REVIEW EXAM 2

MA 26100-FALL 2023

DR. HOOD

WARM UP

REVIEW EXAM 2

Convert the following surfaces to Cylindrical and Spherical Coordinates.

Cartesian	Cylindrical	Spherical
$x - y = 0$	$\theta = \frac{\pi}{4}$	$\theta = \frac{\pi}{4}$
$x^2 + y^2 + z^2 = a^2$	$r^2 + z^2 = a^2$	$\rho = a$
$x^2 + y^2 = b^2$	$r = b$	$\rho \sin\phi = b$
$\sqrt{3}\,z = \sqrt{x^2 + y^2}$	$z = \frac{r}{\sqrt{3}}$	$\phi = \frac{\pi}{3}$

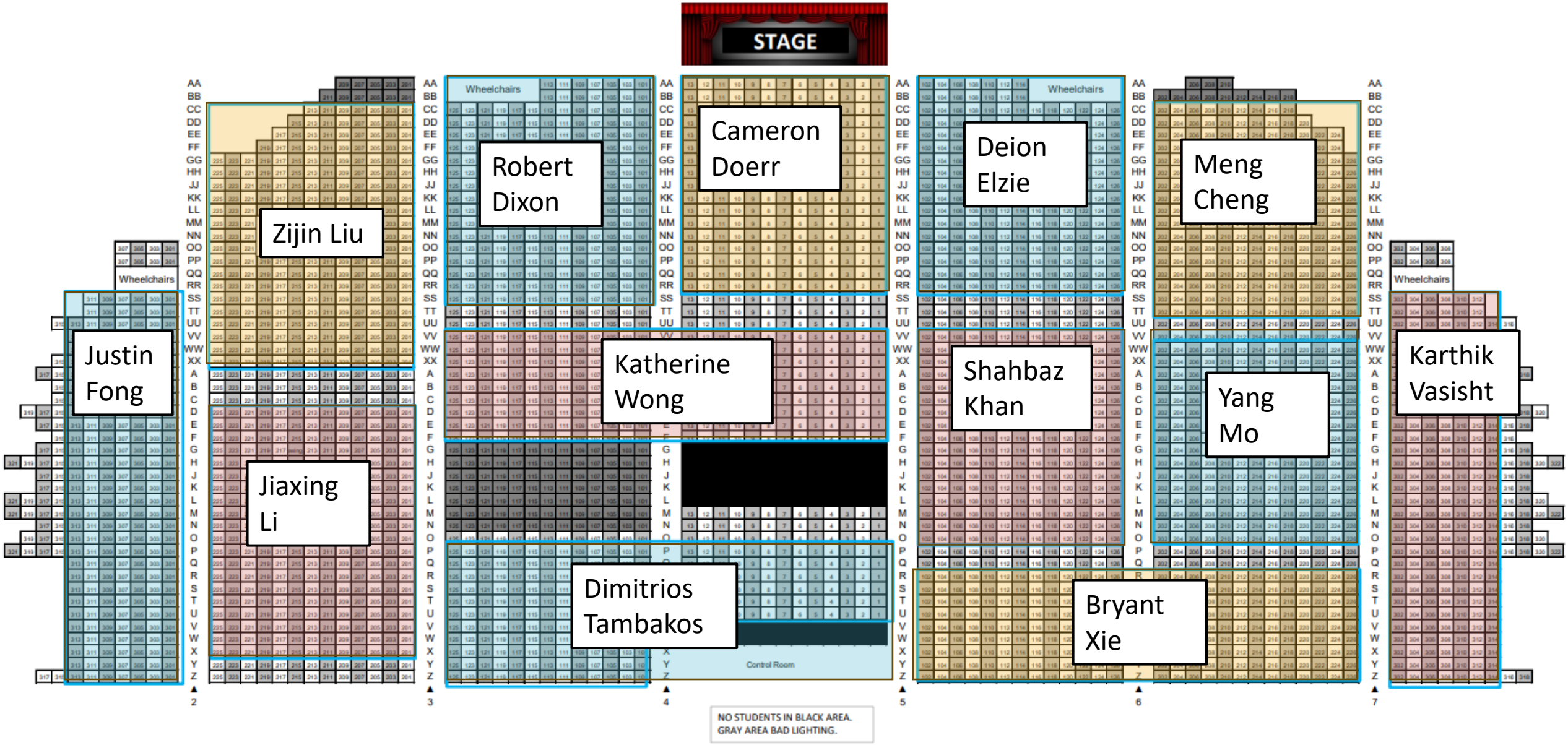
EXAM 2 INFORMATION

- Tuesday, November 7, 2023 at Time: 8:00pm – 9:00pm
- Location: ELLT 116 and Loeb Playhouse.
  - Seating chart: https://www.math.purdue.edu/academic/courses/semester/202410/ma26100/resources/261_exam2_fall2023_merged.pdf
  - Lessons covered on the exam: Lessons 17 – 28.
  - Study Guide: https://www.math.purdue.edu/~kthood/docs/MA261_Fall2023/exam2_study_guide_ma261_f23.pdf

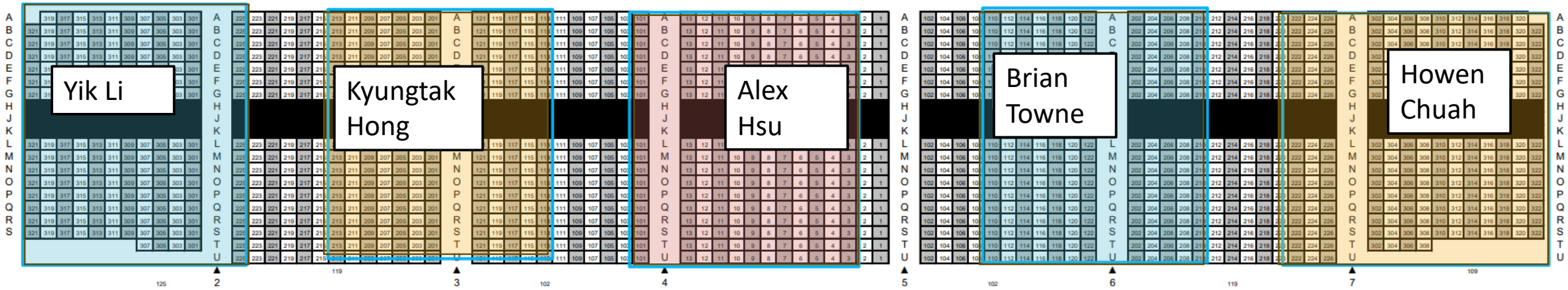
MA 26100
Exam 1

Elliot Hall Main Floor ELLT 116

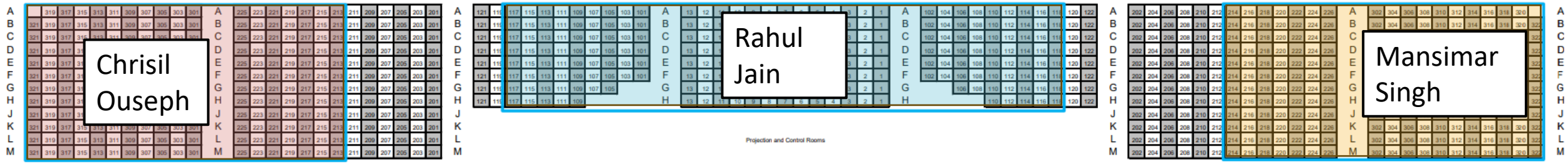
Tuesday, October 2023
8:00 - 9:00 p.m.



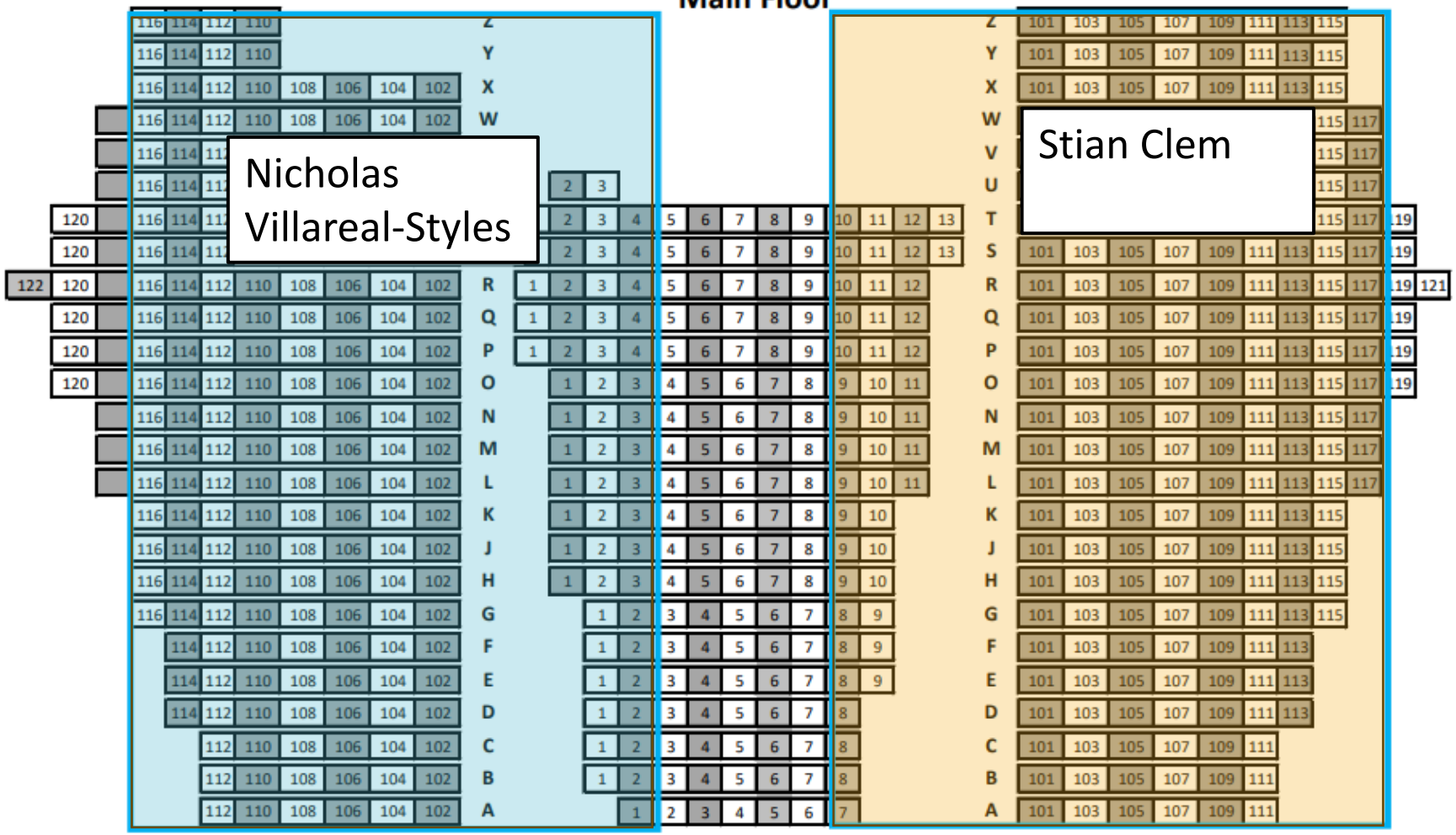
MA 26100
Exam 1
Tues., Oct. 3, 2023
8:00-9:00 p.m.
ELLT HALL 116
FIRST BALCONY



MA 26100
Exam 1
Tues., Oct. 3, 2023
8:00-9:00 p.m.
ELLT HALL 116
SECOND BALCONY



MA 26100
Exam 1
Tues., Oct. 3, 2023
8:00-9:00 p.m.
Loeb Playhouse
Main Floor



MA 26100
Exam 1
Tues., Oct. 3, 2023
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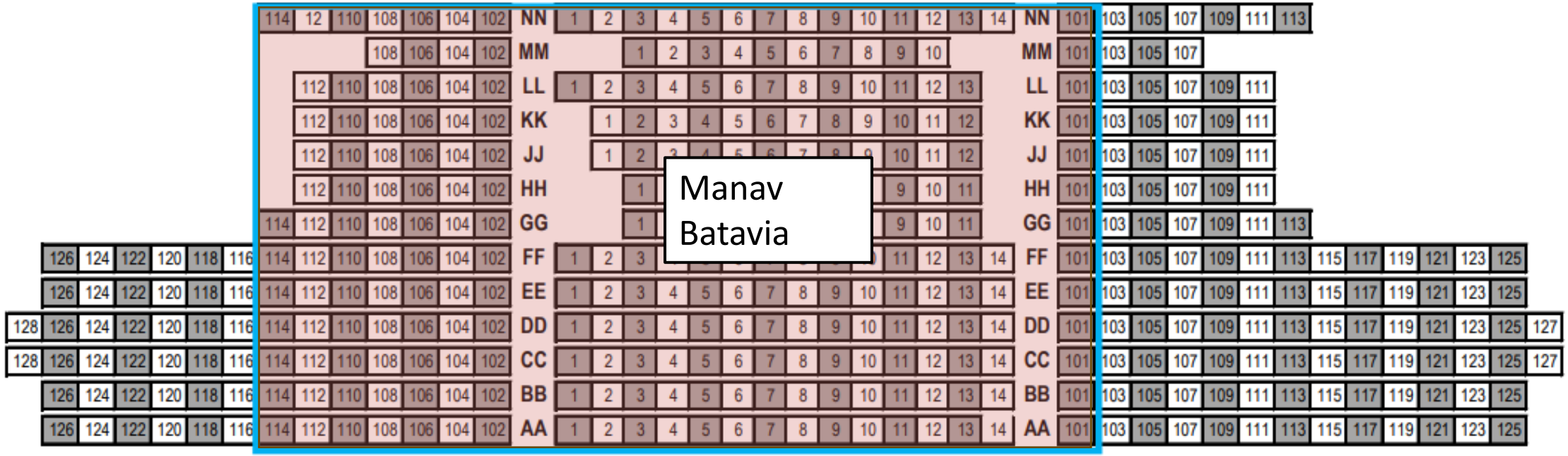
Loeb Balcony



Sample Exam Booklet

MA 26100
Exam 1
10/03/2023
TEST/QUIZ NUMBER:
1003

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION # _____

You must use a #2 pencil on the scantron answer sheet. Fill in the following on your scantron and blacken the bubbles

1. Your name. If there aren't enough spaces for your name, fill in as much as you can.
2. Your 3-digit recitation section number, e.g. **XYZ**. (If you don't know your recitation section number, ask your TA.)
3. Test/Quiz number: **1003**
4. Student Identification Number: **This is your Purdue ID number with two leading zeros**
5. Blacken in your choice of the correct answer on the scantron answer sheet for questions 1–12.

There are **12** questions, each worth 8 points (you will earn 4 points for filling out your scantron correctly). Do all your work in this exam booklet. Use the back of the test pages for scrap paper. Turn in both the scantron and the exam booklet when you are finished.

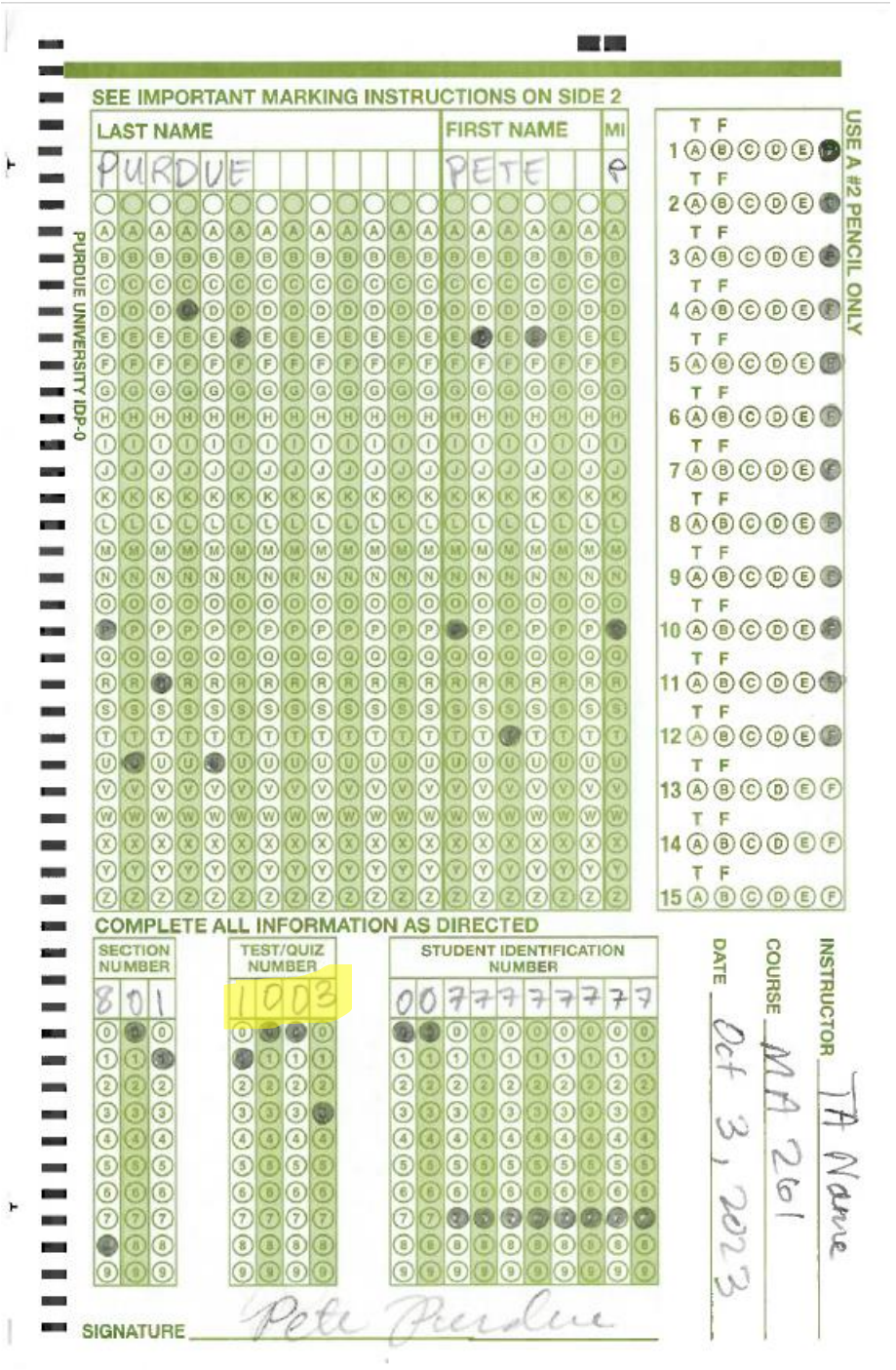
If you finish the exam before 8:50pm, you may leave the room after turning in the scantron sheet and the exam booklet. You may not leave the room before 8:20pm. If you don't finish before 8:50pm, you MUST REMAIN SEATED until your TA comes and collects your scantron sheet and your exam booklet.

EXAM POLICIES

1. Students may not open the exam booklet 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, phone, or any electronic devices are not allowed on the exam, and they should not even be in sight in the exam room. 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, students must 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 SIGNATURE: _____



POLL 1

Maximize $f(x,y) = x^2 + y^2$ subject to the constraint $2x^2 + +3xy + 2y^2$. Use Lagrange Multipliers to find a relationship between x and y.

a) $x = y$

b) $x = -y$

c) $x^2 = y^2$

d) $x^2 = -y$

$\nabla f = \lambda \nabla g$

$y(2x = \lambda(4x + 3y))$

$x(2y = \lambda(3x + 4y))$

$\lambda(3x^2 + 4xy) = 2xy = \lambda(4xy + 3y^2)$

$3x^2 = 3y^2$

$x^2 = y^2 \rightarrow x = \pm y$

POLL 2

For each of the following integrals, decide if it is is better to leave it in Cartesian coordinates or to convert to cylindrical or spherical coordinates.

Integral	Convert?
$\int_0^3 \int_{-\sqrt{9-y^2}}^{\sqrt{9-y^2}} \int_0^{9-3\sqrt{x^2+y^2}} dz\, dx\, dy$	cyl $\int_0^{\pi} \int_0^3 \int_0^{9-3r} r\, dz\, dr\, d\theta$ $z = 9-3r$ $r = 3-\frac{z}{3}$ switch dz and dr
$\int_{-2}^2 \int_0^{\sqrt{4-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{8-x^2-y^2}} 3\, dz\, dy\, dx$	sph $\int_0^{\pi} \int_0^{\sqrt{8}} \int_0^{\frac{\pi}{4}} 3\rho^2 \sin\phi\, d\phi\, d\rho\, d\theta$ $\leftrightarrow$ 11
$\int_0^1 \int_0^{1-z} \int_0^{1-y-z} z\, dx\, dy\, dz$	leave $\int_0^{\pi} \int_0^{\frac{\pi}{4}} \int_0^{\sqrt{8}} 3\rho^2 \sin\phi\, d\rho\, d\phi\, d\theta$

POLL 3

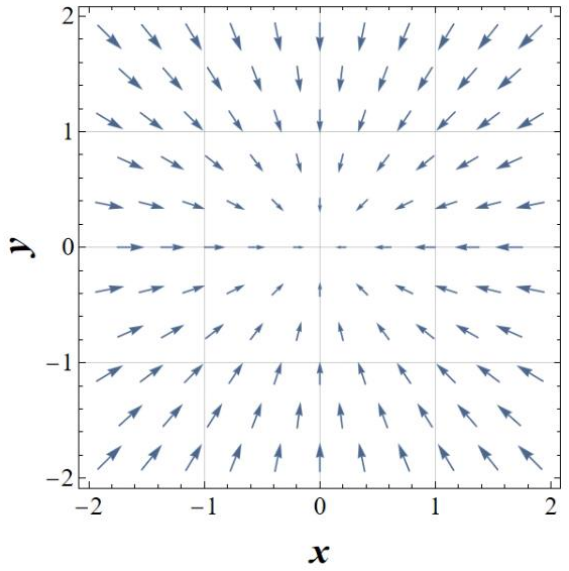
For each vector field $\vec{F}(x, y)$, determine if it is radial, rotational, and/or conservative. Sketch the vector field.

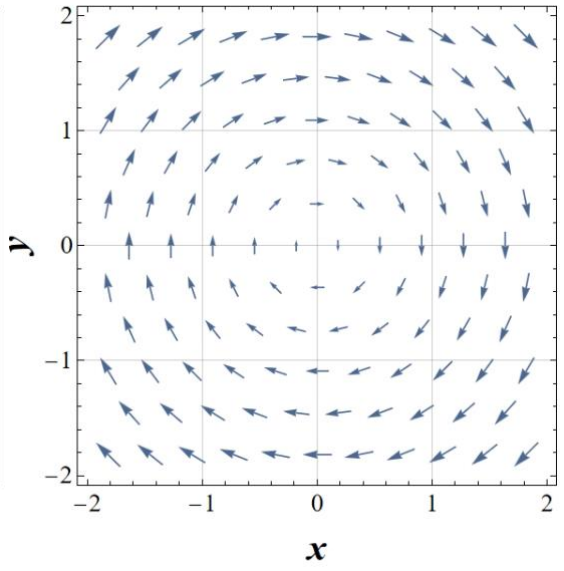
$\langle -x, -y \rangle$	$\langle y, -x \rangle$	$\langle 1, x \rangle$	$\langle y, x \rangle$

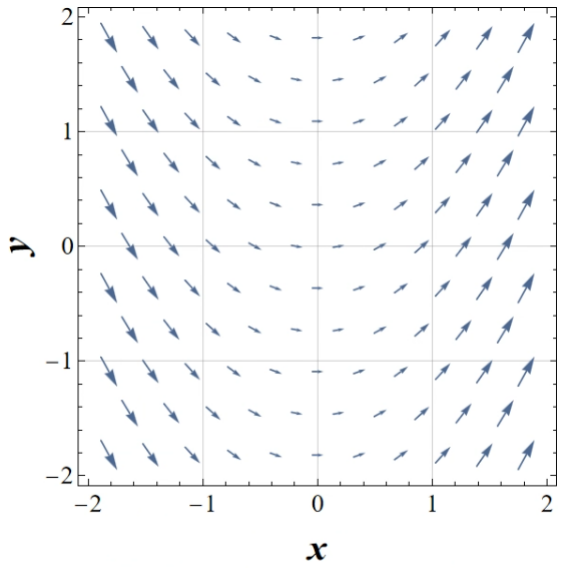
POLL 3

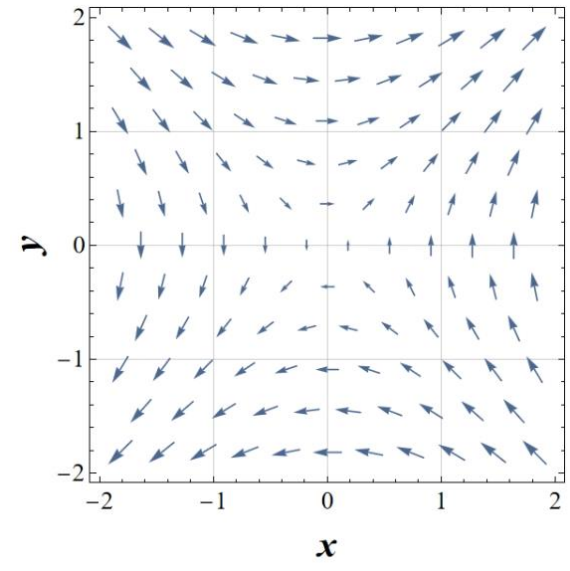
For each vector field $\vec{F}(x, y)$, determine if it is radial, rotational, and/or conservative. Sketch the vector field.

$\langle -x, -y \rangle$	$\langle y, -x \rangle$	$\langle 1, x \rangle$	$\langle y, x \rangle$
radial Yes cons $\phi = -\frac{x^2}{2} - \frac{y^2}{2} + C$	rotational Not cons.	NOT cons.	Yes cons. $\phi = xy + C$









POLL 4

Which question from Practice Exam 2 Version B would you most like to see today?

2) Lagrange Multipliers
3) Double integral (rectangular)
4) Double integral (general)
5) Double integral (polar)
6) Triple integrals
7) Triple integral (cylindrical)
8) Triple integral (spherical)
9) Center of Mass
10) Vector fields
11) Scalar line integrals
12) Vector line integrals
13) Fundamental Theorem of line integrals