

Five Trigonometry Identities problems

1. If $A + B + C = 180^\circ$,
prove that $\tan A + \tan B + \tan C = \tan A \tan B \tan C$.
2. Prove that $1 - \cos 2A + \cos 4A - \cos 6A = 4 \sin A \cos 2A \sin 3A$
3. Prove that $\tan 4A (\sin 2A + \sin 10A) = \cos 2A - \cos 10A$
4. Prove that $\sin A (\sin 3A + \sin 5A) = \cos A (\cos 3A - \cos 5A)$
5. Prove that $\tan A + \tan (A + 120^\circ) + \tan (A + 240^\circ) = 3 \tan 3A$

