Consider the (7,4) Hamming code defined by the generator polynomial
\[ g(x) = 1 + X + X^3 \]
The code word 0111001 is sent over a noisy channel, producing the received word 0101001 that has a single error.

a) Determine the syndrome polynomial \( S(X) \) for this received word

b) Show that \( S(X) \) is identical to the error polynomial \( E(X) \).

\[ R(X) = C(X) + E(X) \]