Secondary 3 Honors

Name:____________________________

11.1 Verifying Trigonometric Identities Practice

Verify each identity. Show all work.

1. $\tan x \csc x \cos x = 1$

2. $\tan x \ \sec x \ \sin x = \tan^2 x$

3. $(\sin x - \cos x)(\sin x + \cos x) = 1 - 2\cos^2 x$

4. $(\tan x)(1 - \cot x) = \tan x - 1$

5. $\frac{1}{\sin x} - \frac{1}{\cos x} = \boxed{\frac{\cos x - \sin x}{\sin x \cos x}}$

$$\frac{\cos x}{\sin x \cos x} - \frac{\sin x}{\sin x \cos x}$$

6. $\frac{\cos x}{1-\sin x} = \sec x + \tan x$

7. $\boxed{\sin^4 x - \cos^4 x} = \sin^2 x - \cos^2 x$

$(\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x)$

8. $\frac{\cos x \tan x - \sin x}{\cot x} = 0$

9. $\boxed{(\sin x + \cos x)^2} = 1 + 2 \sin x \cos x$

$(\sin x + \cos x)(\sin x + \cos x)$

$\sin^2 x + \sin x \cos x + \sin x \cos x + \cos^2 x$

$\underbrace{\sin^2 x + \cos^2 x}_{1} + 2 \sin x \cos x$

$1 + 2 \sin x \cos x$ ✓

10. $\boxed{\frac{2\sin x\cot x+\sin x-4\cot x-2}{2\cot x+1}} = \sin x - 2$

$2\sin x\cot x + \sin x - 4\cot x - 2$

$2\sin x\cot x - 4\cot x + \sin x - 2$

$$\frac{2\cot x(\sin x - 2) + (\sin x - 2)}{2\cot x + 1}$$

$$\frac{\cancel{(2\cot x+1)}(\sin x-2)}{\cancel{2\cot x+1}} = \sin x - 2 \checkmark$$

11. $\sec x - \cos x = \sin x \tan x$

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

13. $\boxed{\dfrac{2\cot x}{\cot x+\tan x}} = 2\cos^2 x$

$$\frac{2\,\frac{\cos x}{\sin x}}{\frac{\cos x}{\sin x}+\frac{\sin x}{\cos x}}$$

common denominator: $\sin x \cos x$

$$\frac{2\,\frac{\cos x}{\sin x}}{\frac{\cos x}{\sin x}+\frac{\sin x}{\cos x}} \cdot \frac{\sin x\cos x}{\sin x\cos x}$$

$$\frac{2\cdot\frac{\cos x\,\cancel{\sin x}\cos x}{\cancel{\sin x}}}{\frac{\cos x\,\cancel{\sin x}\cos x}{\cancel{\sin x}}+\frac{\sin x\sin x\,\cancel{\cos x}}{\cancel{\cos x}}}$$

$$= \frac{2\cos^2 x}{\underbrace{\cos^2 x+\sin^2 x}_{=1}} = 2\cos^2 x \blacksquare$$