(33 - cont.)

$$= \cos^2 x \sin^2 x + \cos^6 x - \sin^4 x - \sin^2 x + 2\sin^4 x - \sin^6 x$$

$$= \underbrace{(\cos^2 x - 1)} \sin^2 x + \cos^6 x + \sin^4 x - \sin^6 x$$

$$= \underbrace{-\sin^2 x} \sin^2 x + \cos^6 x + \sin^4 x - \sin^6 x$$

$$= -\cancel{\sin^4 x} + \cos^6 x + \cancel{\sin^4 x} - \sin^6 x$$

$$= \cos^6 x - \sin^6 x$$

Another derivation:

$$// \cos^6 x - \sin^6 x = (\cos^2 x)^3 - (\sin^2 x)^3$$

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

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

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

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

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