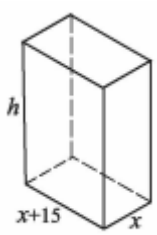
MAT 116E Advanced Scientific and Engineering Computing

Lab-10

Q-1. A 240-cm long rod is cut into 12 pieces, which are welded together to form the frame of a rectangular box. The length of the box's base is 15 cm longer than its width.



a) Create a polynomial expression for the volume V in terms of x.
b) Make a plot of V versus x.
c) Determine the x that maximizes the volume and determine that volume.

Q-2. Data on the vapor pressure P of water as a function of temperature T are given in the following table. Determine whether the data can be described by a linear($y = mx + n$) fit or by an exponential fit ($y = be^{mx}$) by calculating the SSE(sum of squared error). Develop a model of the pressure as a function of temperature using the ***polyfit*** command, and use best fit curve to estimate the pressure at a temperature of $T = 300°K$.

T	273	278	283	288	293	298
P	4.579	6.543	9.209	12.788	17.535	23.756

Let $y\ be\ actual\ data\ point$ and $\bar{y}$ be the estimated values, then SSE is calculated as follows:

$$SSE = \sum_{i=1}^{n} (y_i - \bar{y}_i)^2$$

where n is the number of data points. In one figure sketch linear fit, exponential fit and data points.