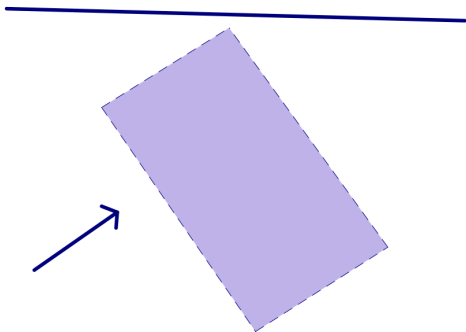


# Math 2240: Introduction to Linear Algebra



- Linear Objects
- Linear Operations
- Critical analysis and creative inquiry: why / why not?
- Diverse perspectives and disciplines (alg, geom, computer, applications...)

*Is 100% online 2240 a good fit for you?*

1. Do you have reliable access?



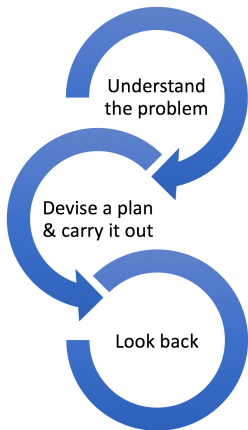
*Is 100% online 2240 a good fit for you?*

2. Are you good at working with and communicating with others in online spaces?



*Is 100% online 2240 a good fit for you?*

### 3. Do you have time for this course?



*Is 100% online 2240 a good fit for you?*

#### 4. Are you good at time management and meeting deadlines?

Try it Out!

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

Review and Understand  
Misconceptions

feedback  
re-engage solutions  
debrief t-s-p-c

Solidify and Make  
Connections

problem sets  
video projects

Credits: Thanks to Emory Maiden for letting me adapt the questions and advice

[https://www.youtube.com/watch?time\\_continue=139&v=HKoiVZaX4iA](https://www.youtube.com/watch?time_continue=139&v=HKoiVZaX4iA)



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

### Try it Out!

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

### Review and Understand Misconceptions

- feedback
- re-engage solutions
- debrief t-s-p-c

### Solidify and Make Connections

- problem sets
- video projects

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

Activities are under the day I imagine you will complete work on them and are intended to be turned in by 10am the next academic day (or earlier!). However, I encourage you to work ahead to complete items early. Items with strict deadlines of 10am the next academic day include **handwrite practices**, **begin assignments** and **major assignments**. All others are those you should attempt for completion by then, but you'll have 2nd chances that remain open until the corresponding video project. Some days are lighter than others and it will help you to progress on upcoming activities in advance, especially major assignments. Plan to spend 5-6.5 hours each day on class, on average, as per the University-wide Statement on Student Engagement with Courses.

	Monday (by 10am Tues)	Tuesday (by 10am Wed)	Wednesday (by 10am Thur)	Thursday (by 10am Fri)	Friday (by 10am next day***)
May 23-27	finish "prep" for 2240* 1.1 read the e-text 1.1 interactive video 1.1 practice quiz	1.2 read the e-text 1.2 interactive video 1.2 practice quiz 1.1, 1.2 <b>handwrite practice</b> Maple intro video	re-engage <b>handwrite</b> 1.3 read the e-text 1.3 interactive video 1.3 practice quiz 1.3 <b>handwrite practice</b>	re-engage 1.3 <b>handwrite</b> 1.4 read the e-text 1.4 interactive video 1.4 practice quiz 1.4 <b>handwrite practice</b> 1.5 read, <b>interactive video</b>	re-engage 1.4 <b>handwrite</b> 1.5 practice quiz 1.5 <b>handwrite practice</b> 1.7 read, <b>interactive video</b> 1.7 practice quiz <b>begin problem set 1</b>
May 31- Jun 3	State Holiday	re-engage 1.5 <b>handwrite</b> 1.7 <b>handwrite practice</b> 1.1-1.5, 1.7 t-s-p-c** debrief 1.1-1.5, 1.7 review 1 practice re-engage review 1	re-engage 1.7 <b>handwrite</b> re-read feedback and posts <b>problem set 1</b> video project 1 intro <b>begin video project 1</b>	re-engage ps 1 2.1 read, <b>interactive video</b> 2.1 practice quiz 2.1 <b>handwrite practice</b> 2.2 read, <b>interactive video</b> 2.2 practice quiz	re-engage 2.1 <b>handwrite</b> 2.3 read, <b>interactive video</b> 2.3 practice quiz 2.2, 2.3 <b>handwrite practice</b> 2.8 read, <b>interactive video</b> 2.8 practice quiz
June 6-10	re-engage <b>handwrite</b> 2.8 <b>handwrite practice</b> 2.9 read, <b>interactive video</b> 2.9 practice quiz <b>begin problem set 2</b>	re-engage 2.8 <b>handwrite</b> 2.9 <b>handwrite practice</b> 2.1-2.3, 2.8, 2.9 t-s-p-c debrief 2.1-2.3, 2.8, 2.9 review 2 practice re-engage review 2	re-engage 2.9 <b>handwrite</b> re-read feedback and posts <b>problem set 2</b> glossary 1	re-engage ps 2 <b>complete open items</b> video project 1 <b>begin Friday's activities</b>	<b>video project peer review</b> 1.8, 1.9 read, video 1.8, 1.9 practice quiz 1.8, 1.9 <b>handwrite practice</b> 6.1 read, <b>interactive video</b> 6.1 practice quiz
June 13-17	re-engage <b>handwrite</b> 6.1 <b>handwrite practice</b> 2.7 read, <b>interactive video</b> 2.7 practice quiz <b>begin problem set 3</b>	re-engage <b>handwrite</b> 6.1 2.7 <b>handwrite practice</b> 1.8, 1.9, 6.1, 2.7 t-s-p-c debrief 1.8, 1.9, 6.1, 2.7 review 3 practice re-engage review 3	re-engage 2.7 <b>handwrite</b> re-read feedback and posts <b>problem set 3</b> video project 2 intro <b>begin video project 2</b>	re-engage ps 3 3.1-3.3 read, video 3.1-3.3 practice quiz 3.1-3.3 <b>handwrite practice</b>	re-engage <b>handwrite</b> 5.1, 5.2 read, video 5.1, 5.2 practice quiz 5.1, 5.2 <b>handwrite practice</b> <b>begin problem set 4</b>
June 20-24	re-engage <b>handwrite</b> 5.6 read, <b>interactive video</b> 5.6 practice quiz 5.6 <b>handwrite practice</b>	re-engage 5.6 <b>handwrite</b> 3.1-3.3, 5.1-5.2, 5.6 t-s-p-c debrief review 4 practice re-engage review 4	re-read feedback and posts <b>problem set 4</b> glossary 2	re-engage ps4 <b>complete open items</b> video project 2 <b>begin Friday's activities</b>	<b>video project peer review</b> & <b>self-evaluation</b> course survey (optional) <b>revise and reflect on one problem set</b>

\*online 2240 intro, practice feedback & submit **handwritten PDF**, think-share-pair-compare your intro video, download Maple (free), add ASULearn profile pic, add Zoom profile pic, syllabus, access e-text. \*\*t-s-p-c is the think-share-pair-compare forum

\*\*\*Last Friday assignments are due by 10am Saturday because I need time to get final grades in; Friday activities are due by 10am the next academic day

\*\*\*\*I will post regularly in the announcement forum and sometimes in the need help forum. I recommend keeping up with my posts as they go out to you and also ask that you re-read relevant ones before a problem set is due. I will also provide feedback regularly in assignments themselves.



Mon 5/23

finish preparing for 2240 items

 1.1 read Linear Algebra and its Applications

Mark as done

 1.1 interactive video

**To do:** Receive a grade

 1.1 practice quiz

**To do:** Receive a grade

**To do:** Receive a pass grade

Tues 5/24

 1.2 read Linear Algebra and its Applications



## 1.1 read *Linear Algebra and its Applications*



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**

Manually mark the solid box on the right in ASULearn by clicking on it for the checkmark when you have finished.

# 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



## Preparing for 2240

 online 2240 intro

**Failed:** Receive a grade

 practice feedback and submit handwritten PDF

**To do:** Receive a grade **To do:** Receive a pass grade

 think-share-pair-compare your intro video link

**Done:** Start discussions: 1 **To do:** Post replies: 2 **To do:** Receive a grade

 download or access Maple (free) and open the program

✓ Done

 add ASULearn profile picture (name/Edit profile)

**To do:** Receive a grade

 add Zoom profile picture and update to the latest version (appstate.zoom.us/Login/Profile/Change)

Mark as done

**policies & grades** → syllabus

Mark as done

**V** My Materials

Mark as done

First obtain the bookstore code from My Materials. Then access the link for the book at the top of ASULearn to apply the code and open the book.



## Preparing for 2240

 online 2240 intro

**Done:** Receive a grade

 practice feedback and submit handwritten PDF

**To do:** Receive a grade **To do:** Receive a pass grade

 think-share-pair-compare your intro video link

**Done:** Start discussions: 1 **To do:** Post replies: 2 **To do:** Receive a grade

 download or access Maple (free) and open the program

Done

 add ASULearn profile picture (name/Edit profile)

**To do:** Receive a grade

 add Zoom profile picture and update to the latest version ([appstate.zoom.us/Login/Profile/Change](http://appstate.zoom.us/Login/Profile/Change))

**policies & grades** → [syllabus](#)

**V** [My Materials](#)

First obtain the bookstore code from My Materials. Then access the link for the book at the top of ASULearn to apply the code and open the book.

## [Dr. Sarah's Linear Algebra Tentative Calendar Page - Summer 2022](#)

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?](#)

Date

work is due by 10am the next academic day

### Linear Systems of Matrix and Vector Equations

23 May - Mon

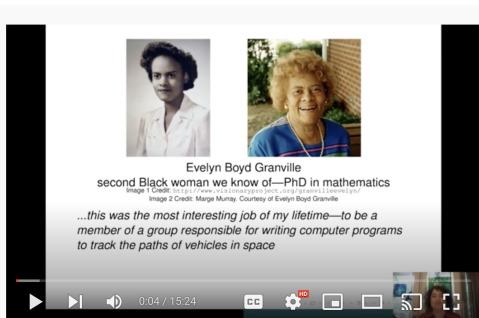
- finish [preparing for 2240 items](#)
- 1.1 read *Linear Algebra and its Applications*
- 1.1 interactive video [slides](#), [Maple](#), [Desmos](#), [interactions](#)
- 1.1 practice quiz

24 May - Tues

- 1.2 read *Linear Algebra and its Applications*
- 1.2 interactive video [slides](#), [Maple](#), [interactions](#)
- 1.2 practice quiz [GeoGebra 1](#), [GeoGebra 2](#)
- 1.1, 1.2 handwritten practice
- Maple intro video [slides](#), [Maple](#), [interactions](#)



Search



Evelyn Boyd Granville  
second Black woman we know of—PhD in mathematics  
Image 1 Credit: <https://www.wikimedia.org/wiki/File:Granville.jpg>  
Image 2 Credit: Marge Munay. 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*

0:04 / 15:24



practice with instantaneous feedback from me, repeatable **Instantaneous Feedback** opens after you **Check** a response, and then you can retake it if you wish. For a box where you enter the symbols, **hover over the box to see the feedback.**

 ✗  

yes for all  $k$  ✗ look for  $k$ (s) that makes row 2 column 2 nonzero in Gaussian to have a pivot. So you have to eliminate two  $k$ 's that give a missing pivot

- only when  $k = \pm 1$
- only when  $k \neq \pm 1$
- other

The correct answer is: only when  $k \neq \pm 1$

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

- yes
- no ✓

The correct answer is: no

Part f) How many solutions are there for a  $k$  so that  $k \neq \pm 1$ ?  ✗

Part g) How many solutions are there for a  $k$  so that

Incorrect  
try again. you have  
full pivots

## Summary of your previous attempts

Attempt	State	Points / 9.00	Grade / 100.00	Review
1	Finished Submitted Tuesday, April 27, 2021, 7:19 PM	7.66	85.16	<a href="#">Review</a>





## practice with instantaneous feedback from me, repeatable

True or False:

The **solution** set of a linear system involving variables  $x_1, \dots, x_n$  is a list of numbers  $(s_1, \dots, s_n)$  that makes each equation in the system a true statement when the values  $(s_1, \dots, s_n)$  are substituted for  $x_1, \dots, x_n$  respectively.

For true/false questions, the book instructs: if a statement is false, provide a specific counterexample. If it is true, quote a phrase and page number from the book.

- True and I found a phrase and page number from the text ✘ it is false-write down a system that has infinite **solutions** and see how the part that reads "is a list of numbers" is a problem
- False and I can provide a counterexample
- other

Mark 0.00 out of 1.00

The correct answer is: False and I can provide a counterexample

Check

A system with infinite **solutions** would provide a counterexample, because the **solution** set would be all assignments of the numbers, not just one assignment of them that works. The problematic text here is "is a list of numbers"

## General Feedback

## Avoid Becoming too Dependent on the Online System


## Second Chance



handwrite practice. Collate into one single PDF

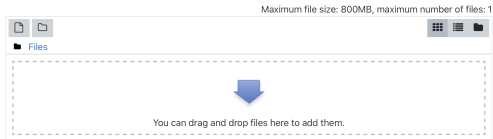
Grade:

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 a checkmark.
- I'll respond with feedback on your PDF and  re-engage solutions will also open

Add submission

You have not made a submission yet.



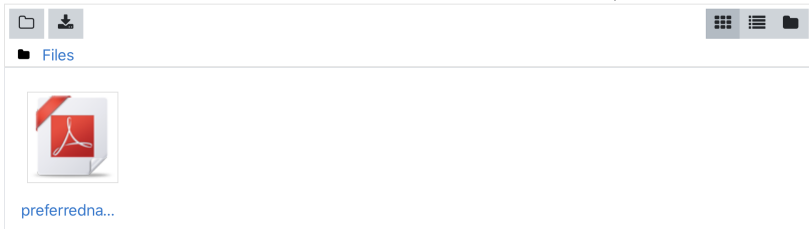
Accepted file types:

PDF document .pdf

Save changes

Cancel

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



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.

nsnot

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





## think-share-pair-compare forums

- **Think and Share** about possible answers on your own and respond to my posting about them
- **Pair** once open, look at others postings
- **Compare** your reply separately to at least two of your classmates in a meaningful way. Don't just say, "Yeah, I agree." Instead, say, "Yes, but we also need to consider..." Or, "I don't agree because..." You might also pose questions, answer questions, extend ideas, or compare and contrast your responses and summarize what you chose and why. Be sure to use their preferred name!



## debrief



begin assignment



glossary



surveys...



begin problem set 1

**To do:** Submit feedback

Tues 5/31



re-engage 1.5 handwrite

**Restricted** Not available unless any of:

- The activity [1.5 handwrite practice](#) is complete and passed
- It is after **May 31 2022, 10:15 AM**



1.7 handwrite practice

**To do:** Receive a grade



1.1, 1.2, 1.3, 1.4, 1.5, 1.7 think-share-pair-compare

**To do:** Make forum posts: 3 **To do:** Receive a grade




debrief 1.1, 1.2, 1.3, 1.4, 1.5, 1.7 t-s-p-c

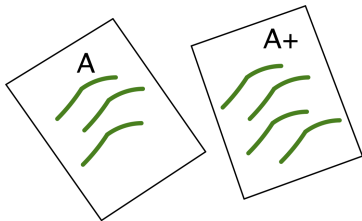
**Restricted** Not available unless: The activity [1.1, 1.2, 1.3, 1.4, 1.5, 1.7 think-share-pair-compare](#) is marked complete





# Grades

- Effective ASULearn Engagement 50%   
try again, keep scrolling down, I'm here to help!
- Problem Sets 30%
- Video Projects 20%



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



## *Material from MAT 1120*

- algebraic solutions of linear equations  
partial fractions
- visualizations and equations of curves and surfaces and  
linear intersections in 2D and 3D  
rectangle and box slicing, both visually and algebraically
- limits applied to diverse objects  
like improper integrals and partial sums of series
- sin and cos trigonometry  
trig substitution
- linear approximations  
Taylor polynomial of degree 1, Euler's method, and slope  
field
- mathematical reasoning and justifications  
algebraic, numerical, and geometric reasoning, including  
computer algebra software like Maple

## *Zoom check-in for help on activities*



Dr. Sarah's e-Z check-in (internet allowing)

I go to Zoom at the listed time to see if anyone is there but otherwise I log off as university required summer office hours are satisfied quickly.

activity day	pm Zoom	am Zoom	due
Mon–Fri	3:30pm	9:30am	next academic day 10am
last Fri	same		Sat 10am

## Where to Get Help

- Zoom
- need help from me, math dept tutoring, your classmates, or tech support forum
- use my instant feedback and later feedback to help you learn **keep scrolling down**
- <https://sites.google.com/appstate.edu/mat-2240-syllabus-s22/student-advice>

I care about you and your success!

