

Hon Alg 2 Bellwork Friday, June 2, 2017

Simplify each trigonometric expression.

1. $\sec x \cdot \cot x - \cot x \cdot \cos x$

2. $\frac{1 + \cot \theta}{\csc \theta} - \sin \theta$

3. $\frac{\csc x}{\tan x + \cot x}$

4. $\frac{\sec x - \cos x}{\tan x}$

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$$(1) \sec x \cdot \cot x - \cot x \cdot \cos x$$

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

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

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

$$(2) \frac{1 + \cot \theta}{\csc \theta} - \sin \theta = \frac{\sin}{\sin} \cdot \frac{1 + \frac{\cos}{\sin}}{\frac{1}{\sin}} - \sin = \frac{\sin + \cos}{1} - \sin$$

$$= \sin + \cos - \sin = \boxed{\cos \theta}$$

$$(3) \frac{\csc x}{\tan x + \cot x} = \frac{\frac{1}{\sin}}{\frac{\sin}{\sin} \cdot \frac{\sin}{\cos} + \frac{\cos}{\sin} \cdot \frac{\cos}{\cos}} = \frac{\frac{1}{\sin}}{\frac{\sin^2}{\sin \cdot \cos} + \frac{\cos^2}{\sin \cdot \cos}}$$

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

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

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

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