Homework 5
(Non Parametric Estimation)

1. (a) For the set of samples \( X = \{-7,-5,-4, -3, -2, 0, 2, 3, 4, 5, 7\} \) Taking them in sequence, find the Parzen window estimate to \( P_j(x) \) for a rectangular window. Use \( h_j = 1/\sqrt{j} \).
Sketch the results as a function of \( x \) for \( j = 1, 4, 11 \).

(b) Suppose \( h_j = h/\sqrt{j} \) where \( h \) is a constant chosen at the beginning. Comment on the shape of \( P_j(x) \) for various choices of \( h \).

2. For the following samples in a one-dimensional problem: \( X = \{x_1, x_2, ..., x_{16}\} = \{0, 1, 3, 4, 5, 5.5, 6.0, 6.5, 7.0, 7.2, 7.5, 8.0, 8.8, 9.2, 9.3, 11, 13\} \). Give the values of the k-nearest neighbor estimate \( P_j(x) \), for \( j = 16 \) and \( k_j = \sqrt{j} \), at \( x = 2, x = 4, x = 6, x = 8, \) and \( x = 10 \).