

HAT 5/11/18
Proving Identities

Prove each identity.

Show work on a separate piece of paper!

Do not combine too many steps... a stranger must be able to follow your thinking.

1. $\sin x \cot x = \cos x$
2. $\frac{\sin^2 x + \cos^2 x}{\cos x} = \sec x$
3. $\frac{1 + \sin \alpha}{\sin \alpha} = 1 + \csc \alpha$
4. $1 - 2 \sin^2 x = 2 \cos^2 x - 1$
5. $\sin^4 x - \cos^4 x = 2 \sin^2 x - 1$
6. $(1 + \csc \theta)(1 - \sin \theta) = \cot \theta \cos \theta$
7. $\frac{\sin x}{1 - \cos x} - \frac{\sin x \cos x}{1 + \cos x} = \frac{\cos^2 x + 1}{\sin x}$
8. $\cos \alpha (\csc \alpha - \sec \alpha) = \cot \alpha - 1$
9. $\cos x \tan x = \sin x$
10. $\frac{\sin \gamma - 1}{\cos \gamma} = \tan \gamma - \sec \gamma$
11. $\sin \beta + \cos \beta \cot \beta = \csc \beta$
12. $\frac{\sin x + \tan x}{1 + \cos x} = \tan x$
13. $\sin 2x = \tan x (1 + \cos 2x)$
14. $\frac{2 \tan x}{\sin 2x} = \sec^2 x$
15. $1 - \sin x \cos x \tan x = \cos^2 x$
16. $\sin 2\theta \cos \theta - \cos 2\theta \sin \theta = \sin \theta$
17. $\cot \gamma + \tan \gamma = 2 \csc 2\gamma$
18. $\sin\left(\frac{\pi}{2} - x\right) = \cos x$
19. $\cos\left(\alpha - \frac{\pi}{6}\right) - \cos\left(\alpha + \frac{\pi}{6}\right) = \sin \alpha$
20. $(\sin x + \cos x)^2 = 1 + \sin 2x$