

RESEARCH GROUP IN MATHEMATICAL INEQUALITIES AND APPLICATIONS

PROBLEM CORNER

Problem 1, (2010)

Ovidiu Furdui

Campia Turzii, 405100

Cluj, Romania

Email: ofurdui@yahoo.com

Received: 08 January, 2010

Open Problem. Let $(y_k)_{k \geq 1}$ be the sequence defined by

$$y_k = \frac{1}{2k} \cdot \frac{1}{2k} \cdot \frac{1}{2k} \cdots \frac{1}{2k},$$

where the fraction $\frac{1}{2k}$ appears exactly $2k$ times in the definition of y_k . For example

$$y_1 = \frac{1}{2} \cdot \frac{1}{2}, \quad y_2 = \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}, \quad y_3 = \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}.$$

Prove or disprove that, for $k \geq 10$, the following inequality holds

$$1 - \frac{1}{\ln(2k)} < y_k.$$