

Problem for 2001 January

Communicated by Dan Jurca

The following occurs as problem 2.5.17 in

Problems in Mathematical Analysis I

by W. J. Kaczor and M.T. Nowak.

Let

$$a_n = 3 - \sum_{k=1}^n \frac{1}{k(k+1)(k+1)!}, \quad n \in \mathbf{N}.$$

(a)

Show that $\lim_{n \rightarrow \infty} a_n = e$.

(b)

Show also that $0 < a_n - e < [1/((n+1)(n+1)!)]$.