Math 2433

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639 PGH

Office Hours (starting next Monday):

Mondays 2-4pm,
Thursdays 3-4pm
(also available by appointment)
Class webpage: https://www.casa.uh.edu/

Important Information:

• Labs
• CourseWare Accounts
• Textbook
• Homework
• Daily Poppers
• Online Quizzes
• Exams and Final Exam
Labs/Workshops

Attendance is mandatory!
Homework will be due on Mondays and quizzes will be given each Friday in labs.

<table>
<thead>
<tr>
<th>Class #</th>
<th>Bldg/Room Days</th>
<th>Start - End</th>
<th>TA</th>
<th>email</th>
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<tbody>
<tr>
<td>12022-02</td>
<td>F 154</td>
<td>Mo We Fr 09.00 - 10.00</td>
<td>Dong Nguyen</td>
<td><a href="mailto:duongn@math.uh.edu">duongn@math.uh.edu</a></td>
</tr>
<tr>
<td>17460-04</td>
<td>F 162</td>
<td>Mo We Fr 09.00 - 10.00</td>
<td>Daewa Kim</td>
<td><a href="mailto:daewakim@math.uh.edu">daewakim@math.uh.edu</a></td>
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<tr>
<td>12024-05</td>
<td>F 162</td>
<td>Mo We Fr 09.00 - 10.00</td>
<td>Daewa Kim</td>
<td><a href="mailto:duongn@math.uh.edu">duongn@math.uh.edu</a></td>
</tr>
<tr>
<td>13706-16</td>
<td>SEC 202</td>
<td>Mo We Fr 11.00 - 12.00</td>
<td>Cihan Kayasandik</td>
<td><a href="mailto:kayasa89@math.uh.edu">kayasa89@math.uh.edu</a></td>
</tr>
<tr>
<td>13710-18</td>
<td>SEC 201</td>
<td>Mo We Fr 11.00 - 12.00</td>
<td>Mohamadkazem Safaripoorfatide</td>
<td><a href="mailto:mksafari@math.uh.edu">mksafari@math.uh.edu</a></td>
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CourseWare Accounts

http://www.casa.uh.edu

The first portion of these materials is freely available for the first two weeks of class.

All students must purchase a *Course Access Code* and enter it on CourseWare by the first day of the third week of class to continue accessing the course learning materials.

A *Course Access Code* can be purchased for about $55 from the University Bookstore.
Daily Poppers

Daily quizzes (poppers) will be given in lecture starting the third week of class. You will need to purchase a course pack of custom bubbling forms from the bookstore.

NOTE: Make sure you get the correct packet. They are sold by Section Number. If you don’t have the correct section, you will not receive credit.

Do NOT punch holes in the pages
Do NOT use ink
DO fill in all the required bubbles, or you will NOT receive credit.
Online Quizzes

Online quizzes will be given at http://www.casa.uh.edu starting today.

You may take them up to 20 times each. The highest score is recorded.

Watch for when they are to be closed, and don’t wait until the last day (or minute) to complete them. The system may become overloaded and thus may prevent you from receiving credit.
Important:

Once an online quiz closes, it will NOT reopen.

There is NO AMNESTY at the end of the semester.

It is your responsibility to:

a) take the quizzes in a timely manner
b) be aware of open/close dates
c) realize the quizzes are based on the homework
d) realize the exams are based on the quizzes.
Exams will be given at CASA.

You can schedule the time of your exam at
http://www.casa.uh.edu
The scheduler will be available two weeks prior to the exam.

**NO Make up Exams**
There is NO Standby testing.

Double check your date and time prior to testing.
You MUST have a scheduled time.

Plan on arriving early so if you are “stuck in traffic”, have “overslept”, or “whatever”, you don’t miss the exam.
Grades

Tests 1 and 2 – 17.5% each
Final exam – 35%
Online Quizzes – 10%
Lab Quizzes and Written Homework – 10%
In-class Poppers and Attendance – 5%
EMCF Homework – 5%

Note: The percentage grade on the final exam can be used to replace your lowest test score.

90% and above - A
at least 80% and below 90%- B
at least 70% and below 80% - C
at least 60% and below 70% - D
below 60% - F
Attendance and Classroom Behavior...

- Come to class on time.

- Be prepared to start on time.

- **Turn off your cell phone.**

- Do not read the newspaper, surf the web, or do anything that might disturb other students (including non-calculus discussions).

- Pay attention.

- Ask and answer questions.

- If you must come in late, or leave early, please be respectful of everyone else.
12.1 Cartesian Space Coordinates
Ex: Give the equation of a plane that is parallel to the xz-plane that passes through the point (2, -1, 4).
Distance Formula: 
\[ d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2} \]

Midpoint Formula: 
\[ \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}, \frac{z_1 + z_2}{2} \right) \]

Equation of a Sphere: 
\[ (x-a)^2 + (y-b)^2 + (z-c)^2 = r^2 \]
Examples:
1) Give the equation of the sphere that has A and B as the endpoints of a diameter.
   \[ A (2, 1, 0) \quad B (1, 1, -3) \]
2) Find the center and radius of \( x^2 + y^2 + z^2 + 4x - 8y - 2z + 5 = 0 \)
A vector is an ordered triple (in space) where addition and multiplication by scalars holds. Vectors have a direction and a length (magnitude or norm).
Properties of vectors:

- **Commutative:** \( \mathbf{a} + \mathbf{b} = \mathbf{b} + \mathbf{a} \)
- **Associative:** \( (\mathbf{a} + \mathbf{b}) + \mathbf{c} = \mathbf{a} + (\mathbf{b} + \mathbf{c}) \)

The zero vector \( \mathbf{0} = (0,0,0) \) (note: \( \mathbf{a} \cdot \mathbf{0} = \mathbf{0} \))

Vectors can be multiplied by a **scalar**: if \( \mathbf{a} = (a_1,a_2,a_3) \), then \( 2\mathbf{a} = (2a_1,2a_2,2a_3) \)

The **norm** of a vector \( \mathbf{a} = (a_1,a_2,a_3) \) is \( \|\mathbf{a}\| = \sqrt{a_1^2 + a_2^2 + a_3^2} \)
Examples:
1) Find the vector \( \overrightarrow{PQ} \) and determine its norm given points \( P \) and \( Q \).
\( P(5,3,2), Q(-3,1,5) \)

2) Set \( \mathbf{a} = (-5, -2, 6), \mathbf{b} = (3, 0, 4), \mathbf{c} = (-5, 1, 5) \). Find: \( 4\mathbf{a} + \mathbf{b} - 3\mathbf{c} \)
Two vectors are parallel if \( \mathbf{a} = \alpha \mathbf{b} \) for some real number \( \alpha \).

If \( \alpha > 0 \), then \( \mathbf{a} \) and \( \mathbf{b} \) have the same direction.

If \( \alpha < 0 \), then \( \mathbf{a} \) and \( \mathbf{b} \) have opposite directions.

3) Are any of the following vectors parallel?
\[
\begin{align*}
\mathbf{a} &= (1, -1, 2) & \mathbf{b} &= (2, -1, 2) & \mathbf{c} &= (3, -3, 6) & \mathbf{d} &= (-2, 2, -4)
\end{align*}
\]
Unit Vectors are vectors of norm 1.

\[ u_a = \frac{\mathbf{a}}{\|\mathbf{a}\|} \quad \text{\(u_a\) has direction \(\mathbf{a}\)}

4) Find the unit vector for \(\mathbf{a} = (3, 4, -2)\)
There are 3 special unit vectors:
\[ \mathbf{i} = (1,0,0) \quad \mathbf{j} = (0,1,0) \quad \mathbf{k} = (0,0,1) \]

All vectors can be represented by a linear combination of these:
\[ (a_1, a_2, a_3) = a_1 \mathbf{i} + a_2 \mathbf{j} + a_3 \mathbf{k} \]

Why?
5) Simplify the linear combination:

\[ 4(2\mathbf{j} - 3\mathbf{k}) + 2(2\mathbf{i} + 3\mathbf{j} - 4\mathbf{k}) \]

6) Calculate the norm of the vector:

\[ 7\mathbf{i} + 3\mathbf{j} - 4\mathbf{k} \]
7) Find $\alpha$ given $3\mathbf{i} + \mathbf{j} - \mathbf{k}$ and $\alpha \mathbf{i} - 4\mathbf{j} + 4\mathbf{k}$ are parallel.

8) Find $\alpha$ so that the norm of $\alpha \mathbf{i} + (\alpha - 1)\mathbf{j} + (\alpha + 1)\mathbf{k}$ is 2.
9) Find the vector of norm 2 in the opposite direction of \( \mathbf{a} = \mathbf{i} + 2\mathbf{j} - \mathbf{k} \)
10) Let $\mathbf{a} = (7, 5, 2), \mathbf{b} = (6, 4, 1), \mathbf{c} = (7, 5, 7), \text{ and } \mathbf{d} = (4, 4, 6)$. Find scalars $A, B, C$ such that $\mathbf{d} = A\mathbf{a} + B\mathbf{b} + C\mathbf{c}$.