7. Prove the identity and generalize

$$\cos\frac{\theta}{2}\cos\frac{\theta}{4}\cos\frac{\theta}{8} = \frac{\sin\theta}{8\sin\frac{\theta}{8}}$$

$$L.S. = \cos\frac{\theta}{2}\cos\frac{\theta}{4}\cos\frac{\theta}{8}$$

$$= \frac{\cos\frac{\theta}{2}\cos\frac{\theta}{4}\cos\frac{\theta}{8}}{1} \cdot \frac{2\sin\frac{\theta}{8}}{2\sin\frac{\theta}{8}}$$ "dressing it up!"

$$= \frac{\cos\frac{\theta}{2}\cos\frac{\theta}{4}\sin\frac{\theta}{4}}{2\sin\frac{\theta}{8}} \cdot \frac{2}{2} = \frac{\cos\frac{\theta}{2}\sin\frac{\theta}{2}}{4\sin\frac{\theta}{8}}$$

$$= \frac{2\cos\frac{\theta}{2}\sin\frac{\theta}{2}}{8\sin\frac{\theta}{8}} = \frac{\sin\theta}{8\sin\frac{\theta}{8}} = R.S.$$ qed:)