

# Key

## Unit 7 Lesson #1 More Practice A: Verifying Trig Identities

Verify each Identity

1)  $\tan \theta \cot \theta - \cos^2 \theta = \sin^2 \theta$

$$\tan \theta \cdot \frac{1}{\tan \theta} - \cos^2 \theta$$

$$\frac{\tan \theta}{\tan \theta} - \cos^2 \theta$$

$$1 - \cos^2 \theta$$

$$\sin^2 \theta = \sin^2 \theta \checkmark$$

2)  $(\csc x - 1)(\csc x + 1) = \cot^2 x$

$$\csc^2 x - 1 = \cot^2 x$$

$$\cot^2 x = \cot^2 x \checkmark$$

3)  $\tan^2 \alpha \cos^2 \alpha + \cot^2 \alpha \sin^2 \alpha = 1$

$$\frac{\sin^2 \theta}{\cos^2 \theta} \cdot \cos^2 \theta + \frac{\cos^2 \theta}{\sin^2 \theta} \cdot \sin^2 \theta$$

$$\sin^2 \theta + \cos^2 \theta$$

$$1 = 1 \checkmark$$

4)  $(\sin \beta + \cos \beta)^2 + (\sin \beta - \cos \beta)^2 = 2$

$$\begin{aligned} & \sin^2 B + 2\sin B \cos B + \cos^2 B \\ & + \sin^2 B - 2\sin B \cos B + \cos^2 B \end{aligned}$$

$$2\sin^2 B + 2\cos^2 B$$

$$2(\sin^2 B + \cos^2 B)$$

$$\frac{2(1)}{2}$$

$$= 2 \checkmark$$

$$5) \frac{1 + \cos \theta}{1 + \cos \theta} \cdot \frac{1 - \sin^2 \theta}{1 - \sin^2 \theta} = \cos \theta$$

$1 + \cos \theta$

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

$$\frac{\cos^2 \theta + \cos \theta}{1 + \cos \theta}$$

$$\frac{\cos \theta (\cos \theta + 1)}{(1 + \cos \theta)}$$

$$\cos \theta = \cos \theta \checkmark$$

$$6) \frac{(1 + \sin x) \tan x}{(1 + \sin x)} + \frac{\cos x}{1 + \sin x} = \sec x$$

$$\frac{\tan x + \tan x \sin x + \cos x}{1 + \sin x}$$

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

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

$1 + \sin x$

$$8) \frac{\sin^2 x - \tan x}{\cos^2 x - \cot x} = \tan^2 x$$

$$\frac{\sin^2 x - \frac{\sin x}{\cos x}}{\cos^2 x - \frac{\cos x}{\sin x}}$$

$$\frac{\sin^2 x \cos x - \sin x}{\cos^2 x \sin x - \cos x}$$

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

$$= \frac{\sin x}{\cos x} = \tan x$$

$$= \frac{\sin^2 x}{\cos^2 x} = \tan^2 x$$

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

$$7) \frac{(1 + \cos \alpha) \sec \alpha - 1}{(1 + \cos \alpha)} = \sec \alpha$$

$$\frac{(1 + \cos \alpha) \left( \frac{1}{\cos \alpha} - 1 \right)}{1 - \cos^2 \alpha}$$

$$\frac{1}{\cos \alpha} = 1 + 1 - \cos \alpha$$

$$1 - \cos^2 \alpha$$

$$\frac{1}{\cos \alpha} = \cos \alpha$$

$$\sin^2 \alpha$$

$$1 - \cos^2 \alpha = \sin^2 \alpha$$

$$\cos \alpha$$

$$\frac{\sin x + 1}{\cos x} = \sec x$$

$$\frac{1}{\cos x} = \sec x \checkmark$$

$$\sec x = \sec x \checkmark$$