

3.97  
3

$$\tan\left(\frac{\pi}{4} - \frac{x}{2}\right) \cdot \frac{1 + \sin x}{\sin x} \geq \sqrt{2} \cos x$$

הכלל  
פולי  
לפי

פולי

$$\tan\left(\frac{\pi}{4} - \frac{x}{2}\right) > 0$$

$$x \neq 0$$

כלל  
הכלל

$$x \neq \pi k$$

פולי

$$\frac{\pi}{4} - \frac{x}{2} \neq \frac{\pi}{2} + \pi k$$

$$\pi k + 0 < \frac{\pi}{4} - \frac{x}{2} < \frac{\pi}{2} + \pi k$$

$$\pi k - \frac{\pi}{4} < -\frac{x}{2} < \frac{\pi}{4} + \pi k$$

$$-\frac{\pi}{2} < x < \frac{\pi}{2}$$

$$\frac{x}{2} \neq -\frac{\pi}{4} - \pi k$$

$$x \neq -\frac{\pi}{2} - 2\pi k$$

התחום של  $[0, \frac{\pi}{2}]$  קטן

$$\boxed{x \neq 0} \text{ : פולי}$$

$$\frac{\tan \alpha - \tan \beta}{1 - \tan \alpha \tan \beta} = \tan(\alpha - \beta) \quad \text{כלל } \alpha \neq \beta$$

$$\frac{\tan \frac{\pi}{4} - \tan \frac{x}{2}}{1 + \tan \frac{\pi}{4} \tan \frac{x}{2}} \cdot \frac{1 + \sin x}{\sin x} \geq \sqrt{2} \cos x$$

$$(*) \quad \frac{1 - \tan \frac{x}{2}}{1 + \tan \frac{x}{2}} \cdot \frac{1 + \sin x}{\sin x} \geq \sqrt{2} \cos x$$

$$\text{כלל} \quad \tan \frac{x}{2} = \frac{\sin \frac{x}{2}}{\cos \frac{x}{2}} \quad \text{כלל} \quad t = \frac{1 - \tan \frac{x}{2}}{1 + \tan \frac{x}{2}} \quad \text{כלל}$$

$$t = \frac{\cos \frac{x}{2} - \sin \frac{x}{2}}{\cos \frac{x}{2} + \sin \frac{x}{2}}$$

$$t^2 = \frac{1 - \sin x}{1 + \sin x}$$

$$(*) \rightarrow \text{כלל} \quad t = \sqrt{\frac{1 - \sin x}{1 + \sin x}}$$

כלל  
כלל  
כלל

$$t = \sqrt{\frac{1 - \sin x}{1 + \sin x}}$$

$$\sqrt{\frac{1 - \sin x}{1 + \sin x}} \cdot \frac{1 + \sin x}{\sin x} \geq \sqrt{2} \cos x$$

$$\sqrt{2} \cos x \leq \frac{\sqrt{1 - \sin x} \cdot \sqrt{1 + \sin x}}{\sin x} = \frac{\sqrt{1 - \sin^2 x}}{\sin x} = \frac{\sqrt{\cos^2 x}}{\sin x} = \frac{\cos x}{\sin x}$$

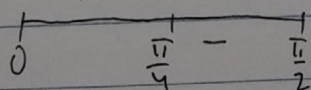
$$0 < \cos x \left( \frac{1}{\sin x} - \sqrt{2} \right) = \cos x \left( \frac{1 - \sqrt{2} \sin x}{\sin x} \right)$$

$$\cos x = 0 \rightarrow x = \frac{\pi}{2}$$

$$\sin x = \frac{1}{\sqrt{2}} \rightarrow x = \frac{\pi}{4}$$

$$\sin x = 0 \rightarrow x = 0$$

כלל  
כלל  
כלל



$$\boxed{0 < x < \frac{\pi}{4}}$$

כלל