

$$3. \frac{1 + \tan \theta}{1 + \cot \theta} = \tan \theta$$

$$\frac{1 + \frac{\sin \theta}{\cos \theta}}{1 + \frac{\cos \theta}{\sin \theta}} = \frac{\frac{\cos \theta + \sin \theta}{\cos \theta}}{\frac{\sin \theta + \cos \theta}{\sin \theta}}$$

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

$$5. \frac{\tan \beta + \cot \beta}{\sec \beta \csc \beta} = 1$$

$$\frac{\frac{\sin \beta}{\cos \beta} + \frac{\cos \beta}{\sin \beta}}{\frac{1}{\cos \beta} \cdot \frac{1}{\sin \beta}} = \frac{\frac{\sin^2 \beta + \cos^2 \beta}{\cos \beta \sin \beta}}{\frac{1}{\cos \beta \sin \beta}}$$

$$\frac{1}{\cancel{\cos \beta \sin \beta}} \cdot \frac{\cancel{\cos \beta \sin \beta}}{1} = 1$$

$$4. \frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \csc \theta$$

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

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

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

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

$$\frac{2}{\sin \theta} = 2 \csc \theta$$

$$6. \frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \sin \theta) \cos \theta} = \frac{\cos \theta}{1 + \sin \theta}$$

$$\frac{1 - \sin^2 \theta}{(1 + \sin \theta)(\cos \theta)}$$

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