

1. Prove $(\sin x - \cos x)^2 - (\sin x + \cos x)^2 = -2 \sin 2x$

2. Prove $\frac{\sin 6x}{\sin 3x} = 2 \cos 3x$

3. Prove $\frac{\cos x + \cot x}{1 + \sin x} = \cot x$

4. Prove $\frac{1}{\sec x + \tan x} = \frac{1 - \sin x}{\cos x}$

5. Determine the general solution for $\cos 2x = -\frac{1}{2}$

6. Determine the non-permissible values and solve the equation: $\frac{\csc x}{\cos x} = 4$ for $0 \leq x < 2\pi$

7. Determine the number of solution(s) for $(a \sin 5x + a)(c \cos 5x - b) = 0$ for $0 \leq x < 2\pi$, if $0 < a < b < c$

5. $\frac{\pi}{3} + \pi n, \frac{2\pi}{3} + \pi n, n \in \mathbb{Z}$

6. $x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$; non-permissible values: $x \neq 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$

7. 15