Problem 6. *Show that* $\frac{1-\sin\theta}{\cos\theta} + \frac{\cos\theta}{1-\sin\theta} = 2\sec\theta$

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

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

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

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

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

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