$$\cos^2(z) = \frac{1+\cos(2z)}{2} = \frac{1+\sum\limits_{n=0}^{\infty}(-1)^n \frac{(2z)^{2n}}{(2n)!}}{2} = 1 + \sum\limits_{n=1}^{\infty}(-1)^n \frac{2^{2n-1}}{(2n)!}z^{2n}$$