$$f+g: \mathbf{A} + \mathbf{B} \to \mathbf{P}$$

$$, \quad \text{if } \mathbf{x} = \iota_{\mathbf{A}}($$

 $\mathbf{x} \mapsto \begin{cases} f(\mathbf{x}), & \text{if } \mathbf{x} = \iota_{\mathbf{A}}(a), & a \in \mathbf{A}, \\ g(\mathbf{x}), & \text{if } \mathbf{x} = \iota_{\mathbf{B}}(b), & b \in \mathbf{B}. \end{cases}$