

$$55) \frac{1 - \sin 2x}{\cos 2x} = \frac{\cos 2x}{1 + \sin 2x}$$

To show this identity is equivalent to show that:

$$(1 - \sin 2x)(1 + \sin 2x) = \cos^2 2x$$

We have:

$$\begin{aligned} \cancel{\cancel{(1 - \sin 2x)(1 + \sin 2x)}} &= \underbrace{1 - \sin^2 2x} \\ &= \cos^2 2x \quad \cancel{\cancel{}} \end{aligned}$$

$$56) \frac{\sin 4x}{1 - \cos 4x} \cdot \frac{1 - \cos 2x}{\cos 2x} = \tan x$$

$$\rightarrow \frac{\sin 4x}{1 - \cos 4x} \cdot \frac{1 - \cos 2x}{\cos 2x} =$$

$$= \frac{2 \sin 2x \cos 2x}{1 - \cos 4x} \cdot \frac{1 - \cos 2x}{\cos 2x}$$

$$\begin{aligned} \cos 4x &= \cos 2 \cdot 2x \\ &= 1 - 2\sin^2 2x \end{aligned} \quad = \frac{2 \sin 2x \cdot (1 - \cos 2x)}{1 - \cos 4x}$$

$$\begin{aligned} 1 - \cos 2x &= \frac{2 \sin 2x}{1 - (1 - 2\sin^2 2x)} \cdot (1 - \cos 2x) = \\ &= 1 - (1 - 2\sin^2 2x) \end{aligned}$$

$$\begin{aligned} &= 2\sin^2 2x \\ &= \frac{\cancel{2} \sin^2 2x}{\cancel{2} \sin^2 2x} \cdot (1 - \cos 2x) = \frac{1 - \cos 2x}{\sin 2x} \end{aligned}$$

Hilroy
→