

$$\begin{aligned}(a + b)^4 &= (a + b)^2 (a + b)^2 \\ &= (a^2 + 2ab + b^2)(a^2 + 2ab + b^2) \quad (1) \\ &= a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4\end{aligned}$$