

$$6. \tan \frac{x}{2} \sin^2 \frac{x}{2} = \csc x - \cot x - \frac{1}{2} \sin x$$

$$\left(\frac{1 - \cos x}{\sin x} \right) \left(\frac{1 - \cos x}{2} \right)$$

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

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

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

$$\frac{1}{2} \csc x - \cot x + \frac{1 - \sin^2 x}{2 \sin x}$$

$$\frac{1}{2} \csc x - \cot x + \frac{1}{2 \sin x} - \frac{\sin^2 x}{2 \sin x}$$

$$\frac{1}{2} \csc x - \cot x + \frac{1}{2} \csc x - \frac{1}{2} \sin x$$

$$\csc x - \cot x - \frac{1}{2} \sin x \quad \checkmark$$

$$7. \sin(2x) - \sin x = 0$$

$$2 \sin x \cos x - \sin x = 0$$

$$\sin x (2 \cos x - 1) = 0$$

$$\sin x = 0 \quad 2 \cos x - 1 = 0$$

$$x = 0, \pi \quad 2 \cos x = 1$$

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

$$x = \frac{\pi}{3}, \frac{5\pi}{3}$$

$$x = \frac{5\pi}{3}$$

$$\sin\left(2 \cdot \frac{5\pi}{3}\right) - \sin \frac{5\pi}{3} = 0$$

$$\sin\left(\frac{10\pi}{3}\right) - \left(-\frac{\sqrt{3}}{2}\right) = 0$$

$$\sin\left(3 \frac{1}{3}\pi\right) + \frac{\sqrt{3}}{2} = 0$$

$$\sin \frac{4\pi}{3}$$