MATH 142

Midterm 2

Apr 1, 2014

NAME (please print legibly): ________________________________

Your University ID Number: ________________________________

Circle your Instructor's Name along with the Lecture Time:

Yoonbok Lee (MWF 9:00) Dillon Ethier (MWF 12:00)
Carl Mueller (MWF 1:00) Eyvindur Palsson (TR 2:00)

- **No calculators are allowed on this exam.**
- **Please show all your work. You may use back pages if necessary. You may not receive full credit for a correct answer if there is no work shown.**
- **Please put your simplified final answers in the spaces provided.**

QUESTION	VALUE	SCORE
1	8	
2	48	
3	16	
4	12	
5	16	
TOTAL	100	

1. (8 points)

Find

$$\frac{d}{dx}\int_1^{x^3} \cos t \; dt$$

ANSWER: ______________________

2. (48 points) Evaluate the following integrals.

(a) (8 points)

$$\int_0^1 \left(3\sqrt{x} - \frac{2}{1+x^2}\right) \; dx.$$

ANSWER: ______________________

(b) (8 points)

$$\int \frac{\sin\theta}{\cos^2\theta}\ d\theta.$$

ANSWER: ______________________

(c) (8 points)

$$\int x^3(5-x^2)\ dx.$$

ANSWER: ______________________

(d) (8 points)

$$\int \frac{1}{x^2\sqrt{1+1/x}}\ dx.$$

ANSWER: ____________________

(e) (8 points)

$$\int_0^2 2e^{x/2}\ dx.$$

ANSWER: ____________________

(f) (8 points)

$$\int_{-1}^{1} |x^2 - x| \, dx.$$

ANSWER: ____________________

3. (16 points) An object is moving in such a way that its velocity function at time t is given by $v(t) = \sin(t)$.

(a) (8 points) Find the displacement from $t = 0$ to $t = 2\pi$.

ANSWER: ______________________

(b) (8 points) Find the total distance traveled from $t = 0$ to $t = 2\pi$.

ANSWER: ______________________

4. (12 points)

Find the area of the region bounded by the curves $x = y^2$ and $x = 4y$.

ANSWER: ____________________

5. (16 points) Consider the region enclosed by the three curves $y = x^2$, $x = 2$ and $y = 0$.

(a) (8 points) Set up a definite integral that represents the volume of the solid obtained by rotating this region about $y = 7$. Do NOT evaluate the integral.

ANSWER: ____________________

(b) (8 points) Set up a definite integral that represents the volume of the solid obtained by rotating this region about $x = -1$. Do NOT evaluate the integral.

ANSWER: ____________________