

Math 781 Hw6

due Wednesday 10/05/2022.

1. If a secant method is applied to the function $f(x) = x^2 - 2$, with $x_0 = 0$ and $x_1 = 1$. What is x_2 ?

2. Find the polynomial of least degree that interpolate the set of data. $\frac{x}{y} \left| \begin{array}{ccc} 7 & 1 & 2 \\ 146 & 2 & 1 \end{array} \right.$

3. Prove that if g interpolates the function f at x_0, x_1, \dots, x_{n-1} and if h interpolates f at x_1, x_2, \dots, x_n , then the function

$$g(x) + \frac{x_0 - x}{x_n - x_0}(g(x) - h(x))$$

interpolate f at x_0, x_1, \dots, x_n . (Hint: You need to check the function value at x_i equals to $f(x_i)$.)

4. Prove that $\sum_{i=0}^n L_i(x) = 1$ for all x , where $L_i(x)$ is the Lagrange interpolation polynomial basis. (Hint: Consider the interpolation polynomial for the function $f(x) = 1$.)