

PDM - Trig Identities # 2

$$\textcircled{1} 1 - \sin x \cos x \tan x = \cos^2 x$$

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

$$1 - \sin^2 x =$$

$$\underline{\cos^2 x = \cos^2 x} \checkmark$$

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

$$1 - 2(1 - \cos^2 x) =$$

$$1 - 2 + 2 \cos^2 x =$$

$$\underline{2 \cos^2 x - 1 = 2 \cos^2 x - 1} \checkmark$$

$$\textcircled{3} \sin x \tan x + \cos x = \sec x$$

$$\sin x \cdot \frac{\sin x}{\cos x} + \cos x =$$

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

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

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

$$\underline{\sec x = \sec x} \checkmark$$

$$\textcircled{4} \frac{\sin x \cot x + \cos x}{\sin x} = 2 \cot x$$

$$\frac{\sin x \cot x}{\sin x} + \frac{\cos x}{\sin x} =$$

$$\cot x + \cot x =$$

$$\underline{2 \cot x = 2 \cot x} \checkmark$$

$$\textcircled{5} \frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$$

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

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

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

$$\underline{\frac{1 + \sin x}{\cos x} = \frac{1 + \sin x}{\cos x}} \checkmark$$

$$\textcircled{6} \quad \frac{1}{\cot x - \tan x} = \frac{\sin x \cos x}{1 - 2\sin^2 x}$$

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

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

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

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

$$\textcircled{7} \quad \sec^2 x \sin^2 x + (\sin x + \cos x)^2 - \sec^2 x = 2\sin x \cos x$$

$$\sec^2 x \sin^2 x + \sin^2 x + 2\sin x \cos x + \cos^2 x - \sec^2 x =$$

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

$$\tan^2 x + 2\sin x \cos x + 1 - 1 - \tan^2 x =$$

$$\underline{2\sin x \cos x} = 2\sin x \cos x \checkmark$$

Primary Values

$$\textcircled{1} \quad \cos x = -\frac{\sqrt{2}}{2}$$

$$x = \frac{3\pi}{4}, \frac{5\pi}{4}$$

$$\textcircled{2} \quad \sec x = \frac{1}{2}$$

$$\Rightarrow \cos x = 2$$

No solution

$$\textcircled{3} \quad \tan^2 x \sin x = -\sin x$$

$$\tan^2 x \sin x + \sin x = 0$$

$$\sin x (\tan^2 x + 1) = 0$$

$$\sin x \cdot \sec^2 x = 0$$

$$\sin x = 0$$

$$\sec^2 x = 0$$

$$x = 0, 2\pi$$

$$\sec x = 0$$

undefined

$\textcircled{4}$

$$-2\sin^2 x - 5\cos x + 4 = 0$$

$$-2(1 - \cos^2 x) - 5\cos x + 4 = 0$$

$$-2 + 2\cos^2 x - 5\cos x + 4 = 0$$

$$2\cos^2 x - 5\cos x + 2 = 0$$

$$(2\cos x - 1)(\cos x - 2) = 0$$

$$\cos x = \frac{1}{2}$$

$$\cos x = 2$$

Never

$$x = \frac{\pi}{3}, \frac{5\pi}{3}$$