LESSON 1

MA 26100·FALL 2023

DR. HOOD

WARM UP

Introduce yourself to your neighbors and answer the following:

- Your Name

- Year at Purdue

- Major

- Favorite Integration Method from Calculus 2

Do you want to share contact information?

BRIGHTSPACE

BEFORE

Syllabus

Complete these first to access course material

Important Announcements will be posted here:

Fall 2023 MA 261-LEC 200 600 -...

ZZDemo ZZStudent
Impersonating

Course Home   Content   Classlist   Grades   Class Progress   Course Tools ˅   Help ˅

LEC 200 & 600
Fall 2023 MA 261-LEC 200 600 - Merge

Announcements ˅

Welcome to Fall 2023 MA 261-LEC 200 600 - Merge!

✕

Hello, and welcome to **Fall 2023 MA 261-LEC 200 600 - Merge**.

To begin, after finishing this announcement, you will need to go to **CONTENT**, located in the navigation bar menu.

To access the material on the Brightspace page, you will need to complete the "Academic Integrity at Purdue Acknowledgement" and "Quiz 0: Syllabus Quiz". You have unlimited attempts to score at least 80% on the Syllabus Quiz. Once completed, you will then be able to access the remainder of the course.

Show All Announcements

Calendar ˅

Thursday, August 17, 2023   ▷

Upcoming events   ▼

AUG   11:59 PM
22   Getting to Know You
        - Due

AUG   11:59 PM
22   Quiz 0: Syllabus Quiz
        - Due

AUG   11:59 PM
28   Getting to Know You
        - Availability Ends

SEP   11:59 PM
1   Quiz 0: Syllabus Quiz

Information in Brightspace is posted week by week

Search Topics

Syllabus

Bookmarks

Course Schedule   2

Access Pearson MyLab Math   2

Quiz Information   1

Week 1   4

Week 1: Recitation   2

Week 3   3

Week 4   3

Week 5   3

Week 1 ∨

🖨 Print

Overview

Week	Day	Date	Class Activities	Outside of Class Activities
1	MON	8/21	Lesson 1 Review of Vectors (13.1 - 13.4)	Reading: 13.1, 13.2, 13.3, 13.4 Homework: None
	TUE	8/22	Recitation (Getting to Know You Survey)	Quiz 0: Syllabus Quiz Quiz is online in Brightspace (Quiz 0 available until 9/1)
	WED	8/23	Lesson 2 13.5 Lines & Planes in Space	Reading: 13.5 Homework: None
	THU	8/24		
	FRI	8/25	Lesson 3 13.6 Quadratic Surfaces, Part I	Reading: 13.6 Homework: HW 1 (Lesson 1)

Expand All | Collapse All

0 % 0 of 4 topics complete

MyLab and Mastering Pearson eText ∨
External Learning Tool
Link to launch the Pearson eText

MyLab and Mastering Homework ∨
External Learning Tool
MyLab and Mastering Homework assignments for students to do

Week 1: Recitation ▼

Summary of class activities and assignments for the week

Link to the eText

Link to the HW

Course Home   Content   Classlist   **Grades**   Class Progress   Course Tools ⌄   Help ⌄

Grades

🖶 Print

Final Calculated Grade

Weight Achieved

- / - 🖩

Grade

-

Grades will be posted in the Brightspace Gradebook

Grade Item	Points	Weight Achieved	Grade
Exams		- / 68	-
Midterm Exam 1	- / 100	- / -	-
Midterm Exam 2	- / 100	- / -	-
Final Exam	- / 100	- / -	-
Quizzes		- / 16	-
Quiz 00	- / 10	- / -	-
Quiz 01	- / 10	- / -	-
Quiz 02	- / 10	- / -	-

REVIEW OF VECTORS

Login to Brightspace and go to our course to see the announcement

Use these notes to solve the problem on the next slide

LEC 200 & 600

Fall 2023 MA 261-LEC 200 600 - Merge

Announcements ⌄

Lesson 1: Review of Vectors ⌄   ✕

Posted Aug 21, 2023 12:01 AM

Hi Everyone,

Attached below is a summary of review of vectors. We will use these in lecture on Monday, Aug 21.

See you in class!

Dr. Hood
Attachment(s):

▤ review_vectors_ma261_fa2...   (1.85 MB)

Welcome to Fall 2023 MA 261-LEC 200 600 - Merge!

⌄   ✕

Calendar ⌄

Monday, August 21, 2023   ▷

Upcoming events   ▼

AUG   **11:59 PM**
22   Getting to Know You
       - Due

AUG   **11:59 PM**
22   Quiz 0: Syllabus Quiz
       - Due

AUG   **11:59 PM**
28   Getting to Know You
       - Availability Ends

REVIEW OF VECTORS

PURDUE UNIVERSITY® | **Department of Mathematics**
Kaitlyn Hood

Home Research Publications Teaching About Me

LECTURE ARCHIVE

MA 26100 • FALL 2023

This table includes the Day, Date, Lesson Title, and links to the Lecture Notes and HotSeat Slides

Day	Date	Lecture Title	Lecture Notes	HotSeat Slides
Mon	8/21	Lesson 1: Review of Vectors (Sec 13.1 - 13.4)	Notes: Review of Vectors	

If Duo is still down:
1. Go to https://www.math.purdue.edu/~kthood/MA261_Fall2023.html
2. Click "Lecture Archive"
3. Download: "Notes: Review of Vectors"

Use these notes to solve the problem on the next slide

POLL 1

Which of these vectors is **not** a unit vector?

a) $\left\langle \cos\left(\frac{\pi}{10}\right), 0, \sin\left(\frac{\pi}{10}\right) \right\rangle$

b) $\left\langle \frac{1}{3}, \frac{1}{3}, \frac{1}{3} \right\rangle$

c) $\left\langle 0, \frac{4}{5}, \frac{3}{5} \right\rangle$

d) $\frac{1}{\sqrt{3}}\left(\hat{\mathbf{i}} + \hat{\mathbf{j}} + \hat{\mathbf{k}} \right)$

unit vector $\vec{v} = \langle v_1, v_2, v_3 \rangle$

$|\vec{v}| = 1$

$\sqrt{v_1^2 + v_2^2 + v_3^2} = 1$

$|\vec{b}| = \sqrt{\left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^2}$

$= \sqrt{\frac{3}{9}} = \frac{\sqrt{3}}{3} \neq 1$

SYLLABUS

SUPPLEMENTAL INSTRUCTION

- These study groups are open to anyone enrolled in this course who would like to stay current with the course material and understand the material better.

- Attendance at these sessions is voluntary, but extremely beneficial for those who attend regularly.

- Times and locations for the help sessions can be found here: www.purdue.edu/si

SUPPLEMENTAL INSTRUCTION

SI Leader	Session 1	Session 2	Session 3	Office hour
Anna Szakats	Sun @ 4:30 PM Academic Success Center	Tue @ 4:30 PM FRNY 1043	Thu @ 4:30 PM FRNY 1043	Thu @ 12:00 PM WILY C215 + Zoom
Jorge Mendoza	Sun @ 6:30 PM Academic Success Center	Mon @ 6:30 PM WALC 3122	Wed @ 6:30 PM WALC 3122	Wed @ 10:30 AM WILY C215 + Zoom

OFFICE HOURS

- **Dr. Hood's Office Hours:**
  - Mon, Wed, Fri at 2:00-3:00pm in MATH 844
  - (may change slightly after first week)

- **TA's have office hours in the Math Resource Room (MRR)**
  - Location to be announced.
  - Schedule will be posted online:
   - https://www.math.purdue.edu/academic/courses/helproom

COURSE CALENDAR

- Posted in Brightspace under the description for each week
- Link: https://www.math.purdue.edu/~kthood/calendar_ma261_fa23.html
- Preview of first couple weeks:

Course Calendar · MA 26100 · Fall 2023

Week	Day	Date	Class Activities	Outside of Class Activities
1	MON	8/21	Lesson 1 Review of Vectors (13.1 - 13.4)	Reading: 13.1, 13.2, 13.3, 13.4 Homework: None
	TUE	8/22	Recitation (Getting to Know You Survey)	Quiz 0: Syllabus Quiz Quiz is online in Brightspace (Quiz 0 available until 9/1)
	WED	8/23	Lesson 2 13.5 Lines & Planes in Space	Reading: 13.5 Homework: None
	THU	8/24		
	FRI	8/25	Lesson 3 13.6 Quadratic Surfaces, Part I	Reading: 13.6 Homework: HW 1 (Lesson 1)
2	MON	8/28	Lesson 4 13.6 Quadratic Surfaces, Part II	Reading: 13.6 Homework: HW 2 (Lesson 2), HW 3 (Lesson 3)
	TUE	8/29	Recitation Quiz 1 (Lessons 1 - 2)	
	WED	8/30	Lesson 5 14.1 Vector-Valued Functions	Reading: 14.1 Homework: HW 4 (Lesson 4)
	THU	8/31		
	FRI	9/1	Lesson 6 14.2 Calculus of Vector-Valued Functions, 14.3 Motion in Space, Part 1	Reading: 14.2, 14.3 Homework: HW 5 (Lesson 5)
3	MON	9/4	Labor Day No Lecture	Reading: None Homework: None
	TUE	9/5	Recitation Quiz 2 (Lessons 3 - 5)	
	WED	9/6	Lesson 7 14.3 Motion in Space, Part II	Reading: 14.3 Homework: HW 6 (Lesson 6)
	THU	9/7		
	FRI	9/8	Lesson 8 14.4 Length of Curves, 14.5 Curvature	Reading: 14.4, 14.5 Homework: HW 7 (Lesson 7)

IMPORTANT DATES

Event	Date	Time
Last day to Withdraw	Fri Sep 1	5pm
Exam 1	Tue Oct 3	8 - 9pm
Last day to Drop (W)	Mon Nov 27	5pm
Exam 2	Tue Nov 7	8 - 9pm
Final Exam	To be announced by Registrar's Office	

POLL 2
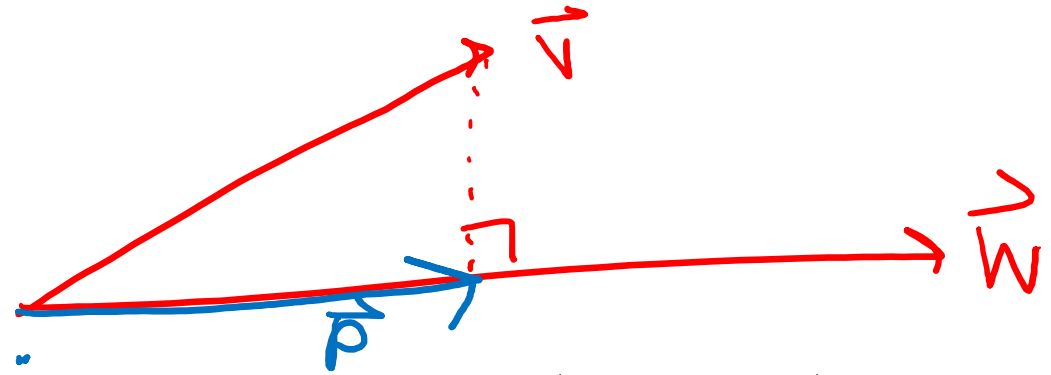
Let $\vec{v} = \langle 1, 2, 3 \rangle$ and $\vec{w} = \langle 2, -1, 2 \rangle$. If $\text{proj}_{\vec{w}}(\vec{v}) = c\vec{w}$, what is c?

a) $c = \dfrac{1}{3}$

b) $c = 2$

c) $c = \dfrac{3}{2}$

d) $c = \dfrac{2}{3}$

$$\vec{P} = \text{proj}_{\vec{w}}(\vec{v}) = \left(\underbrace{\frac{\vec{v} \cdot \vec{w}}{\vec{w} \cdot \vec{w}}}_{c} \right) \vec{w}$$

$$c = \frac{\vec{v} \cdot \vec{w}}{\vec{w} \cdot \vec{w}} = \frac{1 \cdot 2 + 2(-1) + (3)(2)}{2^2 + (-1)^2 + 2^2} = \frac{2 - 2 + 6}{4 + 1 + 4}$$

$$= \frac{6}{9} = \frac{2}{3}$$

GRADES

Graded Item	Percentage
Homework	16%
Quizzes	16%
Two midterms @ 17% each	34%
Comprehensive Final Exam	34%

QUIZZES

- Quizzes will be in-person in recitation on most Tuesdays

- Quiz problems are randomly selected from the past exams

  - 1 problem graded all or nothing

  - 1 problem graded for partial credit

- Link to Past Exam Archive:
  https://www.math.purdue.edu/academic/courses/oldexams.php?course=MA26100

- Link to Quiz Study Guide:
  https://www.math.purdue.edu/~kthood/docs/MA261_Fall2023/quiz_study_guide_ma261_f23.pdf

HOTSEAT

- https://www.openhotseat.org/
- In-class polls
- iOS – download app
- Use the website
- SMS texting

HotSeat polls **will not** be graded this semester

APPROVED ABSENCES

- Students will need to provide documentation of an approved absence in order to receive an extension on HW or exemption from quiz.

- Detailed list provided in the syllabus

- **No make-up quizzes**
  - Missed quizzes will be exempted (with documentation of approved absence)
  - We drop the lowest quiz score

APPROVED ABSENCES

Type of Absence	Description of Absence	Supporting Documentation Needed
Grief Absences	We know that a time of loss can be difficult for a student. Students are eligible for a specific number of days of excused absence following the death of a loved one.	Submit a Grief Absence Request Form.
Jury Duty Absences	Students summoned to serve as potential jurors or who have been empaneled as jurors in a criminal or civil trial may request an excused absence.	Submit a Jury Duty Absence Request Form.
Military Absences	Purdue recognizes that those actively serving in the reserves or National Guard of the United States are required by their military contract to attend mandatory training, with failure to participate punishable under law.	Submit a Military Absence Request Form.
Parenting Leave	Students who are pregnant, have recently given birth, or need a leave of absence to care for a newborn, adopted, legal guardian, or foster care, may petition for a leave of absence.	Submit a petition for a leave of absence through the Office of Institutional Equity (OIE).
Medical Absences due to long-term conditions	For doctor's visits, medical procedures, or flare-ups due to an **ongoing long-term health condition**, you should request accommodations under the Americans with Disabilities Act (ADA).	Contact the DRC (Disability Resource Center)
Medical Excused Absences (MEAPS)	Students may occasionally miss class and other academic obligations due to **hospitalization, emergency department, or urgent care visits**, whether physical or mental health related. This policy intends to afford arrangements for students experiencing serious and short-term medical situations that cause them to miss coursework or exams.	Submit a Medical Excused Absence Request Form.

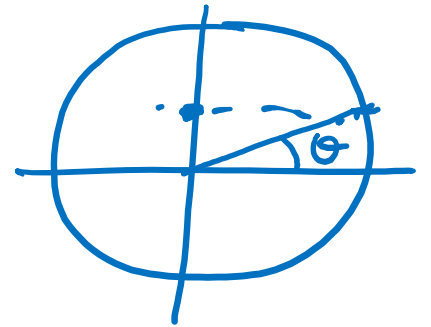|		
Acute Illnesses	Absences due to **acute illnesses** (like the flu or a cold) are not covered by the MEAPS policy. Covid-19 diagnosis is now covered by this policy. (Please minimize the medical information you share. A doctor's note verifying your dates of absence is sufficient.)	The first day of illness may be excused without documentation. For longer absences due to illness, a doctor's note is needed. If a student has multiple illnesses during the semester, an appropriate course of action will be negotiated with the TA and instructor.
Travel for Purdue University Activities	Travel for Purdue sports teams or other academic related events may be approved.	A letter signed by the sponsor of your Purdue University activity.
Personal Emergencies or Unforeseen Circumstances	Personal emergencies or unforeseen circumstances may be approved with documentation. These include: - House fire - Car accident - Visa problems - Cancelled flights - Family emergencies	The type of documentation may be negotiated with the TA. For help with contacting an instructor about an absence, see these Coaching Tips.
Religious Observances	Religious holidays may be approved with documentation and advanced notice	A letter from clergy with dates of absence.
Evening Exam conflict with other class at Purdue	According to the Office of the Dean of Students, regularly scheduled classes take precedence over evening exams. A student with a conflict must provide documentation, then they will be permitted to take the alternate exam with no late penalty. The same procedure applies to students with two evening exams at the same time.	Fill out the Exam Conflict Form and return to Dr. Hood.
Technical Problems	There are computer labs on campus students can use if their personal computer is malfunctioning. Check the Pearson Student Support page with answers to common questions. If all else fails, contact Pearson Technical Support. If you lose your phone, you can request a Hardware Token (free of charge) to submit BoilerKey Two-Factor Authentication. More information at BoilerKey FAQ.	A letter from Pearson Technical Support and a case number.

23

POLL 3

$\hat{i} = \langle 1,0,0 \rangle$
$\hat{j} = \langle 0,1,0 \rangle$
$\hat{k} = \langle 0,0,1 \rangle$

$\vec{b} = \langle 1,4,8 \rangle$

$|\vec{b}| = \sqrt{1^2 + 4^2 + 8^2}$
$= \sqrt{81} = 9$

Suppose $|\vec{a}| = 4$ and $\vec{b} = \hat{i} + 4\hat{j} + 8\hat{k}$. The angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$. What is $|\vec{a} \times \vec{b}|$?

$|\vec{a} \times \vec{b}| = |\vec{a}||\vec{b}| \sin\theta$

$= 4 \cdot |\vec{b}| \sin\left(\frac{\pi}{6}\right)$

a) 26

b) 36

c) 18

d) 9

$= 4 \cdot 9 \cdot \frac{1}{2} = 2 \cdot 9 = 18$

$\vec{a} \cdot \vec{b} = |\vec{a}||\vec{b}| \cos\theta$

MYLAB MATH

MYLAB MATH

Click here to access My Lab Math

Course Home   Content   Classlist   Grades   Class Progress   Course Tools ⌄   Help ⌄

Search Topics

Table of Contents ⌄

🖶 Print

Download

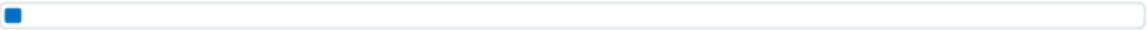Expand All | Collapse All

1.37 % 1 of 73 topics complete

Start Here   ▷

Calendar   ▷

Access Pearson MyLab Math   ▷

Quiz Information   ▷

Week 1   ▷

Week 2   ▷

MYLAB MATH

- Need an **access code** for the Pearson MyLab Math platform to complete your homework online in MyLab Math.
  - Video Instructions: How to Register for MLM
- Access Pearson MyLab Math through the course page in Brightspace.
- You do not need a physical textbook. (An eText included with the access code.)

MYLAB MATH

- **New Fall 2023:**
  - You have **unlimited attempts** on each problem
    - Each attempt has (up to) 3 **tries**
    - After 3 tries, the correct answer is shown, and a new attempt starts with a slightly different problem
  - These setting allow you to review and rework the HW problems after the due date. (A potential study option)

![Pearson logo] **Pearson**

Using Pearson products?

Join your local Pearson campus team to get *LIVE* help with online registration

Date: **Tuesday, August 22, 2023**
Time: **12:30 pm-4:00 pm**
Location: **The Krannert Drawing Room**

Get *10% off* your Pearson+ subscription this semester!

PCAM0008

Copy and paste the code above at checkout when you purchase access to Pearson+

Scan this QR code to purchase Pearson eTextbooks for your courses!

Two $2,500 Awards!

Share Your Story Contest: Post a 10-60 second video on Instagram or TikTok answering the question: What advice would you give to your younger self? Enter between 8/1/2023 and 9/15/2023 to win 1 of 2 $2,500 awards toward you education! Head to @pearson_plus on social for full contest details.

POLL 4

$A = \frac{1}{2}|\vec{v} \times \vec{w}|$
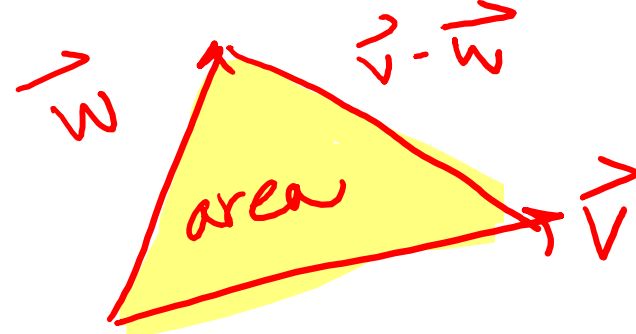
Find the area of the triangle whose sides are the vectors $\vec{\mathbf{v}} = \langle 1, 1, 1 \rangle$, $\vec{\mathbf{w}} = \langle 2, 0, 2 \rangle$, and $\vec{\mathbf{v}} - \vec{\mathbf{w}}$

$$\vec{v} \times \vec{w} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 1 \\ 2 & 0 & 2 \end{vmatrix}$$
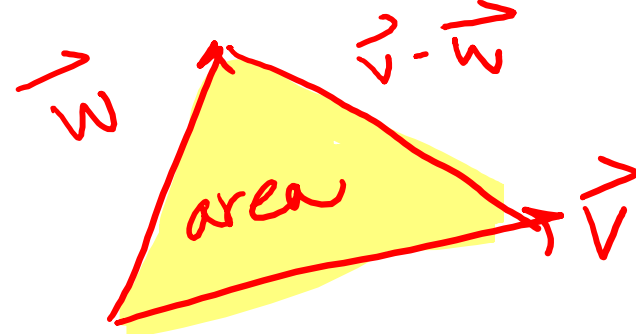
a) $\sqrt{5}$

b) $2\sqrt{5}$

c) $\sqrt{2}$

d) $2\sqrt{2}$

$$= \hat{i} \begin{vmatrix} 1 & 1 \\ 0 & 2 \end{vmatrix} - \hat{j} \begin{vmatrix} 1 & 1 \\ 2 & 2 \end{vmatrix} + \hat{k} \begin{vmatrix} 1 & 1 \\ 2 & 0 \end{vmatrix}$$

$$= \hat{i}(1 \cdot 2 - 1 \cdot 0) - \hat{j}(1 \cdot 2 - 1 \cdot 2) + \hat{k}(1 \cdot 0 - 1 \cdot 2)$$

POLL 4

$$A = \frac{1}{2}\left|\vec{v} \times \vec{w}\right|$$

Find the area of the triangle whose sides are the vectors
$\vec{v} = \langle 1, 1, 1 \rangle$, $\vec{w} = \langle 2, 0, 2 \rangle$, and $\vec{v} - \vec{w}$

$$= \hat{i}(1 \cdot 2 - 1 \cdot 0) - \hat{j}(1 \cdot 2 - 1 \cdot 2) + \hat{k}(1 \cdot 0 - 1 \cdot 2)$$

$$= 2\hat{i} - 0\hat{j} + (-2)\hat{k} = \langle 2, 0, -2 \rangle$$

a) $\sqrt{5}$

b) $2\sqrt{5}$

c) $\sqrt{2}$

d) $2\sqrt{2}$

$$\text{Area} = \frac{1}{2}\left|\vec{v} \times \vec{w}\right|$$

$$= \frac{1}{2}\sqrt{2^2 + 0^2 + 2^2} = \frac{\sqrt{8}}{2} = \sqrt{2}$$

WHY STUDY CALCULUS 3?

WHY STUDY CALC 3?

- You will learn:
  - Coordinate systems in 3D
    - Plotting, describing surfaces
  - Derivatives in 3D
    - Used for optimization, mathematical modelling
      - Business, economics, machine learning, etc.
  - Integrals in 3D
    - Used to compute physical quantities: forces, fluxes, etc.

HAVE A GREAT SEMESTER!

- Any additional questions or concerns?