MATH 4513 : HOMEWORK 6

1. Find the Newton and Lagrange forms for the interpolation polynomial corresponding to the following sets of data.

(a)

$$\begin{array}{ll} x_0 = 0 & y_0 = -1 \\ x_1 = 1 & y_1 = -2 \\ x_2 = 2 & y_2 = -1 \\ x_3 = 3 & y_3 = -4 \end{array}$$

(b)

$$\begin{array}{ll} x_0 = 1 & y_0 = 3 \\ x_1 = 2 & y_1 = 2 \\ x_2 = 0 & y_2 = -4 \\ x_3 = 3 & y_3 = 5 \end{array}$$

2. What is the maximal error that can occur in approximating $f(x) = \cosh(x)$ by a polynomial interpolation at 6 points in the interval $[0, -1]$.

3. Suppose you had to design an experiment that would determine an interpolating polynomial for a function that takes values in the range between 1 and 100. If you can only take 10 data points, which points should you choose?