MTH 142: Calculus II

Practice Final Exam

December 17, 2017

NAME (please print legibly): _____

Your University ID Number: _____

Indicate your instructor with a check in the appropriate box:

Crossen	MW 9-10:15	
Zhong	MW 3:25-4:40	

- You have 3 hours to work on this exam.
- You are responsible for checking that this exam has all 9 pages.
- No calculators, phones, electronic devices, books, notes are allowed during the exam.
- Show all work and justify all answers.
- Read the following Academic Honesty Statement and sign:

  I affirm that I will not give or receive any unauthorized help on this exam, and that all work will be my own.

  Signature:_____

Part A		
QUESTION	VALUE	SCORE
TOTAL	0	

Part B		
QUESTION	VALUE	SCORE
1	20	
2	20	
3	10	
4	15	
5	10	
TOTAL	75	

Part A

Please refer to Midterm 1&2, together with their practice problems.

Part B

1. (20 points) Evaluate the following integrals:

(a) $\displaystyle\int_0^{3\sqrt{3}/2} \frac{x^3}{(4x^2+9)^{3/2}}\,dx$

(b) $\displaystyle\int \frac{x}{\sqrt{3-2x-x^2}}\,dx$

2. (20 points) Evaluate the following integrals:

(a) $\displaystyle\int \frac{x^2+3}{x^3-6x^2+9x}\,dx.$

(b) $\displaystyle\int_{-1}^{0} \frac{x^3-4x+1}{x^2-3x+2}\,dx$

3. (10 points) Set up the partial fraction decomposition for the following integral in terms of variables but do not solve for those variables.

$$\int \frac{4x^3 + 5x^2 - 3x + 7}{(x^3 + 2x^2 + x)(x^3 - x)(x^3 + x)(x^2 + x + 1)}\, dx$$

4. (15 points) For each of the following improper integrals, either evaluate the integral or show that it diverges.

(a) $\displaystyle\int_0^5 \frac{w}{w-2}\,dw$

(b) $\displaystyle\int_1^\infty \frac{e^{-1/x}}{x^2}\,dx$

5. (10 points)

Find the arc length of the curve

$$y = 1 + 6x^{3/2}, \quad 0 \leq x \leq 1.$$

Blank page for scratch work

Formula Sheet

- $\sin^2 x + \cos^2 x = 1$
- $1 + \tan^2 x = \sec^2 x$
- $1 + \cot^2 x = \csc^2 x$
- $\sin(2x) = 2 \sin x \cos x$
- $\sin^2 x = \dfrac{1 - \cos(2x)}{2}$
- $\cos^2 x = \dfrac{1 + \cos(2x)}{2}$
- $\sin(x + y) = \sin x \cos y + \cos x \sin y$
- $\cos(x + y) = \cos x \cos y - \sin x \sin y$
- $\sin x \cos y = \dfrac{\sin(x - y) + \sin(x + y)}{2}$
- $\sin x \sin y = \dfrac{\cos(x - y) - \cos(x + y)}{2}$
- $\cos x \cos y = \dfrac{\cos(x - y) + \cos(x + y)}{2}$