

$$\textcircled{1} \sin x \sec x \cot x = 1$$

$$\left(\frac{\sin x}{1}\right) \left(\frac{1}{\cos x}\right) \left(\frac{\cos x}{\sin x}\right)$$

$$\textcircled{2} (\csc \beta - 1)(\csc \beta + 1) = \csc^2 \beta - 1$$

$$\cot^2 \theta$$

$$\textcircled{3} \frac{\cot x}{\cot x} = \frac{\frac{\cos x}{\sin x}}{\frac{\cos x}{\sin x}} = \frac{1}{\cos x} = \frac{1}{\sin x} = \csc x$$

$$\textcircled{4} \csc x (\sec x - \cos x)$$

$$\csc x \sec x - \csc x \cos x$$

$$\frac{1}{\sin x} \cdot \frac{1}{\cos x} - \frac{1}{\sin x} \cdot \frac{\cos x}{1}$$

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

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

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

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

$$\textcircled{5} \frac{1 + \cot^2 \theta}{1 + \tan^2 \theta} = \frac{\csc^2 \theta}{\sec^2 \theta} = \frac{\frac{1}{\sin^2 \theta}}{\frac{1}{\cos^2 \theta}} = \cot^2 \theta$$

$$\textcircled{6} \frac{\cos x}{\frac{1}{\sin x}} - \frac{\sin x}{\frac{1}{\cos x}} = \cos x \sin x - \sin x \cos x = 0$$

$$\textcircled{7} \frac{\csc x - \sin x}{\cos x} = \frac{\frac{1}{\sin x} - \sin x}{\cos x} = \frac{1 - \sin^2 x}{\sin x \cos x} = \frac{1}{\cos x}$$

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