(1) Let \( P_3(x) \) be the interpolating polynomial for the data \((0, 0), (0.5, y), (1, 3)\) and \((2, 2)\). Find \( y \) if the coefficient of \( x^3 \) in \( P_3(x) \) is 6.

(2) Let \( f(x) = e^x \) for \( 0 \leq x \leq 2 \). Approximate \( f(0.25) \) using linear interpolation with \( x_0 = 0 \) and \( x_1 = 0.5 \).

(3) Section 3.1, Exercise 19 (a and c).

(4) Section 3.1, Exercise 22.

(5) For a function \( f \), the forward divided differences are given by

\[
\begin{align*}
x_0 &= 0.0 \quad f[x_0] \\
f[x_0, x_1] \\
x_1 &= 0.4 \quad f[x_1] \\
f[x_0, x_1, x_2] = 50 \quad f[x_1, x_2] = 10 \\
x_2 &= 0.7 \quad f[x_2] = 6
\end{align*}
\]

Determine the missing entries.

(6) Let \( i_0, i_1, \cdots, i_n \) be a rearrangement of the integers \( 0, 1, \cdots, n \). Show that \( f[x_{i_0}, x_{i_1}, \cdots, x_{i_n}] = f[x_0, x_1, \cdots, x_n] \).

(7) Give explicit formulas for \( f[a], f[a, b], f[a, b, c] \) in terms of \( f(a), f(b) \) and \( f(c) \).

(8) Section 3.2, Exercise 7, 10, 16, 17 and 19.

(9) Using the Newton’s divided difference formula discussed in class, do Exercise 2 (a and b) in Section 3.3

Try to give an explicit formula for \( f[x, x+h, x+2h, \cdots, x+nh] \) (optional: You do not have to do it!).

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