Answer Key · Lesson 5.3: Simplifying and Proving Identities

School Launch · Trigonometry · Unit 5 · Worksheet A · for the parent

Key

1. $\tan^2 x$

Simplify to a single trigonometric function or a constant: $\sin^2 x \sec^2 x$.

2. $\tan x$

Simplify to a single trigonometric function or a constant: $\frac{\sec x}{\csc x}$.

3. $\cos x$

Simplify to a single trigonometric function or a constant: $\sec x - \sin x \tan x$.

4. 1

1. $1 + \tan^2 x = \sec^2 x$
2. So $\sec^2 x - \tan^2 x = 1$

Simplify to a single trigonometric function or a constant: $\sec^2 x - \tan^2 x$.

5. 1

1. $1 + \tan^2 x = \sec^2 x$
2. $\sec^2 x \cos^2 x = \dfrac{\cos^2 x}{\cos^2 x} = 1$

Simplify to a single trigonometric function or a constant: $(1 + \tan^2 x)\cos^2 x$.

6. $\cos x$

1. $\sin x \cdot \dfrac{\cos x}{\sin x}$
2. $= \cos x$

Simplify to a single trigonometric function or a constant: $\sin x \cot x$.

7. 1

1. $\dfrac{\cos x}{\sin x} \cdot \dfrac{1}{\cos x} \cdot \sin x$
2. Everything cancels: $= 1$

Simplify to a single trigonometric function or a constant: $\cot x \sec x \sin x$.

8. $2 \csc x$

1. Common denominator: $\dfrac{\sin^2 x + (1 + \cos x)^2}{(1 + \cos x)\sin x}$
2. Numerator: $\sin^2 x + 1 + 2\cos x + \cos^2 x = 2 + 2\cos x = 2(1 + \cos x)$
3. $\dfrac{2(1 + \cos x)}{(1 + \cos x)\sin x} = \dfrac{2}{\sin x} = 2 \csc x$

Simplify to a single trigonometric function or a constant: $\frac{\sin x}{1+\cos x} + \frac{1+\cos x}{\sin x}$.

9. $\sin x$

1. $\dfrac{\sin x}{\cos x} \cdot \cos x$
2. $= \sin x$

Simplify to a single trigonometric function or a constant: $\tan x \cos x$.

10. 1

1. $1 + \cot^2 x = \csc^2 x$
2. So $\csc^2 x - \cot^2 x = 1$

Simplify to a single trigonometric function or a constant: $\csc^2 x - \cot^2 x$.