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## Math128A: Numerical Analysis Programming Assignment \#2, Due April 9, 2008

Let $\alpha$ and $\omega$ be constants. Our job is to compute

$$
I(\alpha, \omega)=\int_{0}^{1}|\sin (\omega \pi x)|^{\alpha} d x
$$

for each of the values $\omega=1,10,100$ and $\alpha=0.5,1,2$. Compute this integral using

- Composite Simpson's rule for $N=20$.
- Gaussian Quadrature, using nodes and coefficients on Table 4.11, and formula (4.42).

Furthermore, for $\alpha=0.5$ and $\omega=2$,

- Re-arrange the integral to make it a proper integral. Note that the fact that the integrant is continuous does not make the integral proper. All of our quadratures require some smoonthness in derivatives.
- Re-compute the integral using the same Composite Simpson's rule and the Gaussian Quadrature.

Compare your results with those obtained from the quad function in matlab.

