ASE 211 Homework 11 Solution

1. Consider the following integral:

$$\int_0^{.9} \left[z^n \arccos(z) - \frac{z^{n+1}}{(n+1)\sqrt{1-z^2}} \right] dz$$

The actual value of this integral is

$$\frac{z^{n+1}}{n+1} \arccos(z)|_0^{.9}.$$

Using either matlab or working by hand, apply the composite trapezoidal rule and the composite Simpson's rule to the approximation of the integral above for $n = 2$. Use the composite formulas with $N = 2$, $N = 4$ and $N = 8$.

Answers:

Trapezoidal rule: N=2, .0421; N=4, .0893; N=8, .1040

Simpson's rule: N=2, .0849; N=4, .1050; N=8, .1090