Exercises

E15.1 [1BP] Prerequisites: [1G2]. Let $a \in \mathbb{R}$, let I be open interval with $a \in I$, and $\varphi_0 : I \to \mathbb{R}$ continuous.

We recursively define $\varphi_n : I \to \mathbb{R}$ for $n \geq 1$ via $\varphi_n(x) = \int_a^x \varphi_{n-1}(t)\,\mathbb{d}t$; show that

$$\varphi_{n+1}(x) = \frac{1}{n!}\int_a^x (x-t)^n \varphi_0(t)\,\mathbb{d}t \tag{15.1}$$

Solution 1. *[1BQ]*