



Determinants

1) Determinant :- $n \times n$ राशियों का दो-समान्तर ऊपवर्धर रेखाओं के मध्य की अंकगुत में लिखे गये क्रम-विन्यास की n -क्रम का सारणिक कहते हैं।

Process of Determinants :-

Δ	+	-	+	= Row Column
	-	+	-	
	+	-	+	

$$|\Delta| = \begin{vmatrix} 3 & 4 \\ 6 & 8 \end{vmatrix} = 3 \times 8 - 6 \times 4 = 24 - 24 = 0$$

$$|\Delta| = \begin{vmatrix} 5 & 8 \\ 9 & 5 \end{vmatrix} \quad \text{Q. } |\Delta| = \begin{vmatrix} 8 & 4 \\ -3 & 4 \end{vmatrix} \quad \text{Q. } |\Delta| = \begin{vmatrix} 7 & 6 \\ 8 & -4 \end{vmatrix}$$

Case-II

$$|\Delta| = \begin{vmatrix} 4 & 8 & 3 \\ 9 & 6 & 2 \\ 4 & 2 & 1 \end{vmatrix}$$

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

$$4(6-4) - 8(9-8) + 3(18-24)$$

$$= 4 \times 2 - 8 \times 1 + 3 \times (-6)$$

Q. Find the value of x if $\begin{vmatrix} x & 1 \\ x & x \end{vmatrix} = 20$

Solution:-

$$|\Delta| = \begin{vmatrix} x & 1 \\ x & x \end{vmatrix} = 20$$

$$= x^2 - x - 20 = 0$$

$$= x^2 - 5x + 4x - 20 = 0$$

$$x(x-5) + 4(x-5) = 0$$

$$(x+4)(x-5) = 0$$

$$x = -4 / 5$$

①

$$\begin{array}{ccc|c} x+a & b & c & \\ a & x+b & c & = 0 \\ a & b & x+c & \end{array}$$

$$C_1 \rightarrow C_1 + C_2 + C_3$$

$$\begin{array}{ccc|c} x+a+b+c & b & c & \\ a+x+b+c & x+b & c & \\ a+b+x+c & b & x+c & \end{array}$$

$$= (x+a+b+c) \begin{array}{ccc|c} 1 & b & c & \\ 1 & x+b & c & \\ 1 & b & x+c & \end{array}$$

$$R_1 = R_1 - R_2 \quad \& \quad R_2 - R_3$$

$$= (x+a+b+c) \begin{array}{ccc|c} 1-1 & b-x-b & c-c & \\ 1-1 & x+b-b & c-x-c & \\ 1 & b & x+c & \end{array}$$

$$= (x+a+b+c) \begin{array}{ccc|c} 0 & -x & 0 & \\ 0 & x & -x & \\ 1 & b & x+c & \end{array}$$

$$= (x+a+b+c) \begin{array}{ccc|c} -x & 0 & & \\ x & -x & & \end{array}$$

07

Do not write your name or any mark of identification in any part of your answer Book. For Writing an answer. (Includ

$$= (x+a+b+c)(x^2-0)$$

$$= (x+a+b+c)x^2$$

$$\therefore |\Delta| = 0$$

$$\text{so } \begin{array}{l|l} x^2 = 0 & x+a+b+c = 0 \\ x = 0 & x = -(a+b+c) \end{array}$$

$$Q. \begin{vmatrix} 1 & bc & bc & (b+c) \\ 1 & ca & ca & (c+a) \\ 1 & ab & ab & (a+b) \end{vmatrix} = 0$$

Solution:-

R_1 को a से, R_2 को b से तथा R_3 को c से गुणा करें

$$\Delta \begin{vmatrix} 1 & a & abc & abc(b+c) \\ abc & b & abc & abc(c+a) \\ abc & c & abc & abc(a+b) \end{vmatrix}$$

$$\Delta \begin{vmatrix} (abc)(abc) & a & b+c \\ (abc) & b & c+a \\ & c & a+b \end{vmatrix}$$

$$C_1 \rightarrow C_1 + C_3$$

$$= (abc) \begin{vmatrix} a+b+c & 1 & b+c \\ a+b+c & 1 & c+a \\ a+b+c & 1 & a+b \end{vmatrix}$$

$$= (abc)(a+b+c) \begin{vmatrix} 1 & 1 & b+c \\ 1 & 1 & c+a \\ 1 & 1 & a+b \end{vmatrix}$$

$$= (abc)(a+b+c) \times 0$$

0

$$\begin{vmatrix} a & a & x \\ a & a & a \\ b & x & b \end{vmatrix} = 0$$

$$C_1 \rightarrow C_1 - C_2 \quad \& \quad C_2 \rightarrow C_2 - C_3$$

$$[\Delta] = \begin{vmatrix} a-a & a-x & x \\ a-a & a-a & a \\ b-x & x-b & b \end{vmatrix}$$

$$= \begin{vmatrix} 0 & a-x & x \\ 0 & 0 & a \\ b-x & x-b & b \end{vmatrix}$$

$$= (b-x) \begin{vmatrix} a-x & x \\ 0 & a \end{vmatrix}$$

$$= (b-x) a^2 - ax = 0$$

$$(b-x) a(a-x) = 0$$

$$a-x = 0$$

$$-x = -a$$

$$x = a$$

$$b-x = 0$$

$$-x = -b$$

$$x = b$$

$$\begin{aligned} x + 2y &= 4 \\ 2x + 3y &= 3 \end{aligned}$$

$$D_x \quad D_y = Z_1$$

$$D_x \quad D_y = Z_2$$

$$|\Delta| = \begin{vmatrix} 1 & 2 \\ 2 & 3 \end{vmatrix} = 3 - 4 = -1$$

$$D_x = \begin{vmatrix} 4 & 2 \\ 3 & 3 \end{vmatrix}$$

$$= 12 - 6 \\ = 6$$

$$D_y = \begin{vmatrix} 1 & 4 \\ 2 & 3 \end{vmatrix}$$

$$= 3 - 8 \\ = -5$$

$$x = \frac{D_x}{|\Delta|} = \frac{6}{-1} = -6$$

$$y = \frac{D_y}{|\Delta|} = \frac{-5}{-1} = 5$$

D_x के ह्यान पद
 Z_1 और Z_2 का
परयोग कर सकते हैं।

D_y के ह्यान पद
 Z_1 और Z_2 का
मान रखने पद,