PC Unit 7 Review Verifying Identities & Solving Trig EQS Key

Name: _____

Verify:

1. $\frac{\csc\theta}{\sec\theta}+\frac{\cos\theta}{\sin\theta}=2\cot\theta$

$\frac{1}{\sin\theta}$ / $\frac{1}{\cos\theta}$ + $\cot\theta$

$\frac{\cos\theta}{\sin\theta}$ + $\cot\theta$

$\cot\theta + \cot\theta$

$2\cot\theta = 2\cot\theta$ ✓

2. $1-\frac{\sin^2\theta}{1-\cos\theta}=-\cos\theta$ $\left(\frac{1-\cos\theta}{1-\cos\theta}\right)$

$\frac{1-\cos\theta-\sin^2\theta}{1-\cos\theta}$

$\frac{\cos^2\theta-\cos\theta}{1-\cos\theta}$

$\frac{\cos\theta(\cos\theta-1)}{(1-\cos\theta)}$

$\frac{\cos\theta(\cos\theta-1)}{-1(\cos\theta-1)} = -\cos\theta$ ✓

3. $\frac{\tan x-\sin x\cos x}{\sin^2 x}=\tan x$ flip flop →

break apart →

$\frac{\tan x}{\sin^2 x} - \frac{\sin x\cos x}{\sin^2 x}$

$\frac{\sin x}{\cos x} \div \sin^2 x - \frac{\cos x}{\sin x}$

$\frac{\sin x}{\cos x} \cdot \frac{1}{\sin^2} - \frac{\cos x}{\sin x} \rightarrow \frac{1}{\sin x\cos x} - \frac{\cos^2 x}{\sin x\cos x} \rightarrow \frac{\sin^2 x}{\sin x\cos x} \rightarrow \frac{\sin x}{\cos x} = \tan x$ ✓

4. $\cos\theta+\sin\theta\tan\theta=\sec\theta$

$\cos\theta + \sin\theta \cdot \frac{\sin\theta}{\cos\theta}$

$\cos\theta + \frac{\sin^2\theta}{\cos\theta}$

$\frac{\cos^2\theta+\sin^2\theta}{\cos\theta} \rightarrow \frac{1}{\cos\theta} = \sec\theta$ ✓

5. $\frac{\sin\theta}{1+\cos\theta}=\csc\theta-\cot\theta$ $\left(\frac{1-\cos\theta}{1-\cos\theta}\right)$

$\frac{\sin\theta(1-\cos\theta)}{1-\cos^2\theta}$

$\frac{\sin\theta(1-\cos\theta)}{\sin^2\theta}$

$\frac{1-\cos\theta}{\sin\theta} \rightarrow \frac{1}{\sin\theta} - \frac{\cos\theta}{\sin\theta} \rightarrow \csc\theta - \cot\theta$ ✓

6. $\frac{\sin\theta}{\csc\theta}+\frac{\cos\theta}{\sec\theta}=1$

$\sin\theta \div \frac{1}{\sin\theta} + \cos\theta \div \frac{1}{\cos\theta}$

$\sin^2\theta + \cos^2\theta$

$1 = 1$ ✓

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7. $\frac{1+\cos\theta}{\sin\theta}+\frac{\sin\theta}{1+\cos\theta}=2\csc\theta$

$\frac{1+2\cos\theta+\cos^2\theta+\sin\theta}{\sin\theta(1+\cos\theta)}$

$\frac{1+2\cos\theta+1}{\sin\theta(1+\cos\theta)}$

$\frac{2+2\cos\theta}{\sin\theta(1+\cos\theta)} \Rightarrow \frac{2(1+\cos\theta)}{\sin\theta(1+\cos\theta)} \rightarrow \frac{2}{\sin\theta} = 2\csc\theta$ ✓

8. $\frac{\sin\theta+\cos\theta}{\sin\theta\cos\theta}=\sec\theta+\csc\theta$

$\frac{\sin\theta}{\sin\theta\cos\theta} + \frac{\cos\theta}{\sin\theta\cos\theta}$

$\frac{1}{\cos\theta} + \frac{1}{\sin\theta}$

$\sec\theta+\csc\theta$ ✓

9. $\csc^2\theta - \cos^2\theta\csc^2\theta = 1$

GCF

$\csc^2\theta(1-\cos^2\theta)$

$\csc^2\theta(\sin^2\theta)$

$\left(\frac{1}{\sin^2\theta}\right)\left(\frac{\sin^2\theta}{1}\right)$

$1 = 1$ ✓

10. $\frac{1-2\csc\theta}{\cot\theta}=\tan\theta-2\sec\theta$

$\frac{1}{\cot\theta} - \frac{2\csc\theta}{\cot\theta}$

$\tan\theta - \frac{2}{\sin\theta} \div \frac{\cos\theta}{\sin\theta}$

$\tan\theta - \frac{2}{\cos\theta}$

$\tan\theta - 2\sec\theta$ ✓

11. $\frac{\cos x+1}{\tan^2 x}=\frac{\cos x}{\sec x-1}$ $\left(\frac{\sec x+1}{\sec x+1}\right)$

DO NOT CROSS MULT.

$\frac{\cos x(\sec x+1)}{\sec^2 x-1}$

$\frac{\cos x(\sec x+1)}{\tan^2\theta}$

$\frac{\cos x\left(\frac{1}{\cos x}+1\right)}{\tan^2\theta} \Rightarrow \frac{1+\cos x}{\tan^2 x}$ ✓

12. $\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$

$\sec^2\theta(\sec^2\theta-1)$

$\sec^2\theta(\tan^2\theta)$

$(\tan^2\theta+1)(\tan^2\theta)$

$= \tan^4\theta+\tan^2\theta$ ✓