APPROXIMATE INTEGRATION

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Name: _____

In the following Problems, we will estimate

$$\int_0^\pi \sin^2(x)\,\mathrm{d}x = \frac{\pi}{2}.$$

1. Find the number of intervals required to estimate the integral using the Trapezoid or Midpoint rules with an error of no more than 10^{-4}.

2. Find the number of intervals required to estimate the integral using Simpson's Rule to with an error of no more than 10^{-4}.

3. Estimate the value of the integral using M_2, T_2, and S_4. For each of these, what is the error from your estimate?