

$$\begin{aligned}
 f(k-1) &= 2^{k-1} - 1 - 2^{k-2} - 1 \\
 &= \underline{3 \cdot 2^{k-1}} - \underline{3} - \underline{2 \cdot 2^{k-2}} + \underline{2} \\
 &= \underline{3 \cdot 2 \cdot 2^{k-2}} - 2 \cdot 2^{k-2} - 1 \\
 &= \underline{6 \cdot 2^{k-2}} - 2 \cdot 2^{k-2} - 1 \\
 &= \underline{4 \cdot 2^{k-2}} - 1 \\
 &= 2^2 \cdot 2^{k-2} - 1 = 2^{2+k-2} - 1 \\
 &= 2^k - 1
 \end{aligned}$$