Verifying W.S | Key

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

$\sec^2 x - 1 = \tan^2 x$

$\tan^2 x = \tan^2 x$

② $\tan x(\cot x + \tan x) = \sec^2 x$

$1 + \tan^2 x$

$\sec^2 x$

③ $\sin x(\csc x - \sin x) = \cos^2 x$

$1 - \sin^2 x$

$\cos^2 x$

④ $\cos x(\sec x - \cos x) = \sin^2 x$

$1 - \cos^2 x$

$\sin^2 x$

⑤ $\csc^2 x - \cos^2 x \csc^2 x = 1$

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

$\csc^2 x(\sin^2 x)$

1

⑥ $\cos^2 x + \tan^2 x \cos^2 x = 1$

$\cos^2 x(1 + \tan^2 x) = 1$

$\cos^2 x(\sec^2 x)$

1

⑦ $(\sec\theta + 1)(\sec\theta - 1) = \tan^2\theta$

$\sec^2\theta - 1$

$\tan^2\theta$

⑧ $(1 + \sin x)(1 - \sin x) = \cos^2 x$

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

$\cos^2 x = \cos^2 x$

⑨ $\sec^2 A + \tan^2 A \sec^2 A = \sec^4 A$

$\sec^2 A(1 + \tan^2 A)$

$\sec^2 A \cdot \sec^2 A$

$\sec^4 A$

⑩ $\cot^2 A \csc^2 A - \cot^2 A = \cot^4 A$

$\cot^2 A(\csc^2 A - 1)$

$\cot^2 A \cdot \cot^2 A$

$\cot^4 A$

⑪ $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$

$(\cos^2 x - \sin^2 x)(\cos^2 x + \sin^2 x)$

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

$1 - 2\sin^2 x$

⑫ $\sec^4 x - \tan^4 x = 1 + 2\tan^2 x$

$(\sec^2 x - \tan^2 x)(\sec^2 x + \tan^2 x)$

$(\tan^2 x + 1 - \tan^2 x)(\tan^2 x + 1 + \tan^2 x)$

$(1)(1 + 2\tan^2 x)$

⑬ $\dfrac{1}{\sin x \cos x} - \dfrac{\cos x}{\sin x} = \tan x$

$\dfrac{1 - \cos^2 x}{\sin x \cos x}$

$\dfrac{\sin^2 x}{\sin x \cos x}$

$\dfrac{\sin x}{\cos x}$

$\tan x$

(14) $\frac{\sec x}{\sin x} - \frac{\sin x}{\cos x} = \cot x$

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

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

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

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

$\cot x$

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

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

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

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

(15) $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$ OK! $\Rightarrow \sin^2 x + \cos^2 x = 1$

$1 = 1$

$\sin x \sec x + \cos x \csc x$

$\csc x \sec x$

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

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

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

1

(16) $\frac{1}{\sec^2 x} + \frac{1}{\csc^2 x} = 1$ OK! $\sin^2 x + \cos^2 x = 1$

$1 = 1$

$\frac{\csc^2 x + \sec^2 x}{\sec^2 x \csc^2 x}$

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

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

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

(17) $\frac{1}{1+\cos x} = \csc^2 x - \csc x \cot x$

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

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

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

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

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

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

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

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

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

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

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

(19) $\frac{\cos x}{\sec x - 1} - \frac{\cos x}{\tan^2 x} = \cot^2 x$

$\sec^2 x - 1$

$\frac{\cos x}{\sec x - 1} - \frac{\cos x}{(\sec x - 1)(\sec x + 1)}$

$\frac{\cos x(\sec x + 1) - \cos x}{\tan^2 x}$

$\frac{1 + \cos x - \cos x}{\tan^2 x}$

$\frac{1}{\tan^2 x}$

$\cot^2 x$

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

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

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

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

$2\csc x$

(21) $\frac{\sec x}{\sec x - \tan x} = \sec^2 x + \sec x \tan x$

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

$\frac{1}{1-\sin x} \cdot \frac{1+\sin x}{1+\sin x}$

$\frac{1+\sin x}{1-\sin^2 x}$

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

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

$\sec^2 x + \sec x \tan x$

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

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

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

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

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

(23) $\sin^3 x \cos^2 x = \sin^3 x - \sin^5 x$

$\sin^3 x (1 - \sin^2 x)$

$\sin^3 x - \sin^5 x$

(24) $\sin^3 x \cos^2 x = \cos^2 x \sin x - \cos^4 x \sin x$

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

$\cos^2 x \sin x \sin^2 x$

$\cos^2 x \sin^3 x$

(25) $\sec^2 x + \csc^2 x = \sec^2 x \csc^2 x$

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

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

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

$\sec^2 x \csc^2 x$

(26) $\sec x + \tan x = \frac{1}{\sec x - \tan x}$

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

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

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

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