

THE PYTHAG. IDENTITIES CAN ONLY BE USED WHEN
COS/SIN IS SQUARED.

$\cos x + \sin x \neq 1$ like $a + b \neq c$ only $a^2 + b^2 = c^2$
even though

$$\cos^2 x + \sin^2 x = 1$$

$$3. \sin x - \sin x \cos^2 x = \sin^3 x$$

$$\text{L.S.} = \sin x (1 - \cos^2 x)$$

$$= \sin x (\sin^2 x)$$

$$= \sin^3 x$$

$$= \text{RS}$$

$$4. \frac{\cos x}{1 + \sin x} + \frac{1 + \sin x}{\cos x} = 2 \sec x$$

$$\text{L.S.} = \frac{\cos^2 x + (1 + \sin x)(1 + \sin x)}{(1 + \sin x) \cos x}$$

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

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

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

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

$$= \frac{2}{\cos x}$$

$$= 2 \sec x = \text{RS}$$

$$5. \frac{\cos x}{1 - \sin x} - \frac{\cos x}{1 + \sin x} = 2 \tan x$$

$$LS = \frac{\cos x(1 + \sin x) - \cos x(1 - \sin x)}{(1 - \sin x)(1 + \sin x)}$$

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

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

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

$$= \frac{2 \cos x \sin x}{\cos^2 x}$$

$$= \frac{2 \sin x}{\cos x}$$

$$= 2 \tan x = RS$$