$$f(x) = g(x) = \sum_{n=1}^{\infty} \left(\frac{x}{2}\right)^n = 0 + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{16} + \cdots$$

Find power series of $f(x) \cdot g(x)$

$$C_n = \frac{1}{2^n} \rightarrow C_{n-1} = \frac{1}{2^{n-1}}$$

$$\left(0 + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{16} + \cdots\right)\left(0 + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{16} + \cdots\right)$$

n^{th} coeff. of $f \cdot g$

$n+1$

$$C_0 d_n + C_1 d_{n-1} + C_2 d_{n-2} + \cdots C_{n-1} d_1 + C_n d_0$$

$$0 + \left(\frac{1}{2}\right)\left(\frac{1}{2^{n-1}}\right) + \left(\frac{1}{2^2}\right)\left(\frac{1}{2^{n-2}}\right) + \cdots + \left(\frac{1}{2^{n-1}}\right)\left(\frac{1}{2}\right) + 0$$

$$\underbrace{\frac{1}{2^n} + \frac{1}{2^n} + \frac{1}{2^n} + \cdots + \frac{1}{2^n}}_{n-1} = \sum_{k=1}^{n-1} \frac{1}{2^n}$$

$$= \frac{n-1}{2^n} \rightarrow \sum_{n=1}^{\infty} \frac{n-1}{2^n} x^n$$