Class - 12

CHAPTER - 5 DETERMINANTS

EXERCISE 5 (a)

Ans - 1.

(i) $\begin{vmatrix} 2 & 5 \\ 4 & 1 \end{vmatrix}$

$= 2 - 20$

$= -18$

(ii) $\begin{vmatrix} 3 & 5 \\ 1 & 2 \end{vmatrix}$

$= 3 \times 2 - 1 \times 5$

$= 6 - 5$

$= 1$

(iii) $\begin{vmatrix} a & b \\ -b & a \end{vmatrix}$

$= a \times a - b \times (-b)$

$= a^2 + b^2$

(iv) $\begin{vmatrix} x+2 & 2x+5 \\ 3x-1 & x-3 \end{vmatrix}$

$= (x+2)(x-3) - (2x+5)(3x-1)$

$= (x^2 - 3x + 2x - 6)$

$\quad -(6x^2 - 2x + 15x - 5)$

$= -15x^2 - 14x - 1$

(v) $\begin{vmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$

$= \cos^2\theta - \sin\theta \times (-\sin\theta)$

$= \cos^2\theta + \sin^2\theta = 1$

(vi) $\begin{vmatrix} y-x & -x^2+xy-y^2 \\ x+y & x^2+xy+y^2 \end{vmatrix}$

$= (y-x)(y^2+yx+x^2)$

$\quad -(x+y)(-x^2+xy-y^2)$

$= y^3 - x^3 + x^3 + y^3$

$= 2y^3$

Ans-2.

$$\begin{vmatrix} \sin 10^\circ & -\cos 10^\circ \\ \sin 80^\circ & \cos 80^\circ \end{vmatrix}$$

$= \sin 10^\circ \cos 80^\circ + \cos 10^\circ \sin 80^\circ$

$= \sin(10^\circ + 80^\circ) = \sin 90^\circ = 1$

Ans-3.

$$\begin{vmatrix} 3 & m \\ 4 & 5 \end{vmatrix} = 3$$

$= 3 \times 5 - 4 \times m$

$= 3$

$= 15 - 4m = 3$

$= 12 = 4m$

$= m = 3$

Ans-4.

(i) $\begin{vmatrix} x-1 & x-2 \\ x & x-3 \end{vmatrix} = 0$

$= (x-1)(x-3) - x(x-2) = 0$

$= x^2 - 4x - 3 - x^2 + 2x = 0$

$\Rightarrow -2x + 3 = 0$

$\Rightarrow x = \frac{3}{2}$

(iii) $\begin{vmatrix} 3n & 7 \\ -2 & 4 \end{vmatrix} = \begin{vmatrix} 8 & 7 \\ 6 & 4 \end{vmatrix}$

$\Rightarrow 12n + 14 = 32 - 42$

$\Rightarrow 12n = -10 - 14$

$= -24$

$\Rightarrow n = -2$

Ans. 5.

$\begin{vmatrix} k & k \\ 4 & 2k \end{vmatrix} = 0$

$\Rightarrow k \times 2k - 4 \times k = 0$

$\Rightarrow 2k^2 - 4k = 0$

$\Rightarrow 2k(k-2) = 0$

$\Rightarrow k = 0, 2$