

An Infinite Product Identity

*Problem 12-001 by CARLO SANNA*¹ (Università degli Studi di Torino, Turin, Italy).

Prove the infinite product identity

$$\prod_{k=1}^{\infty} \frac{(1 + n/k)^{2k+n}}{e^{2n}} = \frac{e^{n^2+n}}{(2\pi)^n} \prod_{k=1}^n k^{n-2k}, \quad n = 1, 2, 3, \dots$$

Status. The proposer has a solution. Other solutions are welcome.

¹E-mail: carlo.sanna.dev@gmail.com