

Admitere_UPB_2024

Să se calculeze $I = \int_{-2}^2 \frac{1}{(x^2 + 4)(3^x + 1)} dx$.

Metoda 1: utilizând King's Rule $\int_a^b f(x)dx = \int_a^b f(a+b-x)dx$ obținem

$$I = \int_{-2}^2 f(x)dx = \int_{-2}^2 f(-2+2-x)dx = \int_{-2}^2 f(-x)dx \Rightarrow$$

$$\Rightarrow I = \frac{1}{2} \left(\int_{-2}^2 f(x)dx + \int_{-2}^2 f(-x)dx \right) = \frac{1}{2} \cdot \left(\int_{-2}^2 \frac{1}{(x^2 + 4)(3^x + 1)} dx + \int_{-2}^2 \frac{3^x}{(x^2 + 4)(3^x + 1)} dx \right) \Rightarrow$$

$$\Rightarrow I = \frac{1}{2} \int_{-2}^2 \frac{1}{x^2 + 4} dx = \frac{1}{2} \cdot \frac{1}{2} \cdot \operatorname{arctg} \frac{x}{2} \Big|_{-2}^2 = \frac{\pi}{8}$$