

Simplifying Tris Expressions W2

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

because $1 + \tan^2 x = \sec^2 x$

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

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

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

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

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

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

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

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

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

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

$$7) \sec^4 x - \tan^4 x = (\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x)$$

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

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

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

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

$$10) \sin B \left(\frac{1}{\sin B} - \sin B \right)$$

$$= \frac{\sin B}{\sin B} - \sin^2 B$$

$$= \frac{1 - \sin^2 B}{\sin B}$$

$$= \boxed{\cos^2 B}$$

$$11) \frac{\cos x}{\frac{1}{\sin x}} = \frac{\cos x \cdot \sin x}{1} = \boxed{\cos x}$$

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

$$13) \cot^2 x (1 - \cos^2 x) \\ \downarrow \\ = \frac{\cos^2 x}{\sin^2 x} (\sin^2 x) = \boxed{\cos^2 x}$$

$$14) \frac{\sin^2 x (\sec^2 x - 1)}{\sin^2 x (\tan^2 x)} = \boxed{1}$$

$$15) (\tan^2 x + 1)(\tan^2 x + 1) \\ = (\tan^2 x + 1)^2 \\ = (\sec^2 x)^2 \\ = \boxed{\sec^4 x}$$

$$16) \underbrace{(\sin^2 x + \cos^2 x)}_1 (\sin^2 x - \cos^2 x) = \boxed{\sin^2 x - \cos^2 x}$$

$$17) (\sin^2 x + \cos^2 x)^2 \\ = (1)^2 \\ = \boxed{1}$$

$$18) \tan^2 x (1 - \sin^2 x) \\ = \tan^2 x \cdot \cos^2 x \\ \downarrow \\ = \frac{\sin^2 x}{\cos^2 x} \cdot \cos^2 x = \boxed{\sin^2 x}$$

$$19) (\sin x + \cos x)(\sin x + \cos x) \\ = \sin^2 x + 2\sin x \cos x + \cos^2 x \\ = \sin^2 x + \cos^2 x + 2\sin x \cos x \\ = \boxed{1 + 2\sin x \cos x}$$

$$20) \cot^2 x - \csc^2 x = \boxed{-1} \\ \text{because } 1 + \cot^2 x = \csc^2 x$$