MA 126 - 8C, CALCULUS II

February 9, 2016

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

Student Signature: .....

TEST I

No calculators are allowed!

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

Question 1

a) Evaluate the integral $\int_0^2 (x+2)^5\,dx$.

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

Question 2

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

Question 3

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

Question 4

The acceleration function (in m/s^2) and the initial velocity are given for a particle moving along a line.

$$a(t) = t + 6, \quad v(0) = 3.$$

Find the velocity at time t.

Question 5

Find the limit $\lim_{x \to 0} \dfrac{\arctan(5x)}{\sin(3x)}$

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 $\lim_{x\to\infty}\left(1+\frac{2}{x}\right)^{x}$

Question 9

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

a) $\displaystyle\int_1^\infty \frac{\arctan(x)}{x^2+e^{2x}}dx$

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

Question 10

Evaluate the improper integral

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