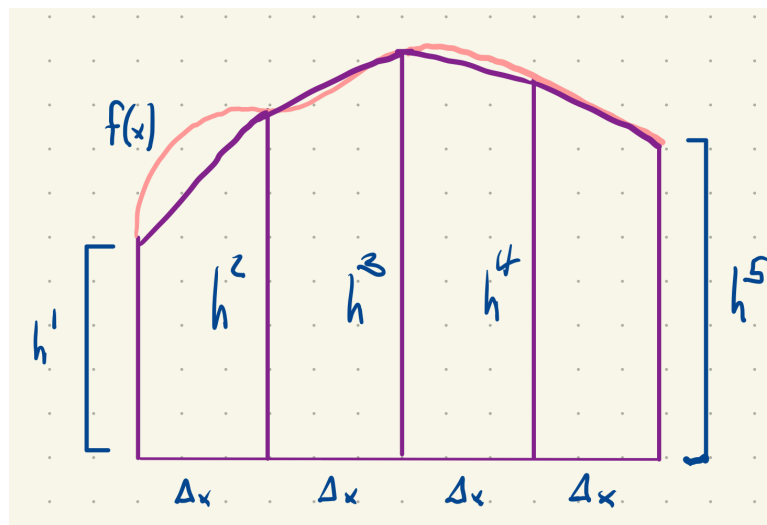


Name:

- (4 points)** The vector x has length 30 and each entry is either a 1 or a 0. Using an inner product, along with vector notation, write down a tidy little expression that equals the total number of ones in x .
- (6 points)** Recall the trapezoid rule for integrating functions, as in the figure below, where the integral is estimated using areas of trapezoids. The area of a trapezoid with width w and heights h_1 and h_2 is $w(h_1 + h_2)/2$.



Let $h = (h_1, \dots, h_5)$ be the vector of heights in the figure, and assume that $\Delta x = 1/4$. Express the sum of the area of the trapezoids in the form $c^T h$. That is, find the vector c . A complete answer expresses c as a vector of 5 explicit numbers.