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$$\begin{aligned} \text{LHS, } \sin 2x (\cot x - \tan x) &= 2 \sin x \cos x \left( \frac{\cos x}{\sin x} - \frac{\sin x}{\cos x} \right) \\ &= 2 \cancel{\sin x} \cancel{\cos x} \left( \frac{\cos^2 x - \sin^2 x}{\cancel{\sin x} \cancel{\cos x}} \right) \\ &= 2(\cos^2 x - \sin^2 x) \\ &= 2 \cos 2x = \text{RHS (proven)} \quad \text{Ans} \end{aligned}$$