Due Monday, April 14, at the start of class. Name: _____

Math 320 – Take Home Quiz 4

This quiz should take you approximately 25 minutes. You may use your calculator, your book, and your notes, but do not work together and do not get help. You are allowed to use Matlab/Octave, but it is not recommended.

1. Use the composite trapezoid rule with $n = 5$ subdivisions to approximate $\int_1^{1.5} \frac{1}{x} dx$.

2. Use the error term $-(b-a)\frac{h^2}{12} f''(\xi)$ from the composite trapezoid rule to bound the error of the approximation in question 1.

3. Show that the midpoint rule has degree of precision equal to one.

4. The composite trapezoid rule applied to $\int_0^4 \sin(\frac{x^2}{4})dx$ gives the results below for $h = .4, .2, .1$. Use two steps of extrapolation to improve the results (this is Romberg integration).

h	Approximation
.4	1.591849
.2	1.605178
.1	1.608462

5. (a) Using the composite Trapezoid Rule to approximate $\int_1^5 \frac{e^x}{x} dx$ with $h = .2$ gives 38.67 with an error of 0.08.

Approximately what error would result from using the composite Trapezoid rule with $h = .02$?

(b) Using the composite Simpson's Rule to approximate $\int_1^5 \frac{e^x}{x} dx$ with $h = .2$ gives 38.290170 with an error of 1.27×10^{-5}.

Approximately what error would result from using composite Simpson's rule with $h = .02$?