & 1 \\ 5 & -1 \end{bmatrix}$ A+A' = $\begin{bmatrix} 6 & 6 \\ 6 & -2 \end{bmatrix}$, A-A' = $\begin{bmatrix} 0 & 4 \\ 4 & 0 \end{bmatrix}$

The required matrix is ½ $\begin{bmatrix} 6 & 6 \\ 6 & -2 \end{bmatrix}$ + ½ $\begin{bmatrix} 0 & 4 \\ 4 & 0 \end{bmatrix}$ = $\begin{bmatrix} 3 & 3 \\ 3 & -1 \end{bmatrix}$ + $\begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$ ans.

EX- 3.5

$\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$ = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ A or, $R_2 \to R_2 - 2R_1$ $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$ = $\begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix}$A or, $R1 \to R_1 - 3R_2$

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ = $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}$A. Hence, A^{-1} = B = $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}$ ans.

4. $R_2 \rightarrow R_2 + R_1$ $\begin{vmatrix} 2 & -1 & 3 \\ -3 & 2 & 4 \\ -3 & 2 & 3 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} A$

$R_3 \rightarrow R_3 - R_1$ $\begin{vmatrix} 2 & -1 & 3 \\ -3 & 2 & 4 \\ 0 & 0 & -1 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ -1 & -1 & 1 \end{vmatrix} A$

$R_1 \rightarrow R_1 + R_2$ AND $R_3 \rightarrow (-1)R_3$ $\begin{vmatrix} -1 & 0 & -10 \\ 0 & -1 & -17 \\ 0 & 0 & 1 \end{vmatrix} = \begin{vmatrix} -3 & -1 & 0 \\ -5 & -2 & 0 \\ 1 & 1 & -1 \end{vmatrix} A$

$R_1 \rightarrow R_1 + 10R_3$, $R_2 \rightarrow R_2 + 17R_3$ $\begin{vmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{vmatrix} = \begin{vmatrix} 7 & 9 & -10 \\ 12 & 15 & -17 \\ 1 & 1 & -1 \end{vmatrix} A$

Or, $A^{-1} = \begin{vmatrix} -7 & -9 & 10 \\ -12 & -15 & 17 \\ -1 & -1 & 1 \end{vmatrix}$ ans.