Due Date: February 20th, 2020. Problems due: 3,4

- 1. Complete the in-Class Worksheet
- 2. Write a function betatrap that uses the Trapezoid rule to evaluate

$$\beta(m,n) = \int_0^1 x^{m-1} (1-x)^{n-1} dx$$

for any m and n and for a sequence of decreasing panel sizes h. You may modify demoTrap.

3. Use the Lagrange interpolation polynomials to obtain a polynomial of least degree that assumes these values:

- 4. For the four interpolation nodes -1, 1, 3, 4, compute the Lagrange polynomials $l_{\cdot}(\cdot)$ required in the Lagrange interpolation procedure. Draw the graphs of these four functions to show their essential properties.
- 5. Solve the

$$\int_{0}^{1} (x^{2} + 2)^{-1} dx$$

via the following methods:

- (a) Use the Partition $\mathcal{P} = \{0, \frac{1}{2}, 1\}$ and calculate the lower sum.
- (b) calculate the integral using Midpoint rule.
- (c) calculate the integral using Trapezoid rule.
- (d) calculate the integral using Simpson rule.
- (e) calculate the integral using the anti-derivative.

Compare the answer and see if error bounds for the rules derived in class are optimal.