

Note:

1. The problems are from the textbook by G. H. Givens and J. A. Hoeting
 2. There are total 2 questions: 5.1 and 5.2
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5.1. For the trapezoidal rule, express $p_i(x)$ as

$$f(x_i) + (x - x_i) \frac{f(x_{i+1}) - f(x_i)}{x_{i+1} - x_i}.$$

Expand f in Taylor series about x_i and evaluate this at $x = x_{i+1}$. Use the resulting expression in order to prove (5.14).

5.2. Following the approach in (5.8)–(5.11), derive A_{ij} for $j = 0, 1, 2$ for Simpson's rule.