Bellwork Alg 2B Friday, June 8, 2018

Simplify each trigonometric expression.

1. $\text{Sin}^2 x\text{Cot}x\text{Csc}x$

2. $\dfrac{\text{Tan}x + \text{Cot}x}{\text{Cot}x}$

3. $\dfrac{\text{Cos}^2\theta - 1}{\text{Sin}^2\theta - 1}$

4. $\text{Sec}x\text{Cot}x - \text{Cot}x\text{Cos}x$

5. $\dfrac{\text{Cos}x}{1 + \text{Sin}x} + \dfrac{\text{Cos}x}{1 - \text{Sin}x}$

6. $\dfrac{\text{Tan}x - \text{Tan}x\text{Sin}^2 x}{2\text{Sin}x\text{Cos}x}$

7. $\dfrac{\text{Tan}x}{\text{Tan}x + \text{Cot}x}$

8. $\dfrac{1 - \text{Tan}^2 x}{1 + \text{Tan}^2 x} + 1$

Verify each trigonometric Identity.

9. $\text{Sin}x\text{Tan}x = \text{Csc}x\text{Tan}x - \text{Cos}x$

10. $\dfrac{\text{Sin}x(1 + \text{Sin}x)}{1 - \text{Cos}^2 x} = \text{Csc}x + 1$

ALG 2B Bellwork Fri 6-8-18 **Answers**

(1) $\sin^2 x \cot x \csc x$

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

(2) $\frac{\tan x + \cot x}{\cot x}$

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

$= \left(\frac{\sin}{\cos} + \frac{\cos}{\sin}\right)\frac{\sin}{\cos}$

$= \frac{\sin^2}{\cos^2} + 1 \cdot \frac{\cos^2}{\cos^2}$

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

$= \boxed{\sec^2 x}$

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

$= \boxed{\tan^2 \theta}$

(4) $\sec x \cot x - \cot x \cos x$

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

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

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

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

$= \frac{2}{\cos x} = \boxed{2\sec x}$

(6) $\frac{\tan x - \tan x \sin^2 x}{2 \sin x \cos x} = \frac{\tan x (1 - \sin^2 x)}{2 \sin x \cos x} = \frac{\tan x \cos^2 x}{2 \sin x \cos x}$

$= \frac{\tan x \cos x}{2 \sin x} = \frac{\frac{\sin x}{\cos x} \cdot \cos x}{2 \sin x} = \frac{\sin x}{2 \sin x} = \boxed{\frac{1}{2}}$

(7) $\dfrac{\tan x}{\tan x + \cot x} = \dfrac{\frac{\sin}{\cos}}{\frac{\sin}{\cos} + \frac{\cos}{\sin}} \cdot \dfrac{\sin \cdot \cos}{\sin \cdot \cos} = \dfrac{\sin^2}{\sin^2 + \cos^2}$

$= \dfrac{\sin^2}{1} = \boxed{\sin^2 x}$

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(8) $\dfrac{1-\tan^2 x}{1+\tan^2 x} + 1 = \dfrac{1-\tan^2 x}{1+\tan^2 x} + \dfrac{1+\tan^2 x}{1+\tan^2 x} = \dfrac{1-\tan^2 x + 1 + \tan^2 x}{1+\tan^2 x} = \dfrac{2}{1+\tan^2 x}$

$= \dfrac{2}{\sec^2 x}$

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

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(9) $\sin x \tan x = \csc x \tan x - \cos x$

$\sin \cdot \dfrac{\sin}{\cos} = \dfrac{1}{\sin} \cdot \dfrac{\sin}{\cos} - \cos$

$\dfrac{\sin^2}{\cos} = \dfrac{1}{\cos} - \cos \cdot \dfrac{\cos}{\cos}$

$= \dfrac{1}{\cos} - \dfrac{\cos^2}{\cos}$

$= \dfrac{1-\cos^2}{\cos}$

$\boxed{\dfrac{\sin^2 x}{\cos x} = \dfrac{\sin^2 x}{\cos x}}$

(10) $\dfrac{\sin x\,(1+\sin x)}{1-\cos^2 x} = \csc x + 1$

$\dfrac{\sin x\,(1+\sin x)}{\sin^2 x}$

$\dfrac{1+\sin x}{\sin x}$

$\dfrac{1}{\sin x} + \dfrac{\sin x}{\sin x}$

$\csc x + 1 = \csc x + 1$