

ROMANIAN MATHEMATICAL MAGAZINE

Find:

$$\Omega = \int_0^{\infty} \frac{x^5}{x^7 + 1} dx$$

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Solution by Daniel Sitaru – Romania

$$\int_0^{\infty} \frac{x^m}{1+x^n} dx = \frac{\pi}{n \sin\left(\frac{m+1}{n} \cdot \pi\right)}; 0 < m+1 < n$$

$$\Omega = \int_0^{\infty} \frac{x^5}{x^7 + 1} dx = \frac{\pi}{7 \sin\left(\frac{5+1}{7} \cdot \pi\right)} = \frac{\pi}{7 \sin\left(\frac{6\pi}{7}\right)} = \frac{\pi}{7 \sin\left(\pi - \frac{\pi}{7}\right)} = \frac{\pi}{7 \sin \frac{\pi}{7}}$$