Trig Identities worksheet 3.4 name:

Prove each identity:

1. $\sec x - \tan x \sin x = \dfrac{1}{\sec x}$

$\frac{1}{\cos x} - \frac{\sin x \cdot \sin x}{\cos x} =$

$\frac{1-\sin^2 x}{\cos x} =$

$\frac{\cos^2 x}{\cos x} =$

$\cos x = \frac{1}{\sec x} = \checkmark$

2. $\dfrac{1+\cos x}{\sin x} = \csc x + \cot x$

$\frac{1}{\sin x} + \frac{\cos x}{\sin x} =$

$\csc x + \cot x = \checkmark$

3. $\dfrac{\sec\theta \sin\theta}{\tan\theta + \cot\theta} = \sin^2\theta$

$\frac{\frac{1}{\cos\theta}\cdot\frac{\sin\theta}{1}}{\tan\theta + \cot\theta} = \frac{\tan\theta}{\tan\theta + \cot\theta}$

$\frac{\frac{\tan\theta}{1}}{\frac{s}{c}+\frac{c}{s}\cdot\frac{c}{c}} = \frac{\tan\theta}{\frac{s^2+c^2}{\sin\cdot\cos}} = \frac{\frac{\tan\theta}{1}}{\frac{1}{\sin\cos}} =$

$= \frac{\sin}{\cos}\cdot\sin\cos = \sin^2$

4. $\dfrac{\sec\theta}{\cos\theta} - \dfrac{\tan\theta}{\cot\theta} = 1$

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

$\frac{\cos^2\theta}{\cos^2\theta}$ ✓

$1 = 1$

5. $\cos^2 y - \sin^2 y = 1 - 2\sin^2 y$

$1 - \sin^2 y - \sin^2 y =$

$1 - 2\sin^2 y = \checkmark$

6. $\csc^2\theta \tan^2\theta - 1 = \tan^2\theta$

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

$\tan^2\theta + \cot^2\theta \cdot \tan^2\theta - 1 =$

$\tan^2\theta + 1 - 1 =$

$\tan^2\theta = \checkmark$

7. $\dfrac{\sec^2\theta}{\sec^2\theta - 1} = \csc^2\theta$

$\frac{\sec^2\theta}{\tan^2\theta} =$

$\frac{1}{\cos^2\theta} \div \frac{\cos^2\theta}{\sin^2\theta} =$

$\csc^2\theta = \checkmark$

8. $\tan^2 x \sin^2 x = \tan^2 x - \sin^2 x$

$(\sec^2 x - 1)(\sin^2 x) =$

$\sec^2 x \cdot \sin^2 x - \sin^2 x =$

$\frac{1}{\cos^2 x}\cdot \sin^2 x - \sin^2 x$

$\tan^2 x - \sin^2 x =$ ✓

9. $(\sin\theta+\cos\theta)^2+(\sin\theta-\cos\theta)^2=2$

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

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

$1+1=$

$2=2$ ✓

10. $(\sin\theta+\cos\theta)(\tan\theta+\cot\theta)=\sec\theta+\csc\theta$

$\sin\theta\tan\theta+\sin\theta\cot\theta+\cos\theta\tan\theta+\cos\theta\cot\theta=$

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

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

$\csc\theta+\sec\theta$

11. $\frac{\tan\theta-1}{\tan\theta+1}=\frac{1-\cot\theta}{1+\cot\theta}$

$\frac{\frac{\sin\theta}{\cos\theta}-\frac{\cos\theta}{\cos\theta}}{\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\cos\theta}}=\frac{\frac{1}{\cot\theta}-\frac{\cot\theta}{\cot\theta}}{\frac{1}{\cot\theta}+\frac{\cot\theta}{\cot\theta}}$

$\frac{1-\cot\theta}{\cot\theta}\cdot\frac{\cot\theta}{1+\cot\theta}$

$=\frac{1-\cot\theta}{1+\cot\theta}$

12. $\frac{1-\tan^2x}{1+\tan^2x}=1-2\sin^2x$

$\frac{1-\tan^2x}{\sec^2x}$

$\frac{1}{\sec^2x}-\frac{\tan^2x}{\sec^2x}$ $\frac{5}{c}\div\frac{c}{c}$

$\cos^2x-\sin^2x=$

$1-\sin^2x-\sin^2x$

$1-2\sin^2x=$ ✓

13. $\frac{\cos x+1}{\sin^3x}=\frac{\csc x}{1-\cos x}$

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

$\frac{1}{\sin x(1-\cos x)(1+\cos x)}$

$\frac{1}{\sin x(1-\cos x)}=\frac{1}{\sin x}\cdot\frac{1}{1-\cos x}$

$\csc x\left(\frac{1}{1-\cos x}\right)$

$\frac{\csc x}{1-\cos x}$

14. $\csc^4x-\cot^4x=\csc^2x+\cot^2x$

$(\csc^2x-\cot^2x)(\csc^2x+\cot^2x)=$

$(1+\cot^2x-\cot^2x)$

$1(\csc^2x+\cot^2x)=$ ✓

15. $\frac{\tan\theta}{\sec\theta}+\frac{\cot\theta}{\csc\theta}=\sin\theta+\cos\theta$

$\frac{5}{c}\div\frac{c}{4}$ $\frac{c}{5}\cdot\frac{4}{1}$

$\sin\theta+\cos\theta$

16. $\frac{\sin y+\tan y}{1+\sec y}=\sin y$

$\frac{\sin y+\frac{\sin y}{\cos y}}{1+\frac{1}{\cos y}}=$

$\frac{\sin\cdot\cos+\sin}{\frac{\cos+1}{\cos}}=\frac{\sin(\cos+1)}{\cos+1}$

$\sin y=$ ✓