

$$(\sec y - \cos y)^2 = \tan^2 y - \sin^2 y$$

$$\hookrightarrow = \sec^2 y - 2\sec y \cos y + \cos^2 y$$

$$= \tan^2 y + \cancel{1} - \cancel{2} + \cancel{1} - \sin^2 y$$

$$= \tan^2 y - \sin^2 y$$

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

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

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

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

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

$$= 2\sec x$$

$$\frac{\cos^2 \beta}{1 - \csc^2 \beta}$$

$$= \frac{\cos^2 \beta}{-\cot^2 \beta}$$

$$= -\cos^2 \beta \tan^2 \beta$$

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

$$= -\sin^2 \beta$$

$$\frac{\cos \theta - \csc \theta}{\sec \theta - \sin \theta}$$

$$= \frac{\cos \theta - \frac{1}{\sin \theta}}{\frac{1}{\cos \theta} - \sin \theta} \cdot \frac{\cos \theta \sin \theta}{\cos \theta \sin \theta}$$

$$= \frac{(\cancel{\cos \theta \sin \theta} - 1) \cos \theta}{(1 - \cancel{\sin \theta \cos \theta}) \sin \theta}$$

$$= -\cot \theta$$

$$\cos t \cot(-t) + \sin(-t) - \csc(-t) + \cos(-t) - \sec(-t) = \sin t \tan(-t).$$

$$\hookrightarrow = -\cos t \cot t - \sin t + \csc t + \cos t - \sec t$$

$$= \frac{-\cos^2 t}{\sin t} - \sin t + \frac{1}{\sin t} + \cos t - \frac{1}{\cos t}$$

$$= \frac{-\cos^2 t - \sin^2 t + 1}{\sin t} + \frac{\cos^2 t - 1}{\cos t}$$

$$= \frac{-\sin^2 t}{\cos t}$$

$$= \sin t \cdot \frac{-\sin t}{\cos t}$$

$$= \sin t \cdot -\tan t$$

$$= \sin t \tan(-t)$$