# Math 373

MARCH 23, 2000

Quiz 4 ANSWERS Name _____

You are given the following data about a function $H(x)$:

$$\begin{aligned} H(1.5000) &= 2.2311 \\ H(1.5250) &= 2.2722 \\ H(1.5500) &= 2.2423 \end{aligned}$$

1. Use simple Simpson's rule to approximate $\int_{1.5}^{1.55} H(x)\,dx$.

   $I \approx \frac{.05}{6}(2.2311 + 2.2423 + 4 \cdot 2.2722) = .11308$

2. To use composite Simpson's rule with four subdivisions to approximate $\int_{1.5}^{1.55} H(x)\,dx$, at what points would you need to know the value of $H(x)$?

   You would have to divide each of the subintervals in half, and therefore you would need the values of $H(1.5125)$ and $H(1.5375)$.

3. If you used 4 rather than 2 subdivisions to approximate the integral using Simpson's rule, by what factor would you expect the error to go down?

   Composite Simpson's rule has an error term of $O(h^4)$. Hence doubling the number of intervals would halve $h$ and have a rough effect of decreasing the error by a factor of $(0.5)^4 = .0625$.