2.3 Problems

Problem 1. *Derive the error formula for Newton's method:*

$$|p - p_{n+1}| \leq \frac{M}{2|f'(p_n)|}|p - p_n|^2$$

2.5 Problems

Problem 2. *Steffensen's method is applied to a function $g(x)$ using $p_0^{(0)} = 1, p_2^{(0)} = 3$ to obtain $p_0^{(1)} = .75$. What is $p_1^{(0)}$?*

2.6 Problems

Problem 3. *Use Horner's method to evaluate $P(x) = 7x^4 - 2x^2 - 5x - 3$ at $x = 1$*

3.1 Problems

Problem 4. *Given $f(x) = x^3 - 4x^2 + 4$, find the Lagrange interpolation polynomial of degree at most three using the nodes $x_0 = -3, x_1 = -1, x_2 = 1, x_3 = 5$*

Problem 5. *Let $x_0 = -1, x_1 = 0, x_2 = 1$, define $f_0(x) = x^2 - 1, f_1(x) = 2x^2 + 3x, f_2(x) = -x^2 + 2x$. Evaluate these polynomials at x_i. Uses this to find a polynomial of degree at most 2 such that $g(x_0) = -4, g(x_1) = -1$, and $g(x_2) = 6$ without preforming any tedious computations.'*