

$$\frac{\sin \frac{x}{2}}{1 + \cos \frac{x}{2}} = \frac{1}{\sin \frac{x}{2}} + \cot \frac{x}{2} \quad [-\pi, \frac{\pi}{2}]$$

$$\tan \frac{x}{2} = \cot \frac{x}{2} \Rightarrow \tan \frac{x}{2} = \tan(\frac{\pi}{2} - \frac{x}{2})$$

$$\frac{x}{2} = k\pi + \frac{\pi}{2} - \frac{x}{2} \Rightarrow \frac{x}{2} = k\pi + \frac{\pi}{2} \Rightarrow x = 2k\pi + \pi$$

$$-0.5x \leq \frac{\pi}{2} \Rightarrow -0.5(2k\pi + \pi) \leq \frac{\pi}{2} \Rightarrow -1.5k + 1.5 \leq \frac{\pi}{2}$$

$$k = -1, 0 \Rightarrow x = -\pi, \pi \quad | -\pi - \pi | = 2\pi \quad -1.5k \leq \frac{1}{2}$$

$$\cos^2 x - \sin^2 x \cos^2 x = 1 \quad [0, \pi]$$

$$\Rightarrow -\sin^2 x \cos^2 x = 1 - \cos^2 x$$

$$\Rightarrow \sin^2 x = 0 \Rightarrow x = k\pi \Rightarrow x = \frac{k\pi}{2} \Rightarrow x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$$

$$\Rightarrow \cos^2 x = -1 \Rightarrow x = 2k\pi + \pi \Rightarrow x = \frac{2k\pi}{2} + \frac{\pi}{2} \Rightarrow x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\sin 2x = 0 \rightarrow x = k\pi \rightarrow k=0 \rightarrow x=0$$

$$k=1 \rightarrow x=\pi$$

$$k=2 \rightarrow x=2\pi$$

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

$$\tan(\frac{\pi}{2} - x) = \tan^2 x$$

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

$$\sqrt{1 + \sin^2 x} = \sqrt{2} \cos^2 x \quad [0, \pi]$$

$$\Rightarrow 1 + \sin^2 x = 2 \cos^2 x \Rightarrow 1 + \sin^2 x = 2 - 2 \sin^2 x \Rightarrow 3 \sin^2 x - 1 = 0$$

$$x = \frac{\pi}{2}$$

$$x = \frac{\pi}{2}$$

$$x = \frac{3\pi}{2}$$

$$\Rightarrow \sin^2 x = \frac{1}{3} \Rightarrow x = k\pi + \frac{\pi}{2}$$

$$\Rightarrow \sin^2 x = \frac{1}{3} \Rightarrow x = k\pi + \frac{\pi}{2}$$

$$x = 2k\pi + \frac{\pi}{2} \Rightarrow x = k\pi + \frac{\pi}{2}$$

$$x = 2k\pi + \pi - \frac{\pi}{2} \Rightarrow x = k\pi + \frac{3\pi}{2}$$

$$\sin^2 x - \cos^2 x = 1 \quad [0, \pi]$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\sin^3 x - \cos^3 x = -1$$

$$x = 0, \frac{3\pi}{2}, 2\pi$$

نشان اصولاً سین های خوبی من نویسد! کس بیشتر وقتش

سوال 9

$$\sqrt{1 + \sin 2x} = \sqrt{2} \cos x \xrightarrow{\text{توان 2}} 1 + \sin 2x = 2 \cos^2 x$$

$$1 + \sin 2x = 2 - 2 \sin^2 x \rightarrow 2 \sin^2 x + \sin 2x - 1 = 0 \rightarrow \sin 2x = -1$$

$$\sin 2x = -1 \rightarrow 2x = 2k\pi - \frac{\pi}{2} \xrightarrow{\substack{0 \leq x \leq \pi \\ k \in \mathbb{Z}}} x = \frac{3\pi}{4}$$

$$\hookrightarrow \sin 2x = \frac{1}{2}$$

$$\sin 2x = \frac{1}{2} \rightarrow 2x \in \left\{ k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right\} \xrightarrow{\substack{0 \leq x \leq \pi \\ k \in \mathbb{Z}}} x = \frac{\pi}{12} \cup \frac{5\pi}{12}$$

چون عبارت به توان 2 رسیده است جواب را باید تولید مکنند
به ازای $x = \frac{5\pi}{12}$ $\cos 2x$ منفی می شود پس این جواب را باید استثناییم

* معادله 2 جواب دارد