

dividing  $\cos^2 \theta + \sin^2 \theta \equiv 1$  by  $\cos^2 \theta$

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

but  $\tan \theta = \frac{\sin \theta}{\cos \theta}$  and  $\sec \theta = \frac{1}{\cos \theta}$

$$\therefore \underline{1 + \tan^2 \theta \equiv \sec^2 \theta}$$