

Question :If system of linear equations

$$x + y + z = 6$$

$$x + 2y + 3z = 10 \text{ and}$$

$$3x + 2y + \lambda z = \mu$$

has more than two solutions, then $\mu - \lambda^2$ is equal to _____.

Solution:

The system of equations has more than 2 solutions.

Find for $D = D_3 = 0$

$$\Rightarrow \begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 3 & 2 & \lambda \end{vmatrix} = 0$$

$$\Rightarrow 2\lambda - 6 - \lambda + 9 + 2 - 6 = 0$$

$$\Rightarrow \lambda = 1$$

$$\begin{vmatrix} 1 & 1 & 6 \\ 1 & 2 & 10 \\ 3 & 2 & \mu \end{vmatrix} = 0$$

$$\Rightarrow 2\mu - 20 - \mu + 30 - 24 = 0$$

$$\Rightarrow \mu = 14$$

$$\text{So, } \mu - \lambda^2 = 13$$

