Handout for MATH 1300 (Barsamian) Lect. L37 Mon Nov 9, 2026 Section 5.1: Trig Identities

Only do one operation on each line of your proofs, and justify each step!

1) Prove that $1 + \tan^2 x = \sec^2 x$.

2) Prove that $1 + \cot^2 x = \csc^2 x$.

3) Simplify $\frac{\cos x \csc x}{\cot x}$

4) Simplify. $\cot^2 x \csc^2 x - \cot^2 x$

5) Prove that $(\sec^2 x - 1)\cos^2 x = \sin^2 x$

6) Prove that $\cos^2 x\,(1 + \tan^2 x) = 1$

7) Prove that $(1 - \sin x)(1 + \sin x) = \frac{1}{1+\tan^2 x}$

8) Prove that $(\sec^2 x - 1)\cot x = \tan x$

9) Prove that $\cot^2 x\,(\sec^2 x - 1) = 1$

10) Prove that $\tan x\,(1 + \cot^2 x) = \frac{1}{\cos x \sin x}$

11) Prove that $= \frac{1+\sin(-x)}{1+\csc(-x)} = -\sin x$ Justify each step.

12) Prove that $= \frac{\sin(-x)}{1+\cos(-x)} = -\csc x - \cot x$

13) Prove that $= \frac{\cos(-x)}{1-\sin(-x)} = \sec x$