1. For the data \((x_i, y_i) = (0, 6.0) (1, 4.0) (2, 3.0), (4, 7.0)\),
a) Write down the Lagrange form of the interpolating polynomial \(p(x)\). (There is no need
to algebraically multiply out the polynomial. Leave it in Lagrange form.)
b) Evaluate the polynomial at \(x = 3.0\), and at \(x = 5.0\).
c) If I change the third \(y\) value from 3.0 to \(3.0 + \delta\), how much does \(p(5)\) change?

2. Compute the divided difference table for the data in problem 1. Use it to construct the
Newton form of the interpolating cubic for this data. Evaluate the cubic at 3.0 and 5.0 and
make sure the results agree with problem 1.

3. For the data in the problem one, use Matlab to interpolate the data.
(a) Evaluate the cubic at 3.0 and 10.0 and make sure the results agree with problem 1. This
can be done by the commands:

\[
\begin{align*}
x &= [0\ 1\ 2\ 4] \\
y &= [6\ 4\ 3\ 7] \\
c &= \text{polyfit}(x, y, 3) \\
\text{polyval}(c, 3.0)
\end{align*}
\]

Turn in the values of \(c\) and the values of the polynomial at the 3.0 and 10.0.
(b) The vector \(c\) gives the standard form coefficients. Which component is the constant
term of the cubic?
(c) Plot the polynomial and the data on the interval \([-1, 5]\). This can be done with the
commands:

\[
\begin{align*}
h &= [-1:0.01:5] \\
\text{ph} &= \text{polyval}(c, h) \\
\text{plot}(h, \text{ph}, x, y, '*')
\end{align*}
\]

The semicolons suppress printing. Turn in your plot. Typing "help polyval" etc. will give
more information on these commands.