

Verifying WS 2

$$1. \sin^3 \theta + \sin \theta \cos^2 \theta \\ = \sin \theta (\sin^2 \theta + \cos^2 \theta) = \sin \theta (1) = \underline{\sin \theta}$$

ugh!

$$2. \frac{1 + \sec(-x)}{\sin(-x) + \tan(-x)} = \frac{1 + \sec x}{-\sin x - \tan x} = \frac{1 + \sec x}{-(\sin x + \tan x)}$$
$$= \frac{-(1 + \sec x)}{\sin x + \tan x} = \frac{-(1 + \sec x)}{\left(\sin x + \frac{\sin x}{\cos x}\right) \sin x \left(1 + \frac{1}{\cos x}\right)}$$
$$= \frac{-(1 + \sec x)}{\sin x (1 + \sec x)} = \frac{-1}{\sin x} = \underline{\underline{-\csc x}}$$

$$3. \frac{\cos x}{(1 - \sin x)} \cdot \frac{(1 + \sin x)}{(1 + \sin x)} = \frac{\cos x (1 + \sin x)}{(1 - \sin^2 x)} = \frac{\cos x (1 + \sin x)}{\cos^2 x}$$
$$= \frac{1 + \sin x}{\cos x} = \frac{1}{\cos x} + \frac{\sin x}{\cos x} = \underline{\underline{\sec x + \tan x}}$$

$$4. \frac{(\cos x - \cos y)}{(\sin x + \sin y)} + \frac{(\sin x - \sin y)}{(\cos x + \cos y)} = \frac{\cos^2 x - \cos^2 y + \sin^2 y - \sin^2 x}{(\sin x + \sin y)(\cos x + \cos y)}$$
$$= \frac{(1 - \cos^2 y) - \sin^2 y}{CD} = \frac{\sin^2 y - \sin^2 y}{CD} = \frac{0}{CD} = \underline{\underline{0}}$$

$$5. \cos^2 x - \sin^2 x = (1 - \sin^2 x) - \sin^2 x = \underline{\underline{1 - 2\sin^2 x}}$$

$$6. \frac{\csc^2 x - 1}{\csc^2 x} = \frac{\cot^2 x}{\csc^2 x} = \frac{\cos^2 x}{\frac{1}{\sin^2 x}} = \frac{\cos^2 x}{\sin^2 x} \cdot \frac{\sin^2 x}{1} = \underline{\underline{\cos^2 x}}$$

$$7. \frac{1}{(1-\cos x)} + \frac{1}{(1+\cos x)} = \frac{1+\cos x + 1-\cos x}{(1-\cos x)(1+\cos x)} = \frac{2}{1-\cos^2 x}$$

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

$$8. (\cot^2 \theta + 1)(\sin^2 \theta - 1)$$

$$= (\csc^2 \theta) \cdot (-\cos^2 \theta) = \frac{1}{\sin^2 \theta} (-\cos^2 \theta) = -\frac{\cos^2 \theta}{\sin^2 \theta} = \underline{\underline{-\cot^2 \theta}}$$

$$9. \frac{\sin x}{(1-\cos x)} \cdot \frac{(1+\cos x)}{(1+\cos x)} = \frac{\sin x(1+\cos x)}{(1-\cos^2 x)}$$

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

$$= \underline{\underline{\csc x + \cot x}}$$

$$10. \frac{\tan x + \tan y}{1 - \tan x \tan y} = \frac{\frac{\sin x}{\cos x} + \frac{\sin y}{\cos y}}{1 - \frac{\sin x \sin y}{\cos x \cos y}} = \frac{\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y}}{\frac{\cos x \cos y - \sin x \sin y}{\cos x \cos y}}$$

$$= \underline{\underline{\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y - \sin x \sin y}}}$$