

$$34) 4(\cos^6 x + \sin^6 x) = 1 + 3\cos^2 2x$$

left-hand side

$$4(\cos^6 x + \sin^6 x) =$$

$$= 4(\cos^6 x + (\sin^2 x)^3)$$

$$= 4(\cos^6 x + \underbrace{(1 - \cos^2 x)^3})$$

$$= 4(\cos^6 x + (1 - 2\cos^2 x + \cos^4 x)(1 - \cos^2 x))$$

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

$$= 4(1 - 3\cos^2 x + 3\cos^4 x)$$

$$= 4 - 12\cos^2 x + 12\cos^4 x //$$

right-hand side

$$1 + 3\cos^2 2x = 1 + 3(2\cos^2 x - 1)^2$$

$$= 1 + 3(4\cos^4 x - 4\cos^2 x + 1)$$

$$= 1 + 12\cos^4 x - 12\cos^2 x + 3$$

$$= 4 - 12\cos^2 x + 12\cos^4 x //$$

OK!

$$\therefore // 4(\cos^6 x + \sin^6 x) = 1 + 3\cos^2 2x //$$