MATH 222 — THE FIRST MIDTERM

October 6, 2004, 12:05–12:55am

Your Name:

Your TA: (circle one)

Erik Andrejko Christine Carracino Diego Galindo

Hanjun Kim Seyfi Turkelli

Score

1a: 1b: 2: 3: 4a: 4b:

Total:

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1. (a) Find the partial fraction decomposition of $\dfrac{x-3}{x^3-x}$.

(b) Find the partial fraction decomposition of $\dfrac{x^2+1}{(x^2+9)^2(x^2-25)^3}$. You do not have to find the unknown coefficients "A,B, $\cdots$"

2. Compute $\int_0^{\alpha} \sin x \ln(\cos x)\, dx$, where α is some constant satisfying $0 < \alpha < \pi$.

3. Find a reduction formula for

$$I_k = \int (\ln x)^k \mathrm{d}x$$

4. (a) Compute $T_n f(x)$ where $f(x) = \ln(3 + x)$.

(b) Estimate the error you make when you approximate $f(x) = \ln(3 + x)$ by $T_2 f(x)$, assuming that $|x| \leq 0.1$.