Operations with Power Series

Let $f(x) = \sum_{n=0}^{\infty} a_n x^n$ and $g(x) = \sum_{n=0}^{\infty} b_n x^n$

$$1. \quad f(kx) = \sum_{n=0}^{\infty} a_n k^n x^n$$

$$2. \quad f(x^N) = \sum_{n=0}^{\infty} a_n x^{nN}$$

$$3. \quad f(x) \pm g(x) = \sum_{n=0}^{\infty} (a_n \pm b_n) x^n$$