ROMANIAN MATHEMATICAL MAGAZINE

Find:

$$\Omega=\int_{2}^{4}\frac{\sqrt[2024]{ln(9-x)}}{\sqrt[2024]{ln(9-x)}+\sqrt[2024]{ln(x+3)}}dx$$

Proposed by Nguyen Hung Cuong-Vietnam

Solution by Tapas Das-India

$$y=6-x\Rightarrow x=6-y\Rightarrow dx=-dy$$
$$x=2\Rightarrow y=4,\qquad x=4\Rightarrow y=2$$

$$\Omega=\int_{4}^{2}\frac{\sqrt[2024]{ln(9-6+y)}}{\sqrt[2024]{ln(9-6+y)}+\sqrt[2024]{ln(6-y+3)}}(-dy)$$

$$\Omega=\int_{2}^{4}\frac{\sqrt[2024]{ln(3+y)}}{\sqrt[2024]{ln(3+y)}+\sqrt[2024]{ln(9-y)}}dy$$

$$\Omega=\int_{2}^{4}\frac{\sqrt[2024]{ln(3+x)}}{\sqrt[2024]{ln(3+x)}+\sqrt[2024]{ln(9-x)}}dx$$

$$2\Omega=\int_{2}^{4}\frac{\sqrt[2024]{ln(9-x)}+\sqrt[2024]{ln(x+3)}}{\sqrt[2024]{ln(9-x)}+\sqrt[2024]{ln(x+3)}}dx$$

$$2\Omega=4-2\Leftrightarrow\Omega=1$$