

Question 12: If

$$\begin{vmatrix} x^2 + x & x + 1 & x - 2 \\ 2x^2 + 3x - 1 & 3x & 3x - 3 \\ x^2 + 2x + 3 & 2x - 1 & 2x - 1 \end{vmatrix} = Ax - 12,$$

then what is the value of A?

Solution:

Put $x = 1$, then we have

$$\begin{vmatrix} 2 & 2 & -1 \\ 4 & 3 & 0 \\ 6 & 1 & 1 \end{vmatrix} = A - 12$$

$$\Rightarrow \begin{vmatrix} 0 & 2 & -1 \\ 1 & 3 & 0 \\ 5 & 1 & 1 \end{vmatrix} = A - 12$$

Apply $C_1 \rightarrow C_1 - C_2$

$$\Rightarrow -2 + (-1)(-14) = A - 12$$

$$\Rightarrow A = 24$$