MA 114 — Calculus II Spring 2015
Exam 2 March 10, 2015

Name: _____

Section: _____

Last 4 digits of student ID #: _____

- No books or notes may be used.
- Turn off all your electronic devices and do not wear ear-plugs during the exam.
- You may use a calculator, but not one which has symbolic manipulation capabilities or a QWERTY keyboard.
- Additional blank sheets for scratch work are available upon request.
- **Multiple Choice Questions:**
  Record your answers on the right of this cover page by marking the box corresponding to the correct answer.
- **Free Response Questions:**
  Show all your work on the page of the problem. Clearly indicate your answer and the reasoning used to arrive at that answer.

Multiple Choice Answers

Question					
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E

Exam Scores

Question	Score	Total
MC		28
8		14
9		15
10		15
11		13
12		15
Total		100

Unsupported answers for the free response questions may not receive credit!

Record the correct answer to the following problems on the front page of this exam.

1. If the first four terms of the Taylor series for e^x are $1 + x + \frac{x^2}{2} + \frac{x^3}{6}$ what are the first four terms for the Taylor series for $x^2 e^{x^3}$?

A. $1 + x + \dfrac{x^2}{2} + \dfrac{x^3}{6}$.

B. $x^2 + x^5 + \dfrac{x^8}{2} + \dfrac{x^{11}}{6}$.

C. $x^2 + x^3 + \dfrac{x^4}{2} + \dfrac{x^5}{6}$.

D. $1 + x^3 + \dfrac{x^6}{2} + \dfrac{x^9}{6}$.

E. $x^3 + x^4 + \dfrac{x^5}{2} + \dfrac{x^6}{6}$.

2. Use the first four terms of the Taylor series for e^x (see Problem 1) to find an approximate value of $\displaystyle\int_0^1 e^{2x} dx$.

A. $\dfrac{19}{3}$.

B. $\dfrac{16}{5}$.

C. $\dfrac{19}{6}$.

D. 3.

E. $\dfrac{7}{3}$.

Record the correct answer to the following problems on the front page of this exam.

3. Which of the following integrals describes the volume of a right circular cone with base radius $2cm$ and height $8cm$?

A. $\int_0^8 \frac{\pi}{16}(8-y)ydy.$

B. $\int_0^2 \frac{\pi}{16}(8-y)ydy.$

C. $\int_0^8 \frac{\pi}{16}(8-y)^2dy.$

D. $\int_0^8 \frac{\pi}{16}y^2dy.$

E. $\int_0^8 \frac{\pi}{16}(2-y)^2dy.$

4. Which of the following integrals describes the volume of the solid given by revolving the region between $y = 2$ and $y = 6 - x^2$ around the x-axis?

A. $\int_{-2}^2 \pi(4-x^2)^2dx.$

B. $\int_{-1}^1 \pi(4-x^2)^2dx.$

C. $\int_{-2}^2 \pi((6-x^2)^2-4)dx.$

D. $\int_{-1}^1 \pi((6-x^2)^2-4)dx.$

E. $\int_{-1}^1 2\pi x(6-x^2-2)dx.$

Record the correct answer to the following problems on the front page of this exam.

5. Which of the following integrals describes the volume of the solid given by revolving the region under the graph of $f(x) = x^3$ and above the interval $[1, 2]$ around the line $x = -2$?

A. $\int_1^2 2\pi(x+2)x^3 dx.$

B. $\int_1^2 2\pi x(x^3) dx.$

C. $\int_1^2 \pi x^6 dx.$

D. $\int_1^8 2\pi x(x^3) dx.$

E. $\int_1^8 2\pi(x+2)x^3 dx.$

6. How much work is done to remove the water in a swimming pool if the pool is

$20m$ long, $15m$ wide and $3m$ deep?

Water is removed from the top of the pool and the density of water is $1000kg/m^3$. The gravitational constant $g = 9.8m/s^2$.

A. $100J.$

B. $4,410,000J.$

C. $900,000J.$

D. $8,820,000J.$

E. $13,230,000J.$

Record the correct answer to the following problems on the front page of this exam.

7. Compute $\int \sin^2 x \cos^3 x dx$.

A. $\frac{1}{5}\sin^5 x + C.$

B. $\frac{1}{3}\sin^3 x + C.$

C. $\frac{1}{3}\cos^3 x + \frac{1}{5}\cos^5 x + C.$

D. $\frac{1}{3}\sin^3 x + \frac{1}{5}\sin^5 x + C.$

E. $\frac{1}{3}\sin^3 x - \frac{1}{5}\sin^5 x + C.$

8. Find the first four terms of the Taylor series for $f(x) = (1-x)^{-1/2}$ centered at 0. (Hint: you are looking for a polynomial of degree 3.)

9. Find the volume of the solid whose base is the circle $x^2 + y^2 = 2^2$ and the cross sections perpendicular to the x-axis are squares.

10. Consider the region between the circle $x^2 + y^2 = 4$ and the line $y = 1$ and above the x-axis.

(a) Graph this region.

(b) Use the disk/washer method to find the volume of the solid given by revolving this region around the x-axis.

11. Use the shell method to find the volume of the solid given by revolving the region between the graphs of $y = -x^2 + 6x - 8$ and $y = 0$ around the y-axis.

12. (a) Compute $\int \tan^3 x \sec^2 x dx$

(b) What is the volume of the solid given by revolving the region under $f(x) = \sin^{3/2} x$ and above $[0, \pi]$ around the x-axis?