

#ret #hw

1 | Skills and Practices

Explore and Organize Foundational || Exemplary I'm interpreting generating data as compiling the data used to solved a problem, as opposed to say creating a dataset or simulating a programmatic model based on a problem. Before I start a non-trivial problem, I always compile the data that I've collected that could be helpful in solving the problem. This data is generally in the form of my notes or previous endeavors. Once I'm done, I put what I've what learned back into my note system for later use. I tag parts of these notes #question when I don't understand, want to explore further, or have a tangential question. I then go back into my notes and answer these questions.

Generalize and Test Proficient Looking for patterns and connections is the way I organize my learning. For example, here's a graph of my own personal wiki-style Linear Algebra notes! Pasted image 20211009143418.png|300 Each vertex is a note, and each edge is generated when I link two concepts together from my notes. Each of these connections has justification, or rather, explanation which I write for myself. However, these justification are rarely formal because they are just meant for me. I generally write out the reasoning that I need to make the connection intuitive, then give an example of how the connection works. I don't write up formal proofs for each connection. To summarize, I look for and identify patterns and processes, I describe them, test them, I do not justify them formally and fully, and I do look for patterns between different concepts.

Abstract and Symbolize Proficient Other than early on with some of the set theory notation, I don't have trouble understanding the formal notation or definitions in class and in the readings. As for my written assignments, I use formal notation generated with markdown-embedded \LaTeX .

However, for my notes, I am simply not fast enough to use formal notation and definitions. Thus, my definitions end up with a lot of abbreviated words, any my notation often doesn't include things like $v \in V$ when all the elements discussed are in V . In my notes, I also use notation that makes sense to me instead of being formal, like arrows and \neq instead of \neq . These notations are powerful, though not formal.

Transform Exemplary So far, we haven't had a lot of chances to create computational representations in this class. In my Mathematical Modeling class, however, we have. I don't know if this counts, but for almost every project I create multiple representations – for the most recent problem, I created 3 different models in Blender each using a different technique, a 3D printed model, a mathematical representation, and also a computational representation which I viewed with the 3D plotter in Matplotlib after algorithmically generating the data. Each of these models of course served their own purpose and were compared to the others.

Strategy Proficient Frankly, having an rote problem solving process simply doesn't work in Linear Algebra. The only way I can solve the problems is through similar techniques to when I'm doing competitive programming, like writing out incremental 'lemmas,' trying to segment the problem, and thinking though the problem conceptually before going into the nitty-gritty. I do not, however, often solve a problem multiple ways then go back and compare each of the techniques I used to solve the problem when doing the homework or in class problems.

Proof Proficient One of the hardest parts for me so far in Linear Algebra is converting my understanding into formal proofs. My proofs have formal structure, and the arguments are mostly complete, but sometimes I have gaps simply due to the finer granularity of proof-logic as opposed to understanding-logic. I can and do analyze the approaches of others, often when they ask for help in the Linear Algebra Discord server. I can often help, but this is more due to just being a fresh pair of eyes or a good rubber ducky.

Application Foundational? I have not yet solved an exercise or a proof then went and looked for real world applications for my solution. I have often, however, been in the real world and needed a solution, and employed linear algebra to get it. In fact, I did this just yesterday for a ML project, figuring out what my matrix would need to look like after doing some operation to my bits. My process goes: real world -> math -> solution, not math -> solution -> real world. I don't know where this puts me.

Clarity and Articulation Exemplary When being shown to other students, I try to make my work clear. In my first proof presentation, I spent the first half of it going over the problem and then laying out the conceptual basis of the solution. The second half then converted this conceptual basis into rigorous mathematical notation.

Precision and Accuracy Proficient Sometimes I mess up with the finer details, or I confuse a definition with something equivalent. These types of errors haven't been problems in previous math classes, but as I'm learning, is a problem in Linear Algebra. I'm starting to be more careful with my definitions and look for errors in my work that I'm not used to looking for (like missing an iff! Still sad about that one). However, this is all about tailoring how I check my work when doing linear algebra. In the more general case, after finding a potential solution to a problem, I always pass it through a reality check or try to link it to something else and see if it makes sense.

Growth Mindset Exemplary I'm taking Linear Algebra because I want to learn about Linear Algebra. I pick my classes and do my work based on what I'm excited about, not based on my grades or how hard they are. I hope this strategy is evident in the types of questions I ask in class.

I know this Growth Mindset focused strategy is risky, but so far its worked out!

Community Exemplary Doing math with friends is a lot of fun. It's also vital to solving some of the harder problems. Because of this, I started and maintain the Linear Algebra Discord server.

Reflection Proficient? I don't turn in reflections to my normal assignments. However, for my notes both in class and for the readings / exercises, I do a lot of reflecting. This reflection generally happens in two forms:

in these reflection blocks at the end of most of my notes,

or in what I call "Gardening." Gardening is the cultivation of my digital garden (cheesy, I know), where I segment my notes into conceptual chunks then link them all together and find connections / patterns.

Academic Habits Exemplary My habits are based around my interests. I'm excited about this stuff! Linear Algebra is super fun. In class, almost always the most interesting thing to be doing is engaging in the class. I say almost always because sometimes other things take priority, like running to the nurse. Sometimes, admittedly, I am too tired to trust my questions in class – when this happens, I shift my notes to a finer granularity, and spend more time Gardening. To the best of my memory, I turn in my work on time consistently.

1.1 | Summary

	Foundational	Proficient	Exemplary
Explore and Organize	x?		x?
Generalize and Test		x	
Abstract and Symbolize		x	
Transform			x
Strategy		x	
Proof		x	
Application	x?		
Clarity and Articulation			x
Precision and Accuracy		x	
Growth Mindset			x
Community			x
Reflection		x?	
Academic Habits			x

2 | Quiz Corrections

Attached in another file.

quizcorrections.pdf