

9.c Prove

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

Solution:

$$= \frac{\sin \theta (1 - 2 \sin^2 \theta)}{\cos \theta (2 \cos^2 \theta - 1)} \quad (0.0.1)$$

But

$$\cos 2\theta = 2 \cos^2 \theta - 1 \quad (0.0.2)$$

$$\cos 2\theta = 1 - 2 \sin^2 \theta \quad (0.0.3)$$

implies

$$= \frac{\sin \theta \cos 2\theta}{\cos \theta \cos 2\theta} \quad (0.0.4)$$

$$= \tan \theta \quad (0.0.5)$$

Graphical Verification:

