

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

$$LS = \frac{\sin^2 x - \cos^2 x}{\cos^2 x}$$

$$= \frac{1 - \cos^2 x}{\cos^2 x} - \cos^2 x$$

$$= \frac{1}{\cos^2 x} - \frac{\cos^2 x}{\cos^2 x} - \cos^2 x$$

$$= \frac{1}{\cos^2 x} - 1 - \cos^2 x$$

$$= RS$$

$$\begin{aligned} S^2 + C^2 &= 1 \\ S^2 &= 1 - \cos^2 x \end{aligned}$$

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10b 7.4

$$\sin^2 \theta + \cos^4 \theta = \cos^2 \theta + \sin^4 \theta$$

$$LS = \sin^2 \theta + \cos^4 \theta$$

$$= \sin^2 \theta + \cos^2 \theta \cos^2 \theta$$

$$= \sin^2 \theta + (1 - \sin^2 \theta)(1 - \sin^2 \theta)$$

$$= \sin^2 \theta + 1 - 2\sin^2 \theta + \sin^4 \theta$$

$$= (-\sin^2 \theta + 1) + \sin^4 \theta$$

$$= \cos^2 \theta + \sin^4 \theta$$

$$11a) \frac{\cos 2x + 1}{\sin 2x} = \cot x$$

$$RS = \cot x$$

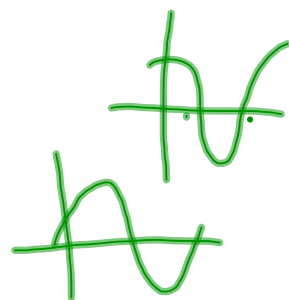
$$= \frac{\cos x}{\sin x}$$

$$LS = \frac{\cos 2x + 1}{\sin 2x}$$

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

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

$$= \frac{\cos x}{\sin x}$$



$$\cos x \neq 0 \cup \frac{3\pi}{2}$$

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

$$\sin x \neq 0 \cup \pi$$

$$x \neq 0, \pi$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\csc 2\theta = \frac{1}{2} (\sec\theta)(\csc\theta)$$

$$\begin{aligned} \text{LS} &= \csc 2\theta \\ &= \frac{1}{\sin 2\theta} \end{aligned}$$

$$= \frac{1}{\sin 2\theta}$$

$$\text{RS} = \frac{1}{2} \frac{1}{\cos\theta} \frac{1}{\sin\theta}$$

$$= \frac{1}{2\cos\theta\sin\theta}$$

$$= \frac{1}{\sin 2\theta}$$

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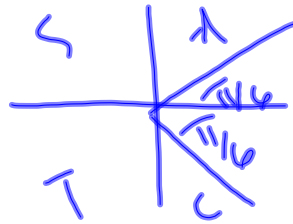
$$\sec t = \frac{\sin 2t}{\sin t} - \frac{\cos 2t}{\cos t}$$

$$\begin{aligned} LS &= \sec t \\ &= \frac{1}{\cos t} \end{aligned}$$

$$\begin{aligned} RS &= \frac{2 \cancel{\sin t} \cos t}{\cancel{\sin t}} - \frac{2 \cos^2 t - 1}{\cos t} \\ &= \frac{2 \cos t \cos t}{\cos t} - \frac{(2 \cos^2 t - 1)}{\cos t} \\ &= \frac{\cancel{2 \cos^2 t} - (\cancel{2 \cos^2 t} - 1)}{\cos t} \\ &= \frac{1}{\cos t} \end{aligned}$$

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

$$\Rightarrow \sin x = 0$$



$$p = \frac{2\pi}{1}$$

$$\frac{10x}{7.5} = 4\pi = \frac{24\pi}{6} \quad \left(\frac{x}{2}\right) = \frac{\sqrt{3}}{2}$$

$$\cos \theta = \frac{\sqrt{3}}{2} \quad \text{let } \theta = \frac{x}{2}$$

$$\theta = \pi/6 \quad 0 \leq \theta < \frac{2\pi}{6}$$

$$\theta = \pi/6, \quad 11\pi/6$$

$$\frac{x}{2} = \frac{\pi}{6} \quad \frac{x}{2} = \frac{11\pi}{6}$$

$$x = \frac{2\pi}{6} \quad x = \frac{22\pi}{6}$$

$$= \frac{\pi}{3} \quad = \frac{11\pi}{3}$$

$$= \frac{2\pi}{6} \quad = \frac{22\pi}{6}$$

$$\theta = \frac{2\pi}{6}, \frac{22\pi}{6}, \frac{2\pi + 4\pi}{6}$$

$$= \frac{2\pi}{6}$$

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

$$0 \leq x \leq 2\pi$$

$$25 \tan^2 x - 70 \tan x = -49$$

$$\text{let } y = \tan x$$

$$25y^2 - 70y = -49$$

$$25y^2 - 70y + 49 = 0$$

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{70 \pm \sqrt{70^2 - 4(25)(49)}}{2(25)}$$

$$\begin{array}{l} \text{S} \uparrow \\ \text{f} \uparrow \\ \text{I} \downarrow \\ \text{C} \downarrow \end{array} = \frac{70 \pm \sqrt{4900 - 4900}}{50}$$

$$= \frac{70 \pm 0}{50}$$

$$= \frac{70}{50}$$

$$= \frac{7}{5}$$

$$y = \frac{7}{5}$$

$$\tan x = \frac{7}{5}$$

$$x_R = \tan^{-1}\left(\frac{7}{5}\right)$$

$$= 0.95\pi + 0.95$$

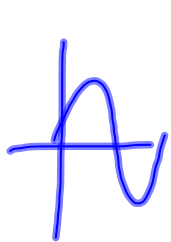
$$= 0.95, 4.09$$

$$3 \tan^2 x \sin x - \frac{\sin x}{3} = 0$$

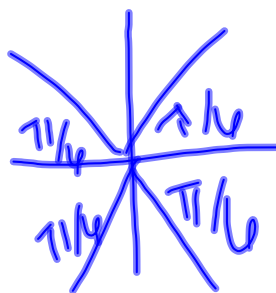
$$3 \tan^2 x \sin x - \sin x = 0$$

$$\sin x (3 \tan^2 x - 1) = 0$$

$$\sin x = 0 \quad \text{or} \quad 3 \tan^2 x - 1 = 0$$



$$x = 0, \pi, 2\pi$$



$$\tan^2 x = \frac{1}{3}$$

$$\tan x = \pm \frac{1}{\sqrt{3}}$$

$$x = \frac{\pi}{6}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

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

$$\tan^2 x \sin x - \frac{\sin x}{3} = 0$$

Reverse

$$25 \tan^2 x - 10 \tan x = -49$$

10x
7.5

$$\cos\left(\frac{x}{2}\right) = \frac{\sqrt{3}}{2}$$

7.5
aa

$$2 - 2 \cot x = 0$$

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

$$\tan^2 x \sin x - \frac{\sin x}{3} = 0$$

Reverse

$$25 \tan^2 x - 10 \tan x = -49$$

10x
7.5

$$\cos\left(\frac{x}{2}\right) = \frac{\sqrt{3}}{2}$$

7.5
aa

$$2 - 2 \cot x = 0$$

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

$$\tan^2 x \sin x - \frac{\sin x}{3} = 0$$

Review

$$25 \tan^2 x - 10 \tan x = -49$$

10x
7.5

$$\cos\left(\frac{x}{2}\right) = \frac{\sqrt{3}}{2}$$

7.5
aa

$$2 - 2 \cot x = 0$$