

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