Extra Exercise Problem Sets 1

Problem 1. Suppose that f and g are two differentiable functions defined on an open interval I.
Use the Mathematical Induction to show the Lebnitz rule:

$$\frac{d^n}{dx^n}\big[f(x)g(x)\big] = \sum_{k=0}^{n} C_k^n f^{(k)}(x)g^{(n-k)}(x) \qquad \forall\, n \in \mathbb{N}\,, x \in I\,.$$