

$$\frac{\tan^2 \theta}{1 + \tan^2 \theta} = \frac{\frac{\sin^2 \theta}{\cos^2 \theta} \cdot \cos^2 \theta}{\left(1 + \frac{\sin^2 \theta}{\cos^2 \theta}\right) \cdot \cos^2 \theta} =$$

$$\frac{\sin^2 \theta}{\cos^2 \theta + \sin^2 \theta} = \sin^2 \theta.$$

$$\tan^2 \theta = \frac{\sin^2 \theta}{\cos^2 \theta} = \frac{1 - \cos^2 \theta}{\cos^2 \theta}$$

$$\Rightarrow \cos^2 \theta = \frac{1}{1 + \tan^2 \theta}$$

$$\Rightarrow \cos \theta = \begin{cases} \frac{1}{\sqrt{1 + \tan^2 \theta}} \\ -1 \\ \frac{-1}{\sqrt{1 + \tan^2 \theta}} \end{cases}$$

$$-\frac{\pi}{2} + 2k\pi \leq \theta \leq \frac{\pi}{2} + 2k\pi \\ k \in \mathbb{Z}.$$

$$\frac{\pi}{2} + 2k\pi < \theta < \frac{3\pi}{2} + 2k\pi \\ k \in \mathbb{Z}$$

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