

Sections 5.1 & 5.2 – I.C.E – Trig Identities

Simplify the following to ONE trig function or numerical value:

$$1) \quad \cos^2 \beta + \cos^2 \left(\frac{\pi}{2} - \beta \right)$$

$$2) \quad \sin t \csc \left(\frac{\pi}{2} - t \right)$$

$$3) \quad \frac{\cos \left(\frac{\pi}{2} - x \right)}{\sin \left(\frac{\pi}{2} - x \right)}$$

$$4) \quad \sec y \cos y$$

$$5) \quad (1 + \sin y)(1 + \sin(-y))$$

$$6) \quad \sec^2 \left(\frac{\pi}{2} - x \right) - 1$$

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Prove the following identities: be sure to only work ONE side of the equation!

$$7) \quad \frac{1}{\tan x} + \frac{1}{\cot x} = \tan x + \cot x$$

$$8) \quad \cot \alpha + \tan \alpha = \csc \alpha \sec \alpha$$

$$9) \quad \sin^2 \alpha - \sin^4 \alpha = \cos^2 \alpha - \cos^4 \alpha$$

$$10) \quad \frac{\cot^3 t}{\csc t} = \cos t (\csc^2 t - 1)$$

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$$11) \frac{1+\sin\theta}{\cos\theta} + \frac{\cos\theta}{1+\sin\theta} = 2\sec\theta$$

$$12) \tan^2\theta + 4 = \sec^2\theta + 3$$

$$13) \cot^2 y (\sec^2 y - 1) = 1$$

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$$14) \frac{1}{\sec x \tan x} = \csc x - \sin x$$

Here's a tough one if you want a challenge!

$$15) \frac{\tan x + \tan y}{1 - \tan x \tan y} = \frac{\sin x \cos y + \cos x \sin y}{\cos x \cos y - \sin x \sin y}$$