MAE384 Homework 4

1. The set of the following 4 data points is given:

x	y
0	1
1	6
2	25
3	76

(a) Perform interpolation by determining the 3rd order polynomial that passes through the points, using Lagrange interpolation method. Show your procedure, including the detail of the Lagrange functions used in the intermediate steps. Use the result to determine the value of y at $x = 1.5$. **2.5 points**
(b) Make a plot of (i) the original data points, (ii) the 3rd order polynomial obtained in (a) that passes through all the data points, and (iii) the four Lagrange functions that are used in (a). (Plotting (i) and (ii) together should demonstrate that your answer to (a) is correct.) **0.5 point**

Note: If you choose to solve (a) by Matlab, please provide not only the Matlab codes but also the detail of the Lagrange functions that are used in the intermediate steps.

2. The set of the following 4 data points is given:

x	y
0.5	0.5
2	1.5
3	2
5	1.2

(a) Determine the quadratic splines that fit the data. Show your detailed procedure except for the step of solving the matrix equation, which can be done with the **a\b** command of Matlab (or other means as you see fit) without detail.
4 points
(b) To demonstrate that you have obtained the correct answer, plot your splines along with the original data points in one figure, in the fashion of the figure in Example 5-7 (p. 215) in the textbook.
1 point