

$$\text{VIII} \quad (1 + \sin \theta) \left(\frac{1}{\cos \theta} + \frac{\cos \theta}{(1 + \sin \theta)(1 + \sin \theta)} \right) = 2 \sec \theta$$

$(1 + \sin \theta)^2$

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

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

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

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

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

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

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

$$2 \frac{1}{\cos \theta} = 2 \sec \theta$$

$$\underline{2 \sec \theta = 2 \sec \theta}$$

$$\boxed{IX} \quad \frac{\sin 2\theta}{1 + \cos 2\theta} = \tan \theta$$

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

$$\frac{2 \sin \theta \cos \theta}{2 \cos^2 \theta} = \tan \theta$$

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

$$\underline{\tan \theta = \tan \theta}$$

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

$\sin^2 \theta + \cos^2 \theta = 1$
 $\cos^2 \theta = 1 - \sin^2 \theta$

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

$1 - \sin^2 \theta \rightarrow 1^2 - \sin^2 \theta$

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

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