Computational Methods   Summer 2021
HOMEWORK 12

Due Date: Tuesday, June 22

1. Use Newton's divided differences to find the Newton table, and a polynomial for interpolating the points $(-1, 0), (2, 1), (3, 1), (5, 2)$.

2. Let $P(x)$ be the degree 10 polynomial taking the value zero at $x = 1, 2, ..., 10$ and where $P(12) = 66$. Find $P(0)$. (Hint: Choose the interpolant basis wisely.)

3. (Optional, not graded) Count the number of operations $(+ - */)$ needed to evaluate a polynomial through n data points in (i) Lagrange form, and (ii) Newton's divided differences. Which is more efficient in terms of evaluation complexity? [Suppose in (ii) that the Newton polynomial is written in *nested form*. For example the nested form of $1 + 2x + 3x^2 + 4x^3$ is $1 + x(2 + x(3 + 4x))$.]