The set of *free variables* of a term M is defined by recursion on the structure of M:

$$\begin{aligned}
\mathrm{FV}(x) &= \{x\} \\
\mathrm{FV}(PQ) &= \mathrm{FV}(P) \cup \mathrm{FV}(Q) \\
\mathrm{FV}(\lambda x.\, N) &= \mathrm{FV}(N) \setminus \{x\}
\end{aligned}$$

A term M without free variables is said to be *closed* or a *combinator*. The set of all closed terms is written Λ^0.

We define *capture-avoiding substitution* of N for free variable x in term M, written $M[N/x]$, recursively on the structure of M:

$$
\begin{aligned}
y[N/x] &= y && \text{if } x \neq y \\
y[N/x] &= N && \text{if } x = y \\
(PQ)[N/x] &= P[N/x]Q[N/x] \\
(\lambda y.\,P)[N/x] &= \lambda y.\,P && \text{if } y = x \\
(\lambda y.\,P)[N/x] &= \lambda y.\,P[N/x] && \text{if } y \neq x \text{ and } y \notin \mathrm{FV}(N)
\end{aligned}
$$