- Critical analysis and creative inquiry: why / why not?
- Diverse perspectives and disciplines (alg, geo, tech, apps)
- Linear Objects
- Linear Operations

I care about your success and feel a great responsibility to you as my student

Solidify and Make Connections

problem sets
in-class assessments
final project

Review and Understand Misconceptions

feedback
re-engage solutions
fill-in guides
debriefs
revise and reflect

Try it Out!

book readings
interactive videos
practice quizzes
handwrite practice
think-share-pair-compare

Making mistakes is integral to the learning process and enriches our understanding as we extend content and clear up misconceptions.

Handwrites, begin assignments and major assignments have strict deadlines of 10:30am our next academic day. All other activities are those you should attempt for completion by then, but you'll have 2nd chances that remain open until closer to the corresponding in-class assessment. Some days are lighter than others and it will help you to progress on upcoming activities in advance, especially major assignments. Plan to spend 3.5–5 hours between classes, on average, as per the University-wide Statement on Student Engagement with Courses (our hybrid class is officially designed by the registrar and scheduled for our third hour to be a part of the activities between classes).

	Class Tuesday	Between Classes (by 10:30am Thursday)	Class Thursday	Between Classes (by 10:30am Tuesday)
8/22–8/24	active learning handwrite course overview module 1 overview	2240 interactive video download Maple (free) access e-text 1.1 read the e-text 1.1 interactive video 1.1 practice quiz syllabus	1.1 handwrite, activities t-shirt Thursday	turn in 2 handwrites 1.2 read the e-text 1.2 interactive video 1.2 practice quiz Maple intro video practice submitting PDF add ASULearn profile pic Zoom update & profile pic
8/29–8/31	1.2 handwrite, activities	re-engage 1.1 handwrite turn in 1.2 handwrite 1.3 read the e-text 1.3 interactive video 1.3 practice quiz	1.3 handwrite, activities t-shirt Thursday	re-engage 1.2 handwrite turn in 1.3 handwrite 1.4 read the e-text 1.4 interactive video 1.4 practice quiz
9/5–9/7	1.4 handwrite, activities	re-engage 1.3 handwrite turn in 1.4 handwrite 1.5 read the e-text 1.5 interactive video 1.5 practice quiz	1.5 handwrite, activities t-shirt Thursday	re-engage 1.4 handwrite turn in 1.5 handwrite 1.7 read the e-text 1.7 interactive video 1.7 practice quiz **begin problem set 1**
9/12–9/14	1.7 handwrite, activities	re-engage 1.5 handwrite turn in 1.7 handwrite card sort 1 review 1 practice quiz	group review 1 t-shirt Thursday	re-engage 1.7 handwrite debrief 1.1–1.5, 1.7 **problem set 1**
9/19–	group debrief 1	re-engage problem set 1	2.1 handwrite, activities	turn in 2.1 handwrite

1.1 read Linear Algebra and its Applications

Mark as done

1.1 interactive video

To do: Receive a grade

To do: Receive a passing grade

1.1 practice quiz

To do: Receive a grade

To do: Receive a passing grade

1.1 read Linear Algebra and its Applications

Mark as done

Mark 1.1 read Linear Algebra and its Applications as done

read 1.1 in the e-text *Linear Algebra and its Applications* by David Lay, Steven Lay, and Judi McDonald at the top of our ASULearn. I recommend taking notes on concepts and examples, especially relating to:

- algebra of linear equations: coefficients and variables
- geometry of linear equations in 2D and 3D: lines and planes
- solution set: inconsistent: 0 solutions; consistent: 1 unique solution or infinite solutions
- matrix of a linear system: coefficient matrix, augmented matrix, triangular form
- row equivalent systems
- algorithm for solving a linear system using elementary row operations of replacement, interchange, and scaling

solutions

The solutions to a system of equations is a representation of the entire set of assignment of variables that makes all the equations (simultaneously) hold. A solution is one assignment, but may not represent them all, whereas the plural version "solutions" (ie the solution set) should. For instance if a matrix reduces to $\begin{bmatrix} 1 & 0 & -1 & 1 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

then it has infinite solutions. One solution is (1,1,0), but to express all solutions: (1+t, 1-2t,t), as t varies over the reals, by parameterizing the free variable and then solving for the variables with pivots. This concept is first explored in 1.1 in the book.
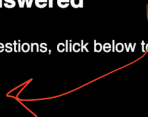
OK

interactive video activities, repeatable

29 Question(s) answered   ✖

You have answered 29 questions, click below to submit your answers.

✔ Submit Answers

Answered questions   **Score**

0:49   EBG heads equation   **1 / 1**

0:53   EBG feet equation   **1 / 1**

0:57   EBG 3 solutions   **1 / 1**

2:07   EBG solution set   **1 / 1**

2:40   EBG elimination   **1 / 1**

H·P 2240 interactive video

✔ **Done:** Receive a grade
✗ **Failed:** Receive a passing grade

📄 download or access Maple (free) and open the program 🌈

Mark as done

V My Materials

Mark as done

First, obtain your access code from My Materials. Then access the e-text *Linear Algebra and its Applications* at the top of ASULearn to enter or create your Pearson account info and **enter the access code from the bookstore**. If you have difficulty, you can access a PDF of the beginning of Chapter 1. Self-report the e-book access as complete here.

📄 1.1 read Linear Algebra and its Applications 🌈

Mark as done

H·P 1.1 interactive video

To do: Receive a grade
To do: Receive a passing grade

☑ 1.1 practice quiz

To do: Receive a grade
To do: Receive a passing grade

🌐 syllabus & course policies

Mark as done

2240 interactive video

download or access Maple (free) and open the program 🌀

✔ Done

My Materials

✔ Done

First, obtain your access code from My Materials. Then access the e-text *Linear Algebra and its Applications* at the top of ASULearn to enter or create your Pearson account info and **enter the access code from the bookstore.** If you have difficulty, you can access a PDF of the beginning of Chapter 1. Self-report the e-book access as complete here.

1.1 read Linear Algebra and its Applications 🌀

✔ Done

1.1 interactive video

Dr. Sarah's Linear Algebra (in-class items, video slides...) - Fall 2023

The best way to contact me is during office hours or on the ASULearn need help forum, as I usually check the posts daily, even on weekends.

- syllabus and grading policies
- What is Due When?

Linear Algebra and its Applications by David Lay, Steven Lay, and Judi McDonald

need help from me, tutoring, your classmates, or tech support?

in-class items, video slides and more

Date	
	☐ **work is due by 10:30am**
assigned time at finals	☐ turn in video presentation in ASULearn assignment by the beginning of our assigned time at finals during the assigned time, conduct final project peer review and self-evaluation
	Linear Systems of Matrix and Vector Equations
24 Aug - Thur	☐ 2240 interactive video slides, interactions
	☐ download or access Maple (free) and open the program
	☐ access the e-text
	☐ 1.1 read Linear Algebra and its Applications
	☐ 1.1 interactive video slides, Maple, Desmos, interactions
	☐ 1.1 practice quiz
	☐ syllabus
	class: 1.1 handwrite, additional activities, t-shirt Thur
22 Aug - Tues	class: course and module 1 overview, active learning handwrite and handout

1.1 interactive video

Evelyn Boyd Granville
second Black woman we know of—PhD in mathematics
Image 1 Credit: https://www.visionaryproject.org/granvilleevelyn/
Image 2 Credit: Marge Murray. Courtesy of Evelyn Boyd Granville

...this was the most interesting job of my lifetime—to be a member of a group responsible for writing computer programs to track the paths of vehicles in space

practice with instantaneous feedback from me, repeatable
Instantaneous Feedback opens after you **Check** a response,
so you can retake it. For a box, **hover for feedback**.

1	k	0

Hover over box to see my feedback and suggestions

1 ✖ $-k^2 + 1$ 0 ✖

Incorrect
multiply-k times 0 and add it to 1. Simplify

Part d) Notic_____ussian form, with items below the diagonal
via pivots. A_____ng from left to right. Here 1 is a pivot for th___
x_2?

⦿ yes for all k ✖   look for k(s) that makes row 2 column 2 nonzero in Gaussian to have a pivot. S_
○ only when $k = \pm 1$
○ only when $k \neq \pm 1$
○ other

Part e) Does this system ever have infinitely many solutions, for a k?

○ yes
⦿ no ✔

1.1 practice quiz

1.1 practice quiz

Done: Receive a grade

Failed: Receive a passing grade

Re-attempt quiz

Grading method: Highest grade

Grade to pass: 70.00 out of 100.00

Summary of your previous attempts

Attempt	State	Points / 31.00	Grade / 100.00	Review
1	Finished Submitted Saturday, June 10, 2023, 9:23 AM	18.90	60.97	Review

1.3 practice quiz

1.3 practice quiz

Done: Receive a grade

Done: Receive a passing grade

re-engage 1.2 handwrite

practice with instantaneous feedback from me, repeatable

Part d) What equation does the new row 2 correspond to?

[1] ✗ $x_2=$ [1] ✗

Part e) Solve the system using part d) to find x_2 and then use back substitution of this value into the equation the value of x_1.

$(x_1, x_2)=($ [1] ✗ , [1] ✗)

We solve this system of 2 equations in 2 unknowns. Use Gaussian elimination on the augmented matrix corre your elimination will only need one step: $r'_2 = -7r_1 + r_2$. So multiply each entry in row 1 by minus –7 and 2 to reduce to Gaussian. The reduced matrix is $\begin{bmatrix} 1 & 2 & -2 \\ 0 & -6 & 24 \end{bmatrix}$. Then use row 2 $-6x_2 = 24$ to solve for x_2 of -4 into row 1 $x_1 + 2x_2 = -2$ to find $x_1 = -2 - 2x_2$.

Partially correct
Marks for this submission: 0.12/1.00. Accounting for previous tries, this gives **0.12/1.00**.

General Feedback
Avoid Becoming too Dependent on the Online System
Second Chance

Fill-In Guide—Fill In and Bring to Classes

2) augmented matrix—example of a system and its augmented matrix

3) augmented matrix and how we convert from a row of an augmented matrix after strict Gaussian back to the equation it represents in terms of coefficients and variables—example

4) back substitution from row echelon form after strict Gaussian in an augmented matrix—example

5) consistent—definition

In-class Activities

- bring your notes and the fill-in guide with you
- active learning and guided discovery that is review or extension
- small group—help each other—and whole class activities I'm here to help!
- individual and group assessments
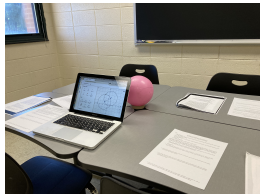
no eating or drinking in class, but you may step out
if you need to hydrate or similar!
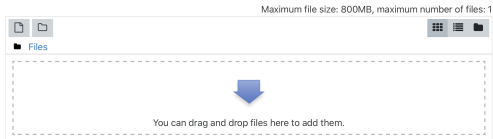
📄 handwrite practice. Collate into one single PDF

Grade:

scale	Padawan (still training)	Jedi	Jedi Master	Good start but this is incomplete. See the attached file.

- Padawans are training to one day become a Jedi.
- Both Jedi and Jedi Master ratings earn completion.
- I'll respond with feedback on your PDF and re-engage solutions will also open

Maximum file size: 800MB, maximum number of files: 1

Files

You can drag and drop files here to add them.

Accepted file types:

PDF document .pdf

Add submission

You have not made a submission yet.

Save changes   Cancel

Maximum file size: 800MB, maximum number of files: 1

Files

preferredna...
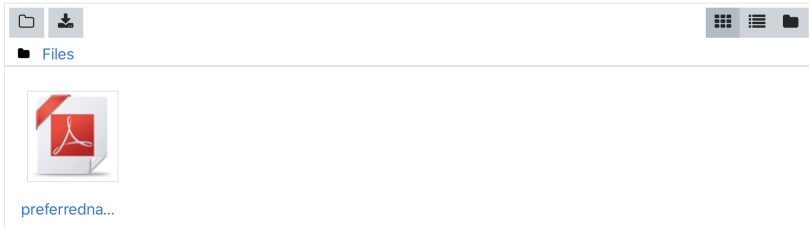
Accepted file types:

PDF document .pdf

Save changes   Cancel

Edit submission   Remove submission

You can still make changes to your submission.

Feedback

Grade	
	scale	Padawan (still training)	Jedi	Jedi Master	see the annotations.
	Jedi
Graded on	Sunday, August 2, 2020, 8:48 AM
Graded by	Sarah Greenwald
Annotate PDF	📄 Sarah Greenwald greenwaldsj_368046_0.pdf August 2 2020, 8:48 AM
	View annotated PDF...

my personalized feedback

begin major assignment or study guide
glossary
re-engage, debrief, surveys

📢 begin problem set 1   **To do:** Submit feedback

Thur 9/14 due by 10:30am

▤ re-engage 1.5 handwrite

🔒 Not available unless any of:
  • It is after **September 12 2023, 10:40 AM**
  • The activity **turn in 1.5 handwrite** is complete and passed

📄 turn in 1.7 handwrite   **To do:** Receive a grade
                                   To do: Receive a passing grade

📄 card sort 1   **To do:** Receive a grade
                                   To do: Receive a passing grade
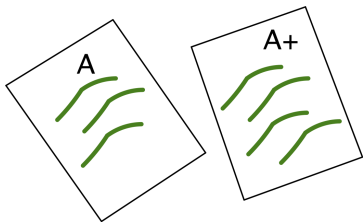
☑ review 1 practice quiz   **To do:** Receive a grade
                                   To do: Receive a passing grade

◁ □ ▷ ◁ 🗗 ▷ ◁ ⊜ ▷ ◁ ⊜ ▷   ⊜   ⠀○ ○ ○

Grades

- Effective ASULearn Engagement 35%
  try again, keep scrolling down, I'm here to help!
- Problem Sets 30%
- In-class Assessments 20%
- Final Project 10%
- Effective Class Engagement 5%

grading scale: $A \geq 93; 90 \leq A- < 93; 87 \leq B+ < 90...$

Material from MAT 1110 and Prior Courses

- algebra like 5!, $2x + 3y = 0$ & solutions of eqs like $x = -\frac{3y}{2}$
- area and volume
- coordinate/analytic geometry like geo of $(1, 2)$, $(1, 2, 3)$
- linear approximations
- lines
- functions, function notation and compositions like $f \circ g(x)$
- limits applied to diverse objects
- representations, mathematical reasoning and justifications, including algebraic, numerical, and geometric
- sin and cos trigonometry
- summation notation/series notation $\sum_{1}^{n} f(n)$
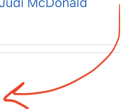- curves and surfaces in 2D and 3D
- technology use

Zoom check-in for help on activities (internet allowing)

Welcome to linear algebra!

Linear Algebra and its Applications by David Lay, Steven Lay, and Judi McDonald

need help from me, tutoring, your classmates, or tech support?

in-class items, video slides and more

Tuesday, Thursday 9:45–10:15am and 2-3pm
Sunday, Monday, Wednesday 7–7:45pm
drop in—no appointment needed—
I want to hear how you are doing!

Where to Get Help Outside of Class

- Zoom

  need help from me, tutoring, your classmates, or tech support?

-
- use my instant feedback and personalized feedback to help you learn keep scrolling down
- https://sites.google.com/appstate.edu/ mat-2240-syllabus-f23/student-advice

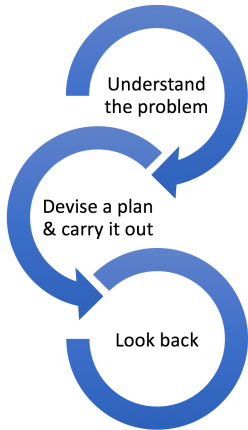### I care about you and your success!

happy to help

Linear algebra is often one of the first classes students see that is not procedural. It is full of new mathematical language, abstract and spatial thinking, algebraic arguments, visual arguments, real-life numerical applications, and other analyses that students must internalize in order to succeed. It is also a class where a computer algebra software system is required. Students who did well in earlier classes through short term memorization often struggle in linear algebra.
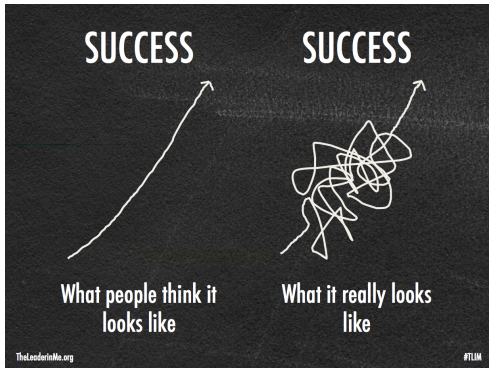
Christine Andrews-Larson, Jason Siefken, and Rahul Simha (2022). "Report on a US-Canadian Faculty Survey on Undergraduate Linear Algebra: Could Linear Algebra Be an Alternate First Collegiate Math Course?" *Notices of the American Mathematical Society* 69(5) p. 809.

Make it Stick: The Science of Successful Learning by Peter C Brown, Henry L. Roediger III, and Mark A. McDaniel

Do you have time for this course?

https://mathequalslove.blogspot.com/p/free-classroom-posters.html
https://www.leaderinme.org/blog/the-power-of-a-growth-mindset/

- Zoom

  need help from me, tutoring, your classmates, or tech support?

- use my instant feedback and personalized feedback to help you learn keep scrolling down

I care about you and your success!