

## ASE 211 Homework 11

Due: 12:00 noon, Friday, Nov 17.

1. Write a Matlab m-file which implements the composite Simpsons's Rule. Your input to the m-file should be the limits of integration  $a, b$  and the number of subintervals  $N$ . Remember that  $N$  has to be even.

Test your m-file on the integral

$$\int_0^1 x^3 dx = .25.$$

It should get the correct answer for any value of  $N$ .

Next, test your m-file on the integral

$$\int_0^1 x^5 dx = 1/6,$$

and show that as you double  $N = 2, 4, 8$ , the error goes to zero like  $h^4$ .

Test your m-file on the following integral:

$$\int_0^4 x^{2.8} e^{-2x} dx$$

and by taking a sufficient number of subintervals  $N$ , determine the integral to within four digits of accuracy.

2. Write a Matlab m-file which implements the composite 2-point Gauss quadrature formula. Test this m-file on all of the integrals in problem 1. In particular, the error should also go to zero like  $h^4$ .