

$$24. \frac{1 + \tan x}{1 + \cot x} = \frac{1 + \frac{\sin x}{\cos x}}{1 + \frac{\cos x}{\sin x}}$$

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

$$= \frac{\sin x}{\cos x} = \boxed{\tan x}$$

$$25. (\sec^2 x + \csc^2 x) - (\tan^2 x + \cot^2 x)$$

$$\underbrace{\sec^2 x - \tan^2 x}_1 + \underbrace{\csc^2 x - \cot^2 x}_1 = \boxed{2}$$

$$26. \frac{\sec^2 u - \tan^2 u}{\cos^2 v + \sin^2 v} = \frac{1}{1} = \boxed{1}$$

$$27. (\sin x)(\tan x + \cot x) = (\sin x) \left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} \right)$$

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

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

$$29. \sin x \cos x \tan x \sec x \csc x$$

$$\cancel{\sin x} \cdot \cancel{\cos x} \cdot \cancel{\sin x} \cdot \cancel{\csc x} \cdot \cancel{\cos x} \cdot \cancel{\sin x} = \boxed{\tan x}$$

$$30. \frac{(\sec y - \tan y)(\sec y + \tan y)}{\sec y}$$

$$\frac{\sec^2 y - \tan^2 y}{\sec y} = \frac{1}{\sec y} = \boxed{\cos y}$$

$$37. \frac{\sec x}{\sin x} - \frac{\sin x}{\cos x}$$

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

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



