$$
\begin{aligned}
f(t) &= (t+1)^4 - (t+1)^3 + 2(t+1) + 1 \\
&= t^4 + 4t^3 + 6t^2 + 4t + 1 \\
&\quad\ - \ \ t^3 - 3t^2 - 3t - 1 \\
&\qquad\qquad\quad 2t + 2 \\
&\qquad\qquad\qquad + 1 \\
&= t^4 + 3t^3 + 3t^2 + 3t + 3
\end{aligned}
$$