Quiz 2

MATH 2300-002

January 26, 2010

1. (a) $\displaystyle\int_1^{100} \frac{1}{x^2}\,dx =$

   (b) $\displaystyle\int_1^{10000} \frac{1}{x^2}\,dx =$

   (c) $\displaystyle\int_1^{1000000} \frac{1}{x^2}\,dx =$

   (d) $\displaystyle\int_1^{N} \frac{1}{x^2}\,dx =$

   (e) $\displaystyle\lim_{N\to\infty} \int_1^{N} \frac{1}{x^2}\,dx =$

   (f) What does this limit represent?

2. Repeat the last problem with $f(x) = \dfrac{1}{\sqrt{x}}$.

3. Verify Simpson's rule with one iteration (SIMP(1)) gives the exact answer for the definite integral of every cubic (or lower) polynomial. *It is enough to consider* $\int_0^1 1\,dx$, $\int_0^1 x\,dx$, $\int_0^1 x^2\,dx$, $\int_0^1 x^3\,dx$. *Try to explain why.*

	ACTUAL	LEFT	RIGHT	MID	TRAP	SIMP
$\int_0^1 1\,dx$						
$\int_0^1 x\,dx$						
$\int_0^1 x^2\,dx$						
$\int_0^1 x^3\,dx$						

4. Use partial fractions to expand $\dfrac{1}{x^4-1} = \dfrac{1}{(x-1)(x+1)(x-i)(x+i)}$. Your work should involve complex numbers, but your answer should not.