

MA 126 - 8C CALCULUS II

January 31, 2017

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 $f(x) = \frac{x-1}{x+2}$ for $x \neq -2$.

Answer:

Question 2

Evaluate the indefinite integral $\int \frac{1}{1+4x^2} dx$.

Answer:

Question 3

Evaluate the definite integral $\int_0^{\pi} x \sin(x) dx$. (Give the exact answer. **No** approximation!)

Answer:

Question 4

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

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 $\cos(\tan^{-1}(x))$; 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) $\lim_{x \rightarrow 0} \frac{\arcsin(2x)}{3x}$.

(b) $\lim_{x \rightarrow \infty} \frac{x^3 - 1}{e^{x^2} - 1}$.

(c) If f' is continuous, $f(2) = 0$ and $f'(2) = 9$, evaluate

$$\lim_{x \rightarrow 0} \frac{f(2x + 2) - f(2 + 4x)}{x}.$$

Problem 2

First make a substitution and then use integration by parts (or use integration by parts directly) to evaluate the indefinite integral

$$\int \ln(\sqrt{t}) dt.$$

(Show your work!)

Problem 3

Evaluate the indefinite integral

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

(Show your work!)

Problem 4

- (a) Write the rational function $\frac{4}{x^2 - 2x - 3}$ as a sum of partial fractions. (Find the numerical values of the coefficients!)

- (b) Use the above to evaluate the following (definite) integral. Write your answer as a single logarithm. (Give the exact answer. No approximation!)

$$\int_0^2 \frac{4}{x^2 - 2x - 3} dx.$$

SCRATCH PAPER

(Scratch paper will not be graded!)

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