MA 126 - 6D, CALCULUS II

February 8, 2016

Name (Print last name first): .....

Student Signature: .....

TEST I

No calculators are allowed!

11 questions, 10 points each. SHOW ALL YOUR WORK!

Question 1

a) Evaluate the integral $\int_{-1}^{6} (x+2)^{1/3}\, dx$.

b) Calculate the derivative of $y = \tan^{-1}(\ln(x))$.

Question 2

Evaluate the integral $\int xe^{2x}\,dx$.

Question 3

Evaluate the integral $\int(\sin(x))^2(\cos(x))^3dx$.

Question 4

The acceleration of the particle is given by $a = 2t$, find velocity and position of the particle if velocity at time $t = 1$ is $v(1) = 1$ and position at time $t = 1$ is $r(1) = 0$.

Question 5

Find the limit

$$\lim_{x \to 0} \frac{e^{-x} - 1}{\sin(x)}$$

Question 6

Write the rational fraction

$$f(x) = \frac{x^2 + 1}{x(x-1)(x-2)}$$

as a sum of partial fractions. Use this representation to calculate the integral $\int f(x)\,dx$ and write the answer as a single logarithm.

Question 7

Evaluate the integral

$$\int x^2 \ln(x^3)\, dx$$

Question 8

Evaluate the limit

$$\lim_{x\to 0}(1+x)^{\frac{1}{\sin(x)}}$$

Question 9

Determine whether the improper integral converges. Give your reasons! You DO NOT need to calculate the integral.

a)

$$\int_1^\infty \frac{x^{10}e^x}{x^2+e^{2x}}dx$$

b)

$$\int_1^\infty \frac{x}{x^2+1}dx$$

Question 10

Evaluate the improper integral

$$\int_1^\infty \frac{\ln(x)}{x^2} dx$$

Question 11

Evaluate the improper integral

$$\int_0^\infty \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$$