Trigonometric Identities

1. $\sin x \tan x = \sec x - \cos x$

$$\rightarrow \sin x \tan x = \sin x \frac{\sin x}{\cos x}$$

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

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

$$= \underbrace{\frac{1}{\cos x}} - \cos x$$

$$= \sec x - \cos x \;//$$

2. $\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$

$$\rightarrow \cos^4 x - \sin^4 x = (\cos^2 x - \sin^2 x)\underbrace{(\cos^2 x + \sin^2 x)}_{=1}$$

$$= \underbrace{\cos^2 x} - \sin^2 x$$

$$= 1 - \sin^2 x - \sin^2 x$$

$$= 1 - 2\sin^2 x \;//$$