

Supplemental 1: Consider these three points: $\{(1, 1), (2.5, 8), (4, 5)\}$. Find the polynomial $P(x)$ of degree 2 which passes through these points. Do this three different ways, by using

- (a) the Vandermonde matrix method,
- (b) the Newton form and its triangular matrix method, and
- (c) the Lagrange form.

Supplemental 2: Consider the x coordinates $x_0 = 0$, $x_1 = \pi/3$, $x_2 = 2\pi/3$ and $x_3 = \pi$.

- a) Plot the four Lagrange basis functions ϕ_k $k = 0, \dots, 4$ on a single graph with domain $[0, \pi]$.
- b) Plot the four Newton interpolation basis functions ψ_k , each on its own individual graph.
- c) Plot the graph of $\sin(x)$ along with its Lagrange interpolant p_{Lag} .
- d) Plot the graph of $\sin(x)$ along with its Newton interpolant p_{Newt} .
- e) What is the relative error of $p_{\text{Lag}}(\pi/4)$?

Exercise 8.1:

Exercise 8.2:

Midterm, problem 6: