

$$45) \sin 8x = 8 \sin x \cos x \cos 2x \cos 4x$$

$$\rightarrow // \sin 8x = \sin 2 \cdot 4x$$

$$= 2 \sin 4x \cos 4x$$

$$= 2 \cdot \underbrace{(\sin(2 \cdot 2x))}_{\sin 4x} \cos 4x$$

$$= 2 \cdot 2 \sin 2x \cos 2x \cos 4x$$

$$= 4 \underbrace{\sin 2x \cos 2x}_{\sin 4x} \cos 4x$$

$$= 4 \cdot 2 \sin x \cos x \cos 2x \cos 4x$$

$$= 8 \sin x \cos x \cos 2x \cos 4x //$$

$$46) \sin x = 1 - 2 \sin^2 \left(\frac{\pi}{4} - \frac{x}{2} \right)$$

$$\rightarrow // 1 - 2 \sin^2 \left(\frac{\pi}{4} - \frac{x}{2} \right) = 1 - 2 \left(\sin \left(\frac{\pi}{4} - \frac{x}{2} \right) \right)^2$$

$$= 1 - 2 \left(\sin \frac{\pi}{4} \cos \frac{x}{2} - \sin \frac{x}{2} \cos \frac{\pi}{4} \right)^2$$

$$= 1 - 2 \left(\frac{\sqrt{2}}{2} \cos \frac{x}{2} - \frac{\sqrt{2}}{2} \sin \frac{x}{2} \right)^2$$

$$= 1 - 2 \left(\frac{\sqrt{2}}{2} (\cos \frac{x}{2} - \sin \frac{x}{2}) \right)^2$$

$$= 1 - \left(\underbrace{\cos^2 \frac{x}{2}}_{\frac{1}{2}} - 2 \cos \frac{x}{2} \sin \frac{x}{2} + \underbrace{\sin^2 \frac{x}{2}}_{\frac{1}{2}} \right)$$

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

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