## Problem Set 2 Numerical Analysis, MATH 3377/6577 Due Wednesday, October 2, 2024

Do the following problems from the text, *Numerical Analysis*, 10th edition, by Burden, Faires and Burden.

Each item is worth 10 points.

- 1. Section 2.3: 6a and 6d
- 2. Section 2.3: 8a and 8d
- 3. Section 2.3: 19
- 4. Section 2.3: 24
- 5. Section 2.4: 1a and 2a
- 6. Section 2.6: 2a and 2e
- 7. Section 2.6: 4b and 4f  $\,$
- 8. MATLAB Exercise: Let  $f(x) = x^2 \cos(x)$ .
  - a) Use the points  $x_0 = 0$ ,  $x_1 = 1.3$ ,  $x_2 = 2$ ,  $x_3 = \pi$  to construct the Lagrange functions  $L_{n,k}(x)$  and the Lagrange polynomials  $P_n(x)$ , of degree n = 1, 2, 3 most appropriate to approximate f(1.5).
  - b) Make a MATLAB plot of 3 sets of graphs, comparing f(x) with  $P_1(x)$ ,  $P_2(x)$ , and  $P_3(x)$  on the same set of axes, respectively. Use the interval  $[0, \pi]$ .
- 9. Section 3.1: 1b and 3b
- 10. Section 3.2: 3b

## For Graduate Students:

- 11. Section 2.4: 14
- 12. Section 3.1: 13d