

Simplifying Trig Expr. WS 2

$$1) \tan^2 x - \sec^2 x = \boxed{-1}$$

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

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

$$3) \cos x + \tan x \sin x$$

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

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

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

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

$$4) \frac{\sin x \cos x}{1 - \sin^2 x} = \frac{\sin x \cos x}{\cos^2 x} = \frac{\sin x}{\cos x} = \boxed{\tan x}$$

$$5) \frac{\sin(-x)}{\cos(-x)} = \frac{-\sin x}{\cos x} = \boxed{-\tan x}$$

$$6) \cos x \csc x = \cos x \cdot \frac{1}{\sin x} = \boxed{\cot x}$$

$$7) \sec^4 x - \tan^4 x$$

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

$$1 (\sec^2 x + \tan^2 x) = \boxed{\sec^2 x + \tan^2 x}$$

$$8) \frac{\sec^2 x - 1}{\sin^2 x} = \frac{\tan^2 x}{\sin^2 x} = \frac{\sin^2 x / \cos^2 x}{\sin^2 x} = \frac{\cancel{\sin^2 x}}{\cos^2 x} \cdot \frac{1}{\cancel{\sin^2 x}}$$

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

$$9) \cot x \sin x = \frac{\cos x}{\cancel{\sin x}} \cdot \frac{\cancel{\sin x}}{1} = \boxed{\cos x}$$

$$10) \sin \beta (\csc \beta - \sin \beta) = \sin \beta \left(\frac{1}{\sin \beta} - \sin \beta \right)$$

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

$$11) \frac{\cot x}{\csc x} = \frac{\cos x / \sin x}{1 / \sin x} = \frac{\cos x}{\sin x} \cdot \frac{\cancel{\sin x}}{1} = \boxed{\cos x}$$

$$12) \sec \beta \cdot \frac{\sin \beta}{\tan \beta} = \frac{1}{\cos \beta} \cdot \frac{\sin \beta}{\sin \beta / \cos \beta} = \frac{1}{\cancel{\cos \beta}} \cdot \frac{\cancel{\sin \beta}}{1} \cdot \frac{\cos \beta}{\cancel{\sin \beta}} = \boxed{1}$$

$$13) \cot^2 x - \cot^2 x \cos^2 x$$

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

$$14) \sin^2 x \sec^2 x - \sin^2 x$$

$$= \sin^2 x (\sec^2 x - 1) = \boxed{\sin^2 x (\tan^2 x)}$$

$$15) \tan^4 x + 2 \tan^2 x + 1$$

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

$$16) \sin^4 x - \cos^4 x$$

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

$$\underbrace{(\sin^2 x + \cos^2 x)}_1 (\sin^2 x - \cos^2 x) = \boxed{\sin^2 x - \cos^2 x}$$

$$17) \sin^4 x + 2\sin^2 x \cos^2 x + \cos^4 x$$

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

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

$$18) \tan^2 x - \tan^2 x \sin^2 x$$

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

$$19) (\sin x + \cos x)^2 = (\sin x + \cos x)(\sin x + \cos x)$$

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

$$= \underbrace{\sin^2 x + \cos^2 x}_1 + 2\sin x \cos x$$

$$= \boxed{1 + 2\sin x \cos x}$$

$$20) (\cot x + \csc x)(\cot x - \csc x)$$

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

$$= \boxed{-1}$$