MA261 — EXAM 2 — WINTER 2015 — APRIL 6
TEST NUMBER 01– GREEN– USE GREEN SCANTRON
ENTER YOUR STUDENT ID NUMBER AND SECTION NUMBER CORRECTLY ON THE SCANTRON

INSTRUCTIONS:

1. **Do not open the exam booklet until you are instructed to do so.**
2. This exam has 12 problems in 8 different pages (including this cover page). Once you are allowed to open the exam, make sure you have a complete test.
3. Do any necessary work for each problem on the space provided or on the back of the pages of this test booklet. Circle your answers in this test booklet.
4. Each problem is worth 8 points. 4 points are granted automatically for a total of 100 points
5. Use a # 2 pencil to fill in the required information in your scantron and fill in the circles.
6. Use a # 2 pencil to fill in the answers on your scantron.
7. After you have finished the exam, hand in your scantron and your test booklet to your recitation instructor.

RULES REGARDING ACADEMIC DISHONESTY:

1. Do not leave the exam room during the first 20 minutes of the exam.
2. If you do not finish your exam in the first 50 minutes, you must wait until the end of the exam period to leave the room.
3. Do not seek or obtain any kind of help from anyone to answer questions on this exam. If you have questions, consult only your instructor.
4. Do not look at the exam of another student. You may not compare answers with anyone else or consult another student until after you have finished your exam, handed it in to your instructor and left the room.
5. Do not consult notes, books, calculators.
6. Do not handle phones or cameras, or any electronic device until after you have finished your exam, handed it in to your instructor and left the room.
7. After time is called, the students have to put down all writing instruments and remain in their seats, while the TAs will collect the scantrons and the exams.
8. Anyone who violates these instructions will have committed an act of academic dishonesty. Penalties for academic dishonesty can be very severe and may include an F in the course. All cases of academic dishonesty will be reported immediately to the Office of the Dean of Students.

I have read and understand the above statements regarding academic dishonesty:

STUDENT NAME: _____

STUDENT SIGNATURE: _____

STUDENT ID NUMBER: _____ SECTION NUMBER _____

RECITATION INSTRUCTOR: _____

MA261 Spring 2015 Exam 1, 8:00-9:00pm

1. Find the rate of change of $f(x,y,z) = 2x^3y\sqrt{z}$ at the point $(1,2,4)$ and in the direction of $\vec{u} = \langle -1, 2, -2 \rangle$.

A. $17/3$

B. $13/3$

C. $-19/3$

D. -6

E. $-21/3$

2. How many local maximum points, local minimum points, and saddle points does

$$f(x,y) = \frac{1}{3}x^3 - x + xy^2$$

have? Answers are in the form :

local maximum points; # local minimum points; # saddle points.

A. 1;1;2

B. 1;1;0

C. 0;1;2

D. 1;0;2

E. 0;0;1

3. Find the absolute maximum of the function $f(x, y) = 4x + 3y$ subject to the constraint $x^2 + y^2 = 25$.

A. $\sqrt{40}$

B. $\sqrt{43}$

C. $\sqrt{48}$

D. $\sqrt{55}$

E. 25

4. Find the volume of the solid which lies below the plane $3x + 2y - z + 1 = 0$ and above the rectangle $R = \{(x, y) \mid -1 \leq x \leq 1,\ 1 \leq y \leq 2\}$.

A. 11

B. 13

C. 21/2

D. 23/2

E. 8

5. Change the order of integration and evaluate

$$\int_0^1 \int_y^1 \frac{56y^6}{x^8+1}\,dxdy$$

A. $3/4$

B. $2/3$

C. $\ln(2)$

D. $1/56$

E. $\ln(3/2)$

6. Use integration in polar co-ordinates to compute the area of the region in the first quadrant inside the circle $(x-1)^2+y^2=1$ and below the line $y=x$. Recall that $2\cos^2\theta = 1+\cos 2\theta$.

A. $(\pi/4)+(1/2)$

B. π

C. $(\pi/2)+(1/2)$

D. $\pi/6$

E. $\pi/4$

7. If we change the order of integration in

$$\int_0^6 \int_0^{2-\frac{x}{3}} \int_0^{3-\frac{1}{2}(x+3y)} dz\ dy\ dx$$

and integrate first in x, then in y and then in z the integral is given by

A. $\int_0^3 \int_0^{2-2z} \int_0^{2-\frac{1}{3}(2z+3y)} dx\ dy\ dz$

B. $\int_0^3 \int_0^{2-\frac{2}{3}z} \int_0^{6-2z-3y} dx\ dy\ dz$

C. $\int_0^3 \int_0^{2-\frac{3z}{4}} \int_0^{6-2z-y} dx\ dy\ dz$

D. $\int_0^3 \int_0^{2-\frac{z}{2}} \int_0^{6-2z-\frac{y}{3}} dx\ dy\ dz$

E. $\int_0^3 \int_0^{3-z} \int_0^{6-z-23y} dx\ dy\ dz$

8. Use cylindrical coordinates to compute the volume of the region in space bounded above by the paraboloid $z = 2 - x^2 - y^2$ and bounded below by the cone $z = \sqrt{x^2 + y^2}$

A. $4\pi/3$

B. $2\pi/3$

C. $5\pi/6$

D. $3\pi/2$

E. π

9. A lamina of mass density $\rho(x, y) = xy$ occupies the region of the plane bounded by the curves $y = x^2$ and $y = \sqrt{x}$. Given that the mass of the lamina is equal to $m = \dfrac{1}{12}$, find the x-coordinate of its center of mass.

A. $3/4$

B. $2/3$

C. $2/5$

D. $1/56$

E. $9/14$

10. Evaluate

$$\int\int\int_E 16z\, dV$$

Where E is the upper half of the sphere $x^2 + y^2 + z^2 = 1$.

A. 4π

B. 2π

C. π

D. $\pi/2$

E. $\pi/4$

11. Let $\vec{F}(x, y) = \langle x, xy \rangle$, and let C be the part of the circle $x^2 + y^2 = 4$ in the first quadrant, oriented counter clockwise. Evaluate

$$\int_C \vec{F} \cdot d\vec{r}$$

A. $5/2$

B. $2/3$

C. $3/2$

D. $3/4$

E. $4/3$

12. Let C be the helix $\langle \cos(t), \sin(t), 3t \rangle$ with $0 \leq t \leq 4\pi$. Evaluate

$$\int_C xyz \, ds$$

A. $\sqrt{10}\pi$

B. $-3\sqrt{10}\pi$

C. -3π

D. $\sqrt{10}$

E. $-\pi$