#11 WS Prove Trig Identities

Name: ____________________

Prove each statement by using fundamental identities. You must show each step!

1. $\cot\theta \cdot \sec\theta = \csc\theta$

$\frac{\cos\theta}{\sin\theta} \cdot \frac{1}{\cos\theta} =$

$\frac{1}{\sin\theta} =$

$\csc\theta =$

2. $\sec^2\beta\left(1-\sin^2\beta\right)=1$

3. $\frac{1-\sin^2 x}{\csc^2 x-1}=\sin^2 x$

$\sin^2\theta+\cos^2\theta=1$

$\cos^2\theta=1-\sin^2\theta$

$1+\cot^2\theta=\csc^2\theta$

$\frac{\cos^2\theta}{\cot^2\theta}$

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

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

$\sin^2\theta$

4. $\frac{1}{\tan^2 x+1}=\cos^2 x$

5. $(\csc\theta+1)(\csc\theta-1)=\cot^2\theta$

$\csc^2\theta-1 =$

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

$\cot^2\theta =$

6. $\frac{\cot x}{\csc x}=\cos x$

7. $\frac{\cos^2 x - 4}{\cos x - 2} = \cos x + 2$

$\frac{(\cos x + 2)(\cos x - 2)}{\cos x - 2} =$

$\cos x + 2 =$

8. $\frac{1}{1+\cos x} + \frac{1}{1-\cos x} = 2\csc^2 x$

9. $\tan x - \frac{\sec^2 x}{\tan x} = -\cot x$

$\cos^2\theta + \sin^2\theta = 1$

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

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

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

$\frac{-1}{\tan x} =$

$-\cot x =$

10. $\tan^2 x - \tan^2 x \cdot \sin^2 x = \sin^2 x$

Find the exact value in radians WITHOUT using a calculator.

11. $\sin\left(Sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right) = \frac{\sqrt{3}}{2}$	12. $Sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$	13. $\text{Arctan}\left(-\sqrt{3}\right) = -\frac{\pi}{3}$	14. $\text{Arccos}\left(\cos\frac{7\pi}{6}\right)$
15. $\sin\left(Tan^{-1}\left(\frac{\sqrt{3}}{3}\right)\right) = \frac{1}{2}$	16. $\sin\left(\text{Arccos}\frac{1}{2}\right)$	17. $\text{Arccos}\left(\sin\frac{\pi}{6}\right) = \frac{\pi}{3}$	18. $\text{Arctan}(\sin 1)$