

**PP44596**

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If  $x_k \in \mathbb{R}$  ( $k \in \overline{1, n}$ ) then:

$$\frac{1}{\sqrt[n]{\prod_{k=1}^n \sin^2 x_k}} + \frac{1}{\sqrt[n]{\prod_{k=1}^n \cos^2 x_k}} \geq 4$$

*Solution by Daniel Sitaru and Claudia Nănuți.*

$$\begin{aligned} & \frac{1}{\sqrt[n]{\prod_{k=1}^n \sin^2 x_k}} + \frac{1}{\sqrt[n]{\prod_{k=1}^n \cos^2 x_k}} \stackrel{\text{AM-GM}}{\geq} \\ & \geq \frac{n}{\sum_{k=1}^n \sin^2 x_k} + \frac{n}{\sum_{k=1}^n \cos^2 x_k} = \\ & = n \left( \frac{1^2}{\sum_{k=1}^n \sin^2 x_k} + \frac{1^2}{\sum_{k=1}^n \cos^2 x_k} \right) \geq \\ & \geq n \cdot \frac{(1+1)^2}{\sum_{k=1}^n (\sin^2 x_k + \cos^2 x_k)} = \frac{4n}{\sum_{k=1}^n 1} = \frac{4n}{n} = 4 \end{aligned}$$

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