Exemplar Problem

Matrix and Determinants

Example 2: If $\triangle = \begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$**,** $\triangle_1$ **=** $\begin{vmatrix} 1 & 1 & 1 \\ yz & zx & xy \\ x & y & z \end{vmatrix}$**, then prove that**

$\triangle+\triangle_1=0$.

Ans: here, we have $\triangle_1 = \begin{vmatrix} 1 & 1 & 1 \\ yz & zx & xy \\ x & y & z \end{vmatrix}$

Now, interchanging rows and columns, we get

$$\Rightarrow \triangle_1 = \begin{vmatrix} 1 & yz & x \\ 1 & zx & y \\ 1 & xy & z \end{vmatrix}$$

$$\Rightarrow \triangle_1 = \frac{1}{xyz}\begin{vmatrix} x & xyz & x^2 \\ y & xyz & y^2 \\ z & xyz & z^2 \end{vmatrix}$$

Taking common xyz from C_2, we get

$$\Rightarrow \triangle_1 = \frac{1}{xyz} \times xyz\begin{vmatrix} x & 1 & x^2 \\ y & 1 & y^2 \\ z & 1 & z^2 \end{vmatrix}$$

Now, interchanging C_1 and C_2, we get

$$\Rightarrow \triangle_1 = (-1)\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$$

$\Rightarrow \triangle_1 = -\triangle$

$\Rightarrow \triangle + \triangle_1 = 0$

Hence proved.