# MA 126 - 6C CALCULUS II

September 14, 2015

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

Student Signature: .....

**TEST I**

**Closed book - Calculators and One Index Card are allowed!**

**PART I**

**Part I consists of 6 questions. Clearly write your answer (only) in the space provided after each question.**
**Show your work to justify your answers. Very limited partial credit or none at all for this part of the test!**

Each question is worth 6 points.

Question 1

Find a formula for the inverse of the function $f(x) = \dfrac{x+1}{x-1}$.

Answer: .....

Question 2

Evaluate the definite integral $\displaystyle\int_0^{e-1} \frac{2}{x+1}\,dx$.

Answer: .....

Question 3

The velocity of a particle is given by $v(t) = 3t^2 + 4t$ and its position at time $t = 0$ is 10. Find its position at time $t = 1$.

Answer: .....

Question 4

Evaluate the indefinite integral $\int \sin^4(x)\cos(x)\,dx$.

Answer: .....

Question 5

Evaluate the definite integral $\int_2^3 \frac{x}{x-1}\,dx$. (Give the exact answer. **No** approximation!)

Answer: .....

Question 6

Simplify the expression $\cot(\sin^{-1}(x))$; that is, write the given expression in terms of the independent variable $x$.

Answer: .....

**PART II**

Each problem is worth 16 points.

**Part II consists of 4 problems. You must show your work on this part of the test to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get full credit - no credit for unsubstantiated answers!**

## Problem 1

Determine whether or not each of the following limits exist. Find the limit if it does exist or justify why the limit does not exist. Simplify where appropriate! (Always show your work!)

(a) $\lim_{x\to 0} \dfrac{e^x - 1}{x}$.

(b) $\lim_{x\to\infty} x^3 e^{-x^2}$

(c) $\lim_{x\to\infty} e^{-x}\cos(x)$

## Problem 2

Evaluate the indefinite integral

$$\int 3x^2 \arctan(x^3)\, dx.$$

(Show your work!)

## Problem 3

Evaluate the indefinite integral

$$\int \cos^5(x)\, dx.$$

(Show your work!)

## Problem 4

(a) Write the rational function $\dfrac{2x+3}{x^2+2x+1}$ as a sum of partial fractions.

(b) Use the above to evaluate the following indefinite integral. (Do not simplify your answer!)

$$\int \frac{2x+3}{x^2+2x+1}\,dx.$$

SCRATCH PAPER

(Scratch paper will not be graded!)

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