MA 26100
EXAM 2 Form A
November 8, 2016

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION TIME _____

1. You must use a #2 pencil on the mark–sense sheet (answer sheet).

2. On the scantron, write 01 in the TEST/QUIZ NUMBER boxes and blacken in the appropriate spaces below.

3. On the scantron, fill in your TA's name and the course number.

4. Fill in your NAME and STUDENT IDENTIFICATION NUMBER and blacken in the appropriate spaces. BE SURE TO INCLUDE THE TWO LEADING ZEROS.

5. Fill in your four-digit SECTION NUMBER. If you do not know your section number, please ask your TA.

6. Sign the scantron.

7. Fill in your name and your instructor's name on the question sheets above.

8. There are 12 questions, each worth 8 points (you will automatically earn 4 points for taking the exam). Blacken in your choice of the correct answer in the spaces provided for questions 1–12. Do all your work on the question sheets.

9. Turn in both the scantron and the exam booklet when you are finished.

10. You cannot turn in your exam during the first 20 min or the last 10 min of the exam period.

11. NO CALCULATORS, PHONES, BOOKS, OR PAPERS ARE ALLOWED. Use the back of the test pages for scrap paper.

EXAM POLICIES

1. Students may not open the exam until instructed to do so.
2. Students must obey the orders and requests by all proctors, TAs, and lecturers.
3. No student may leave in the first 20 min or in the last 10 min of the exam.
4. Books, notes, calculators, or any electronic devices are not allowed on the exam, and they should be put away and should not be visible at all. Students may not look at anybody else's test, and may not communicate with anybody else except, if they have a question, with their TA or lecturer.
5. 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.
6. Any violation of these rules and any act of academic dishonesty may result in severe penalties. Additionally, all violators will be reported to the Office of the Dean of Students.

I have read and understand the exam rules stated above:

STUDENT NAME: _____

STUDENT SIGNATURE: _____

1. In which direction is the rate of change of $f(x, y) = (y - 2)e^x + 3y$ at $(0, 0)$ a maximum?

A. $< -1, -1 >$

B. $< -2, -4 >$

C. $< -2, 4 >$

D. $< 4, -2 >$

E. $< 1, 1 >$

2. According to the Second Derivative Test, the critical points of the function

$$f(x, y) = x^2(y^3 - y) + y^2$$

are

A. two saddle points

B. one maximum, one minimum

C. two saddle points and one undetermined point

D. one maximum, one minimum, and one undetermined point

E. Three saddle points

3. The maximum value of $f(x, y) = 2(x-2)^2(y-1)^2$ on $(x-2)^2 + (y-1)^2 = 2$ is

A. 1

B. 0

C. $\frac{1}{2}$

D. 2

E. 4

4. Let

$$f(x, y) = \frac{\sin(x)}{y}$$

Which of the following statements is correct?

(1). The function has an absolute max or min on its domain of definition.

(2). The function has an absolute max or min on the domain given by $y > 0$.

(3). The function has an absolute max or min on the domain given by $0 \leq x \leq 2\pi$ and $0 < y \leq 1$.

(4). The function has an absolute max or min on the domain given by $0 \leq x \leq 2\pi$ and $1 \leq y \leq 2$.

(5). The function has an absolute max or min on the domain given by $0 \leq x \leq 2\pi$ and $1 \leq y^2 \leq 2$.

A. All of them

B. None of them

C. (1), (3), and (5) only

D. (2), (3), and (4) only

E. (4) and (5) only

5. Evaluate $\int\int_D y\, dA$ where D is inside the disk $x^2 + y^2 = 2x$ and above the x-axis.

A. π

B. $\dfrac{2}{3}$

C. $\dfrac{2\pi}{5}$

D. $\dfrac{8}{3}$

E. $\dfrac{\pi}{8}$

6. Let D be the triangle with vertices $(0, 4)$, $(1, 0)$, and $(0, -2)$. Then $\int\int_D f(x, y)\, dA$ is

A. $\displaystyle\int_0^2 \int_{2-2x}^{4-4x} f(x, y)\, dy\, dx$

B. $\displaystyle\int_0^1 \int_{2x-2}^{4-4x} f(x, y)\, dy\, dx$

C. $\displaystyle\int_0^2 \int_{2+2x}^{4+4x} f(x, y)\, dy\, dx$

D. $\displaystyle\int_0^4 \int_{2-2x}^{4-4x} f(x, y)\, dy\, dx$

E. $\displaystyle\int_0^1 \int_{2-2x}^{4+4x} f(x, y)\, dy\, dx$

7. Find the area of the part of $z = 1 + x + \frac{2}{3}y^{3/2}$ that lies above the square with vertices $(0,0)$, $(0,1)$, $(1,0)$, and $(1,1)$

A. $2 \cdot 3^{1/2}$

B. $3^{3/2}$

C. $\frac{2}{3}(3^{3/2} - 2^{3/2})$

D. $3^{1/2} - 2^{1/2}$

E. $2(3^{1/2} - 2^{1/2})$

8. Evaluate $\int\int\int_E z \, dV$ where E is bounded by $y^2 + z^2 = 4$ and the planes $x = 0$, $y = x$, and $z = 0$ in the first octant.

A. 1

B. 2

C. 4

D. 8

E. 16

9. Which of the following integrals represents the volume of the solid enclosed by $z = \sqrt{x^2 + y^2}$ and $x^2 + y^2 + z^2 = 2$?

A. $\displaystyle\int_0^{2\pi} \int_0^{1} \int_r^{\sqrt{2-r^2}} r \; dz \; dr \; d\theta$

B. $\displaystyle\int_0^{2\pi} \int_1^{\sqrt{2}} \int_r^{\sqrt{2-r^2}} r \; dz \; dr \; d\theta$

C. $\displaystyle\int_0^{2\pi} \int_0^{\sqrt{2}} \int_r^{\sqrt{2-r^2}} r \; dz \; dr \; d\theta$

D. $\displaystyle\int_0^{2\pi} \int_0^{1} \int_{\sqrt{2-r^2}}^{r} r \; dz \; dr \; d\theta$

E. $\displaystyle\int_0^{2\pi} \int_0^{\sqrt{2}} \int_0^{r} r \; dz \; dr \; d\theta$

10. Find the volume of the solid that is enclosed by $x^2 + y^2 + z^2 = 1$, $x^2 + y^2 + z^2 = 4$, and $z = \sqrt{x^2 + y^2}$.

A. $\dfrac{14\pi}{3}\left(1 - \dfrac{\sqrt{2}}{2}\right)$

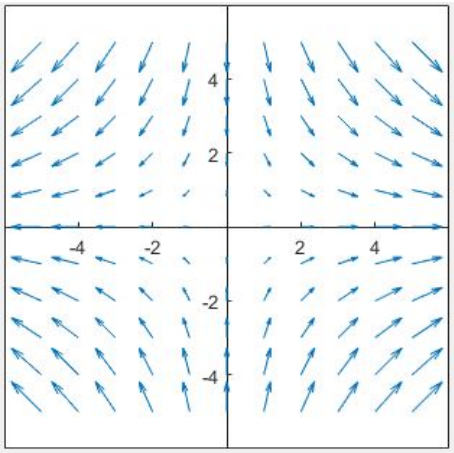
B. $\dfrac{28\pi}{3}$

C. $\dfrac{14\pi}{3}\left(1 + \dfrac{\sqrt{2}}{2}\right)$

D. $3\pi\left(1 - \dfrac{\sqrt{2}}{2}\right)$

E. 3π

11. The graph below is the gradient vector field of which equation?



A. $f(x, y) = x^2 + y^2 + 10$

B. $f(x, y) = x^2 - y^2 + 10$

C. $f(x, y) = e^{y-x}$

D. $f(x, y) = e^{x-y}$

E. $f(x, y) = \dfrac{y}{x}$

12. Find the work done by the force field $\vec{F}(x, y) = 2x\sin(y)\vec{i} + 2y\vec{j}$ on a particle moving along the parabola $y = x^2$ from the point $(1, 1)$ to the point $(2, 4)$.

A. $17 - \cos(1) + \cos(4)$

B. $17 + \cos(1) - \cos(4)$

C. $15 + \sin(1) - \sin(4)$

D. $15 + \cos(1) - \cos(4)$

E. $15 + \sin(1) - \cos(4)$