1. (4pts.) The Trapezoidal rule applied to $\int_0^2 f(x)\,dx$ gives the value 5, and the Midpoint rule gives the value 4. What value does Simpson's rule give?

2. (10pts.) Problem 8.2 on p376
((a) Using the composite midpoint....., (b) Based on the two...., (c) Would you expect....)

3. (8pts.) Problem 8.10 on p376
(Newton-Cotes quadrature rules are derived by fixing the nodes...)

4. (5pts.) Suppose that $f(0) = 1$, $f(0.5) = 2.5$, $f(1) = 2$ and $f(0.25) = f(0.75) = \alpha$. Find α if the Composite Trapezoidal rule with four subintervals gives the value 1.75 for $\int_0^1 f(x)\,dx$.

5. (5pts.) Determine constants a, b, c and d that will produce a quadratic formula

$$\int_{-1}^{1} f(x)\,dx = af(-1) + bf(1) + cf'(-1) + df'(1)$$

that has degree of precision 3.

6. (12pts.) Determine the number of subintervals and h required to approximate $\int_0^2 e^{2x} \sin 3x\,dx$ to within 10^{-4} using

   a. Composite Trapezoidal rule

   b. Composite Simpson's rule

   Write Matlab codes to compute approximate values by the rules using your n. Use the Matlab function *quad* or *quad8* for the integral and compare with your solutions.