PP44167

ROVSEN PIRGULIYEV - AZERBAIJAN

If $x \in (0, \frac{\pi}{2})$ then prove:

$$\frac{\sin(\sin x)}{\sin x} + \frac{\sin(\cos x)}{\cos x} > 1$$

Solution by Daniel Sitaru, Claudia Nănuţi.

$$\frac{\sin(\sin x)}{\sin x} \overset{\text{JORDAN}}{>} \frac{2}{\pi} \sin x \cdot \frac{1}{\sin x} = \frac{2}{\pi}$$

$$\frac{\sin(\sin x)}{\sin x} > \frac{2}{\pi} \tag{1}$$

$$\frac{\sin(\cos x)}{\cos x} \overset{\text{JORDAN}}{>} \frac{2}{\pi} \cos x \cdot \frac{1}{\cos x} = \frac{2}{\pi}$$

$$\frac{\sin(\cos x)}{\cos x} > \frac{2}{\pi} \tag{2}$$

By adding (1); (2):

$$\frac{\sin(\sin x)}{\sin x} + \frac{\sin(\cos x)}{\cos x} > \frac{2}{\pi} + \frac{2}{\pi} = \frac{4}{\pi} > 1$$

□

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