

Applicando le formule goniometriche più opportune, verifica le seguenti identità, esplicitando ogni passaggio.

A.
$$\frac{1 - \operatorname{tg}^2\left(\frac{\pi}{3} + \alpha\right)}{\operatorname{tg}^2\left(\frac{\pi}{3} + \alpha\right) + 1} = \cos^2\left(\frac{\pi}{3} + \alpha\right) - \operatorname{sen}^2\left(\frac{\pi}{3} + \alpha\right)$$

B.
$$\cos 2\alpha - \sin 2\alpha = \frac{1 - \tan^2 \alpha}{1 + \tan^2 \alpha} + (\cos \alpha - \sin \alpha)^2 - 1$$

C.
$$\frac{2 \cos 2\alpha}{(\cos \alpha + \sin \alpha)^2 - 1} = \cot \alpha - \tan \alpha$$

D.
$$\sec(2\alpha) + \operatorname{tg}(2\alpha) = \operatorname{tg}\left(\alpha + \frac{\pi}{4}\right)$$

E.
$$\frac{2 \cos 2\alpha}{\sin 2\alpha} - 1 = \cot \alpha - \cos^2 \alpha - \tan \alpha - \sin^2 \alpha$$