1. Four consecutive samples of a speech signal have the values: \( s_0 = 3, s_1 = 2, s_2 = -1, s_3 = 1 \).

   (a) Apply the autocorrelation method of linear prediction analysis to find a first-order transfer function of the vocal tract.

   (b) What is the minimum error of your estimate? What is the gain of the transfer function?

2. A windowed segment of voiced speech has the autocorrelation values: \( R(0) = 6, R(1) = 2, R(2) = -1 \). Assume that the speech is modeled as the output of a filter \( H(z) \) to an unit impulse of gain \( G \). Find explicitly (give all numeric values) the transfer function \( H(z) = \frac{G}{A(z)} \) of an all-pole filter of second order for this model. Explain your method and show all intermediate steps.