HW3 HW - Simplifying & Verifying

① $\tan^2\theta - \sec^2\theta$

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

$\tan^2\theta - 1 - \tan^2\theta$

-1

② $(1-\cos^2 x)(\csc x)$

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

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

$\sin x$

③ $\tan^2 x - \tan^2 x \sin^2 x$

★FACTOR!

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

$\tan^2 x \cdot \cos^2 x$

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

$\sin^2 x$

④ $\sin\theta(\csc\theta - \sin\theta)$

★distribute★

$\sin\theta\csc\theta - \sin^2\theta$

$\sin\theta \cdot \frac{1}{\sin\theta} - \sin^2\theta$

$1 - \sin^2\theta$

$\cos^2\theta$

⑤ $\frac{\tan^2\theta}{\sec^2\theta}$

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

$\frac{\sin^2\theta}{\cos^2\theta} \cdot \frac{\cos^2\theta}{1}$

$\sin^2\theta$

⑥ $(\cot\theta + \csc\theta)(\cot\theta - \csc\theta)$

★FOIL★

$\cot^2\theta - \cot\theta\csc\theta + \cot\theta\csc\theta - \csc^2\theta$

$\cot^2\theta - \csc^2\theta$

-1

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

get a common denominator

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

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

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

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

$$2\csc^2 x$$

(8) $\tan\theta - \dfrac{\sec^2\theta}{\tan\theta}$

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

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

$$\tan\theta - \frac{1}{\cos\theta\sin\theta}$$

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

*get a common denom: $\cos\theta\sin\theta$

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

Pythag ID ... be careful w/ your signs! *

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

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

$$\frac{-\cos\theta}{\sin\theta}$$

$$-\cot\theta$$

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

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

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

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

$$\sin^2 x + \cos x = \sin^2 x + \cos x$$ ☺

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

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

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

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

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

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

$$\cot^2\theta(\cot^2\theta + 1) = \frac{\csc^2\theta}{\tan^2\theta}$$

$$\cot^2\theta \csc^2\theta = \frac{\csc^2\theta}{\tan^2\theta}$$

$$\frac{1}{\tan^2\theta} \cdot \csc^2\theta = \frac{\csc^2\theta}{\tan^2\theta}$$

$$\frac{\csc^2\theta}{\tan^2\theta} = \frac{\csc^2\theta}{\tan^2\theta}$$ ☺

(12) $$\frac{1 - \tan^2\theta}{\sec^2\theta} = \cos^2\theta - \sin^2\theta$$

$$\frac{1}{\sec^2\theta} - \frac{\tan^2\theta}{\sec^2\theta} = \cos^2\theta - \sin^2\theta$$

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

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

$$\cos^2\theta - \sin^2\theta = \cos^2\theta - \sin^2\theta$$ ☺

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

$$\frac{1}{\tan^2 x} = \csc^2 x \cos^2 x$$

$$\cot^2 x = \csc^2 x \cos^2 x$$

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

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

$$\csc^2 x \cos^2 x = \csc^2 x \cos^2 x \quad \text{(11)}$$

(14) $$\frac{\sec^2 x + \csc^2 x}{\cot^2 x} = \sec^4 x$$

$$\frac{\sec^2 x}{\cot^2 x} + \frac{\csc^2 x}{\cot^2 x} = \sec^4 x$$

$$\frac{1}{\cot^2 x} \cdot \sec^2 x + \frac{\frac{1}{\sin^2 x}}{\frac{\cos^2 x}{\sin^2 x}} = \sec^4 x$$

$$\tan^2 x \sec^2 x + \frac{1}{\sin^2 x} \cdot \frac{\sin^2 x}{\cos^2 x} = \sec^4 x$$

$$\tan^2 x \sec^2 x + \frac{1}{\cos^2 x} = \sec^4 x$$

$$\tan^2 x \sec^2 x + \sec^2 x = \sec^4 x$$

$$\sec^2 x (\tan^2 x + 1) = \sec^4 x$$

$$\sec^2 x \cdot \sec^2 x = \sec^4 x$$

$$\sec^4 x = \sec^4 x \quad \text{(11)}$$