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

1) By starting with $\sin^2\theta+\cos^2\theta=1$, derive the other two Pythagorean Identities.

2) If $\tan\theta=-\frac{4}{5}$ and $\sin\theta>0$, use the fundamental identities to find the other five trig functions for $\theta$.

$\sin\theta=$

$\csc\theta=$

$\cos\theta=$

$\sec\theta=$

$\tan\theta=-\frac{4}{5}$

$\cot\theta=$

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

Simplify the following to ONE trig function or numerical value:

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

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

5) $\dfrac{\cos\left(\frac{\pi}{2} - x\right)}{\sin\left(\frac{\pi}{2} - x\right)}$

6) $\sec y \cos y$

7) $(1 + \sin y)(1 + \sin(-y))$

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

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

9) $\dfrac{1}{\tan x} + \dfrac{1}{\cot x} = \tan x + \cot x$

10) $\cot\alpha + \tan\alpha = \csc\alpha\sec\alpha$

11) $\sin^2\alpha - \sin^4\alpha = \cos^2\alpha - \cos^4\alpha$

12) $\dfrac{\cot^3 t}{\csc t} = \cos t(\csc^2 t - 1)$

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

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

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

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

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

**work on the left side on the following problem (even though the right looks more complicated)

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