

Precalculus - Verifying Review UNIT 7 → 7.1-7.3

$$\textcircled{1} 3\sin^2\theta + 2\cos^2\theta - 2 = \sin^2\theta$$

$$\textcircled{2} \csc x - \frac{\cos^2 x}{\sin x} = \sin x$$

$$\textcircled{3} \frac{\sec x}{\sin x} - \frac{\sin x}{\cos x} = \cot x$$

$$\textcircled{4} \cos^2 x - \sin^2 x \cos^2 x = \cos^4 x$$

$$\textcircled{5} \frac{\sin^2 x}{\sec^2 x - 1} = \cos^2 x$$

$$\textcircled{6} \frac{\csc x}{\tan x + \cot x} = \cos x$$

$$\textcircled{7} \sin\left(\frac{3\pi}{2} + x\right) = -\cos x$$

# Verifying Review Answer Key

$$\begin{aligned} \textcircled{1} \quad 3 \sin^2 \theta + 2 \cos^2 \theta - 2 &= \sin^2 \theta \\ &= 3 \sin^2 \theta + 2(1 - \sin^2 \theta) - 2 \\ &= 3 \sin^2 \theta + 2 - 2 \sin^2 \theta - 2 \\ &= \sin^2 \theta \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad \csc x - \frac{\cos^2 x}{\sin x} &= \sin x \\ &= \frac{1}{\sin x} - \frac{\cos^2 x}{\sin x} \\ &= \frac{1 - \cos^2 x}{\sin x} \\ &= \frac{\sin^2 x}{\sin x} \\ &= \sin x \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad \cos^2 x - \sin^2 x \cos^2 x &= \cos^4 x \\ &= \cos^2 x (1 - \sin^2 x) \\ &= \cos^2 x \cdot \cos^2 x \\ &= \cos^4 x \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad \frac{\sin^2 x}{\sec^2 x - 1} &= \cos^2 x \\ &= \frac{\sin^2 x}{\tan^2 x} \\ &= \frac{\sin^2 x}{\sin^2 x} \cdot \frac{\cos^2 x}{\cos^2 x} \\ &= \cos^2 x \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad \sin\left(\frac{3\pi}{2} + x\right) &= -\cos x \\ &= \sin\frac{3\pi}{2} \cos x + \cos\frac{3\pi}{2} \sin x \\ &= (-1) \cos x + (0) \sin x \\ &= -\cos x \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad \frac{\sec x}{\sin x} - \frac{\sin x}{\cos x} &= \cot x \\ &= \frac{1}{\cos x \sin x} - \frac{\sin^2 x}{\cos x \sin x} \\ &= \frac{1 - \sin^2 x}{\cos x \sin x} \\ &= \frac{\cos^2 x}{\cos x \sin x} \\ &= \frac{\cos x}{\sin x} \\ &= \cot x \end{aligned}$$

$$\begin{aligned} \textcircled{6} \quad \frac{\csc x}{\tan x + \cot x} &= \cos x \\ &= \frac{\frac{1}{\sin x}}{\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}} \\ &= \frac{\frac{1}{\sin x}}{\frac{\sin^2 x}{\sin x \cos x} + \frac{\cos^2 x}{\sin x \cos x}} \\ &= \frac{\frac{1}{\sin x}}{\frac{\sin^2 x + \cos^2 x}{\sin x \cos x}} \\ &= \frac{1}{\sin x} \cdot \frac{\sin x \cos x}{1} \\ &= \cos x \end{aligned}$$