The arity of a function is the number of variables (parameters) it introduces, and the number of arguments it can be applied to. Write axioms to define $\alpha f$ (arity of $f$).

§ As a first effort, we might try

$$\begin{align*}
\alpha x &= 0 & \text{if } x \text{ is not a function} \\
\alpha (A \to B) &= 1 + \alpha B
\end{align*}$$

Unfortunately, $\text{null} \to \text{null} \to 3 = \text{null} \to 3$, so we would prove $2=1$. And there are functions of mixed arity (similar to the list $[2; [3]]$; if indexed by 0 it cannot be indexed again, but if indexed by 1 it can be indexed again). So we try again.

$$\begin{align*}
\alpha x &= 0 & \text{if } x \text{ is not a function} \\
\alpha f &= 1 + \alpha(f(\Box f)) & \text{if } f \text{ is a function}
\end{align*}$$