Supplemental 1: Find n so that degree n polynomial interpolation of $f(x) = \cos(3x)$, using equally-spaced points on $[0, 2]$, gives a maximum approximation error $|f(x) - p(x)|$ which is less than 10^{-6} on $[0, 2]$.

Then use MATLAB's polyfit and polyval and a bit of trial and error to find the actual smallest n needed to approximate $f(x) = \cos(3x)$ to within 10^{-6}.

Text 8.9:

Text 8.7 (a,b):

Text 8.8:

Supplemental 2: At the bottom of page 198 is an inequality that describes the error from the piecewise-linear interpolant $\ell(x)$ for $f(x)$ on $[a, b]$. Suppose we have equally spaced points $a = x_0 < x_1 < \cdots < x_n = b$ with spacing $h = x_i - x_{i-1}$. Then:

$$|f(x) - \ell(x)| \leq \frac{Mh^2}{8}$$

for all $x \in [a, b]$. In this inequality we are assuming $f''(x)$ exists and is bounded by the number M, so that $|f''(x)| \leq M$ for all $x \in [a, b]$. Use this inequality to find n so that $|f(x) - l(x)| \leq 10^{-6}$ for $x \in [0, 2]$ if $f(x) = \cos(3x)$.