

Bellwork Alg 2B Wednesday, May 16, 2018

Simplify each trigonometric expression into a single trigonometric function or a constant.

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

2.  $\frac{\text{Sin}x(1 + \text{Sin}x)}{1 - \text{Cos}^2 x} - 1$

3.  $\frac{\text{Tan}x - \text{Tan}x\text{Sin}^2 x}{\text{Sin}x\text{Cos}x}$

4.  $\frac{\text{Sin}x}{1 - \text{Cos}x} + \frac{1 - \text{Cos}x}{\text{Sin}x}$

Simplify each trigonometric expression into a single trigonometric function or a constant.

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

$$\begin{aligned}
 &= \frac{1}{\cos} \cdot \frac{\cos}{\sin} - \frac{\cos}{\sin} \cdot \cos \\
 &= \frac{1}{\sin} - \frac{\cos^2}{\sin} \\
 &= \frac{1 - \cos^2}{\sin} \\
 &= \frac{\sin^2}{\sin} \\
 &= \boxed{\sin x}
 \end{aligned}$$

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

$$\begin{aligned}
 &= \frac{\sin x + \sin^2 x}{\sin^2 x} - 1 \\
 &= \frac{\sin x + \sin^2 x}{\sin^2 x} - \frac{\sin^2 x}{\sin^2 x} \\
 &= \frac{\sin x + \sin^2 x - \sin^2 x}{\sin^2 x} \\
 &= \frac{\sin x}{\sin^2 x} \\
 &= \frac{1}{\sin x} \\
 &= \boxed{\csc x}
 \end{aligned}$$

3.  $\frac{\tan x - \tan x \sin^2 x}{\sin x \cos x}$

$$\begin{aligned}
 &= \frac{\tan(1 - \sin^2)}{\sin \cdot \cos} \\
 &= \frac{\tan \cdot \cos^2}{\sin \cdot \cos} \\
 &= \frac{\tan \cdot \cos}{\sin} \\
 &= \frac{\sin}{\cos} \cdot \frac{\cos}{\sin} \\
 &= \frac{\sin}{\sin} = \boxed{1}
 \end{aligned}$$

4.  $\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x}$

$$\begin{aligned}
 &= \frac{\sin}{\sin} \cdot \frac{\sin}{1 - \cos} + \frac{1 - \cos}{\sin} \cdot \frac{1 - \cos}{1 - \cos} \\
 &= \frac{\sin^2 + 1 - 2\cos + \cos^2}{\sin(1 - \cos)} \\
 &= \frac{1 - 2\cos + \cos^2 + \sin^2}{\sin(1 - \cos)} \\
 &= \frac{1 - 2\cos + 1}{\sin(1 - \cos)} \\
 &= \frac{2 - 2\cos}{\sin(1 - \cos)} \\
 &= \frac{2(1 - \cos)}{\sin(1 - \cos)} = \frac{2}{\sin} = \boxed{2 \csc x}
 \end{aligned}$$