If $\Delta(r) = \begin{vmatrix} 2^{r-1} & 2.3^{r-1} & 4.5^{r-1} \\ \alpha & \beta & \gamma \\ 2^n - 1 & 3^n - 1 & 5^n - 1 \end{vmatrix}$, then the value of $\sum_{r=1}^{n} \Delta(r)$

Solution:

$$\sum_{r=1}^{n} \Delta(r) = \begin{vmatrix} \sum_{r=1}^{n} 2^{r-1} & \sum_{r=1}^{n} 2.3^{r-1} & \sum_{r=1}^{n} 4.5^{r-1} \\ \alpha & \beta & \gamma \\ 2^n - 1 & 3^n - 1 & 5^n - 1 \end{vmatrix}$$

$S_n = \frac{a(1-r^n)}{1-r}$

$$= \begin{vmatrix} 2^n - 1 & 3^n - 1 & 5^n - 1 \\ \alpha & \beta & \gamma \\ 2^n - 1 & 3^n - 1 & 5^n - 1 \end{vmatrix}$$

$$= 0$$

A. 0

B. $\alpha\beta\gamma$

C. $\alpha + \beta + \gamma$

D. $\alpha 2^n + \beta 3^n + \gamma 4^n$

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