Evaluate value of the determinants

$$(i)\ \Delta = \begin{vmatrix} \log_3 8 & \log_3 512 \\ \log_2 \sqrt{3} & \log_4 9 \end{vmatrix} \quad (ii)\ \Delta = \begin{vmatrix} 1 & -3 & 5 \\ 2 & -1 & 0 \\ -7 & 6 & 8 \end{vmatrix}$$

$$(i)\ \Delta = \begin{vmatrix} \log_3 8 & \log_3 512 \\ \log_2 \sqrt{3} & \log_4 9 \end{vmatrix}$$

$$\log_a x^k = k \log_a x$$

$$\log_{a^k} x = \frac{1}{k} \log_a x$$

$$= \log_3 8 \log_4 9 - \log_2 \sqrt{3} \log_3 512$$

$$= 3 \log_3 2 \log_2 3 - \frac{1}{2} \log_2 3 \cdot \log_3 2^9$$

$$= 3 - \frac{9}{2} = -\frac{3}{2}$$

$$(ii)\ \Delta = \begin{vmatrix} 1 & -3 & 5 \\ 2 & -1 & 0 \\ -7 & 6 & 8 \end{vmatrix}$$

$$= 1(-8) - (-3)(16) + 5(12 - 7)$$

$$= 65$$

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