

Let z and h be complex numbers, and let $n \geq 2$ be an integer. Show that

$$\frac{(z+h)^n - z^n}{h} - nz^{n-1} = h \sum_{k=0}^{n-2} \binom{n}{k} z^k h^{n-2-k}$$

where $\binom{n}{k} = \frac{n!}{k!(n-k)!}$.