1. Find the Lagrange polynomial through the points \((1, 2), (2, 5), (3, 4)\).

2. Find the expansion in Chebyshev polynomials \(T_0(x), T_1(x), T_2(x)\) of the function 
   \(f(x) = 1 + x^2\) defined for \(x \in [-1, 1]\).

3. Suppose that \(f(x) = c\) is a constant function. Show that for any sampling of \(f\),
   the piecewise linear approximation exactly equals \(f\).