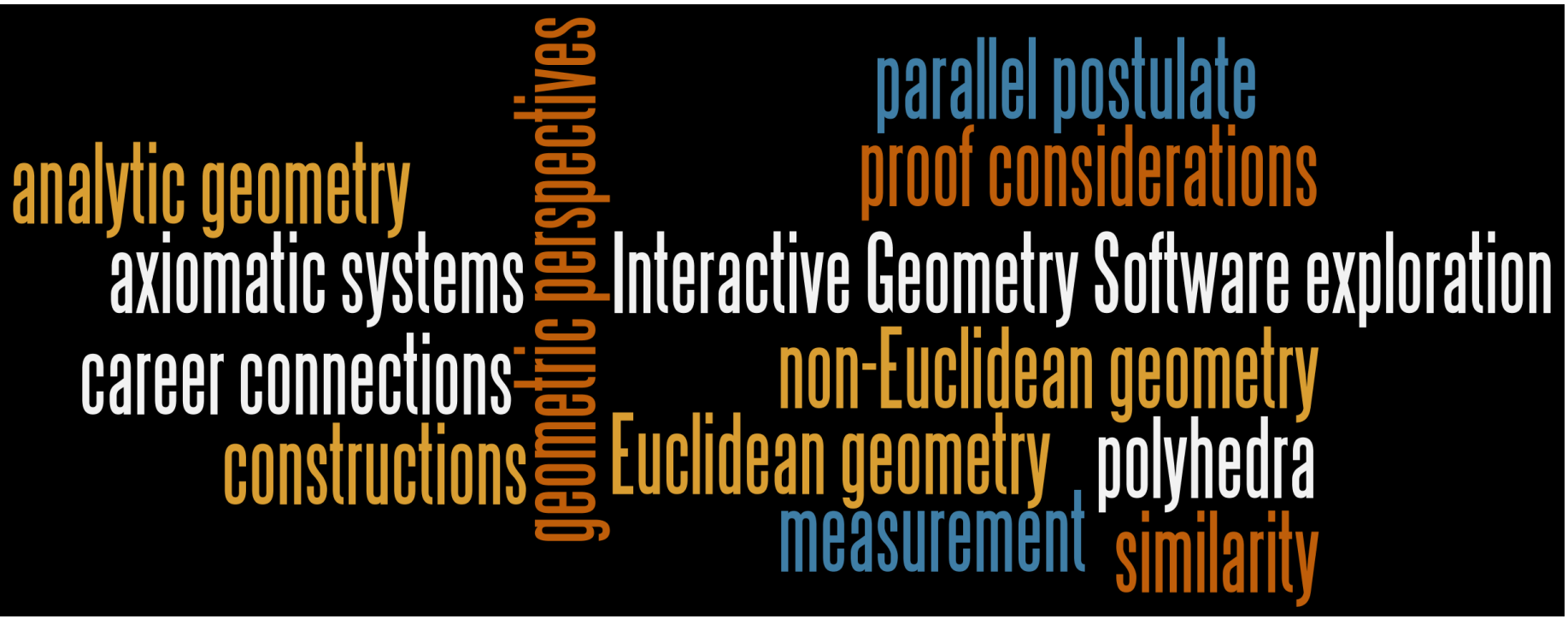
Math 3610: Introduction to Geometry



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

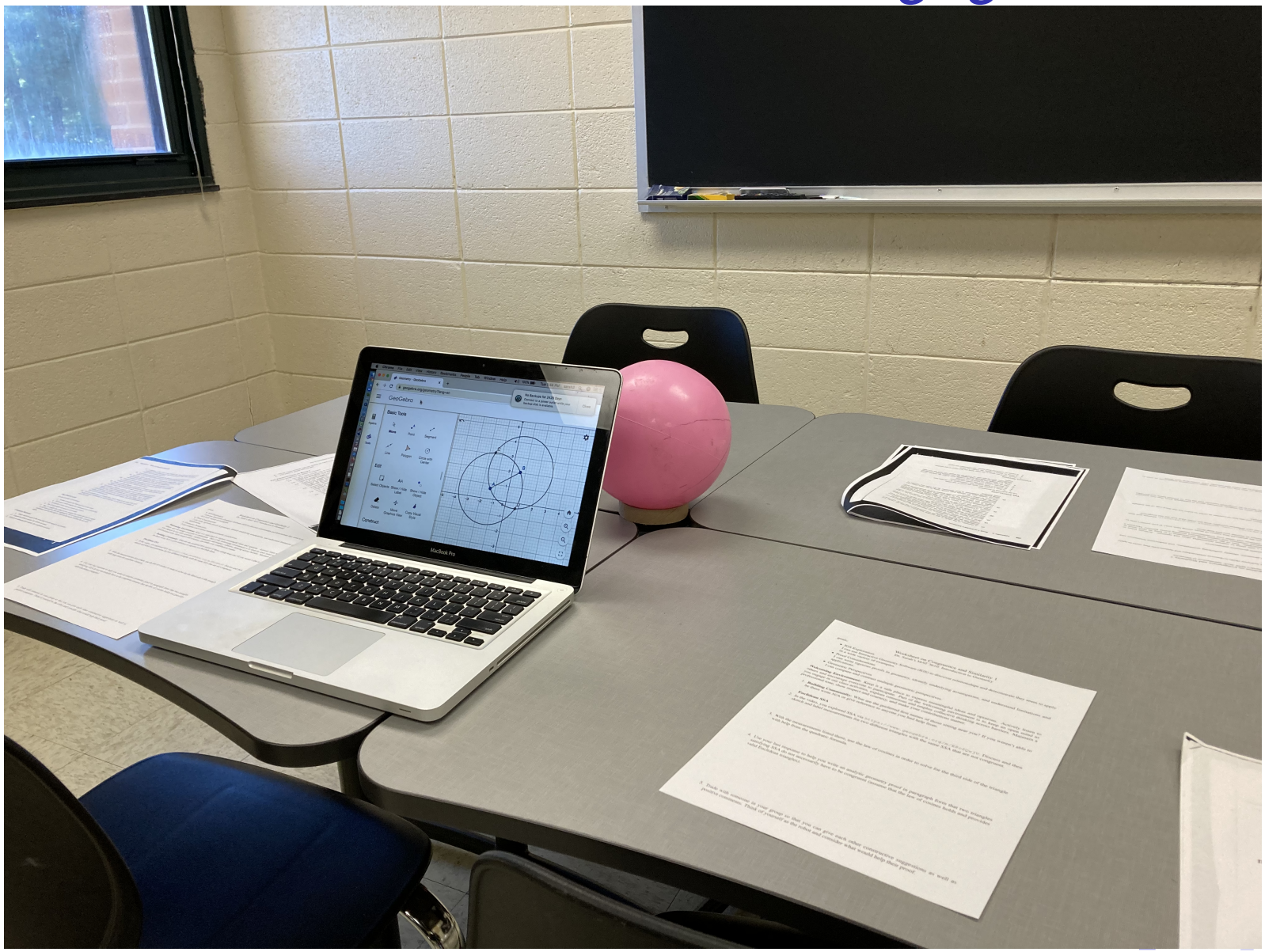
Making mistakes is integral to the learning process and enriches our understanding as we extend content and clear up misconceptions.

Dr. Sarah's MAT 3610 Introduction to Geometry Tentative Calendar

While items like handwrites, begins, reflections and projects have strict deadlines, there is still flexibility built in and multiple pathways for success. Reflections and videos have multiple chances and projects and worksheets can be completed ahead plus the lowest worksheets or other completion items are dropped and you can revise and reflect on one project to replace its grade. Attempt videos for completion and take video notes by the listed date whenever possible as the material builds on itself. Reviews can also be completed later if you are running short on time. Some days are lighter than others and it will help you to progress on upcoming activities in advance, especially major assignments.

	Class Monday	Between Classes (by 1:55pm Wednesday)	Class Wednesday	Between Classes (by 1:55pm Monday)
1/13–1/15	active learning worksheet	-axiomatic systems and constructions 1 interactive video -3610 intro interactive video -turn in worksheet -obtain rental book -read the syllabus -add ASULearn profile pic -Zoom update & profile pic	learning goals worksheet t-shirt Wed	-axiomatic systems and constructions 2 interactive video -IGS intro interactive video -begin Project 1 -turn in worksheet -get to know posting
1/22	university break		axiomatic systems and constructions 1 worksheet t-shirt Wed	-Project 1 -turn in worksheet
1/27–1/29	axiomatic systems and constructions 2 worksheet	-congruence and similarity 1 interactive video -select topic for Project 2 and begin working on it -turn in worksheet	congruence and similarity 1 worksheet t-shirt Wed	-congruence and similarity 2 interactive video -turn in worksheet -review and reflect on axiomatic systems and constructions
2/3–2/5	congruence and similarity 2 worksheet	-Project 2 -turn in worksheet	Project 2 elevator pitch on Euclidean items t-shirt Wed	-Euclidean and spherical perspectives interactive video -begin Reflection 1
2/10–2/12	spherical perspectives worksheet	-Reflection 1 -begin Project 3 -turn in worksheet	spherical angle sum and AAA worksheet t-shirt Wed	-peer review Reflection 1 -turn in worksheet

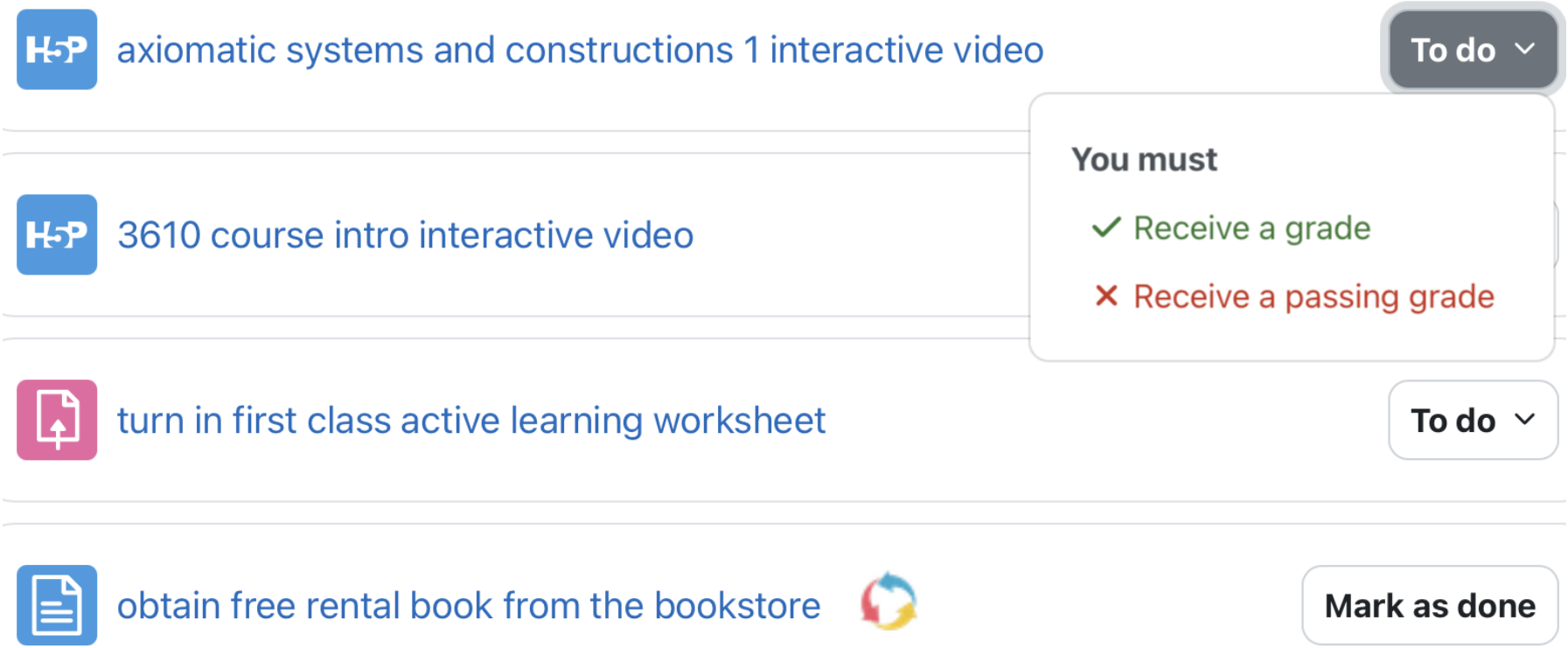
Effective Class Engagement



Where Did Our Third Hour Go?

- rolled into the between class time on activities!

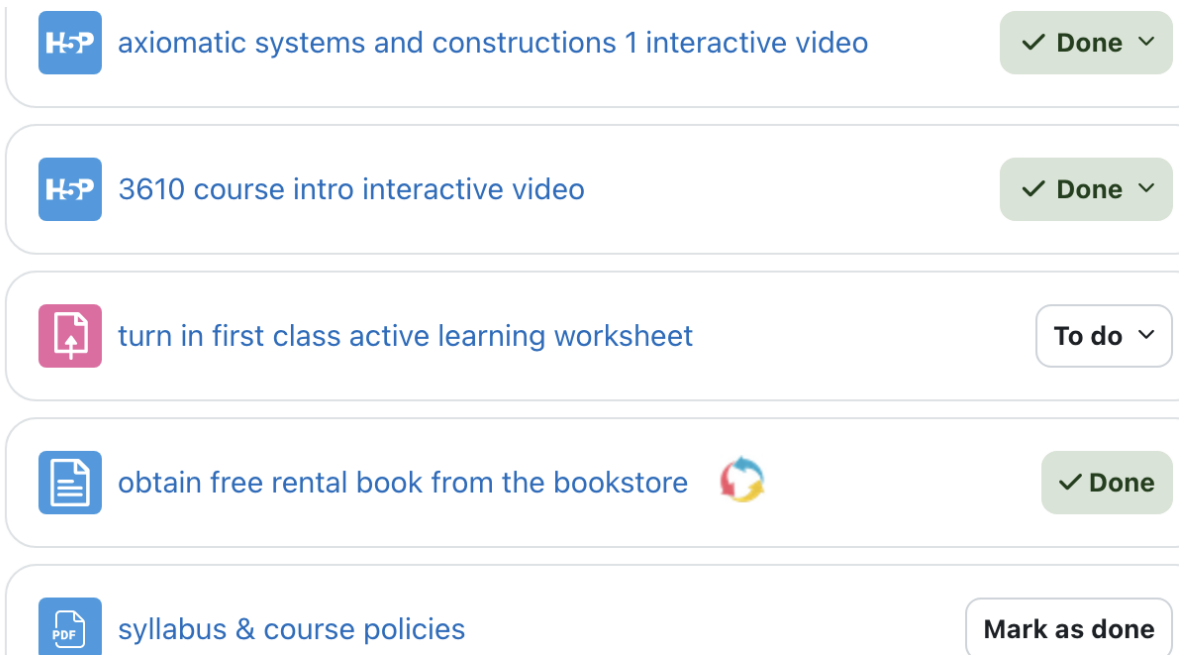
Effective ASULearn Engagement



Effective ASULearn Engagement

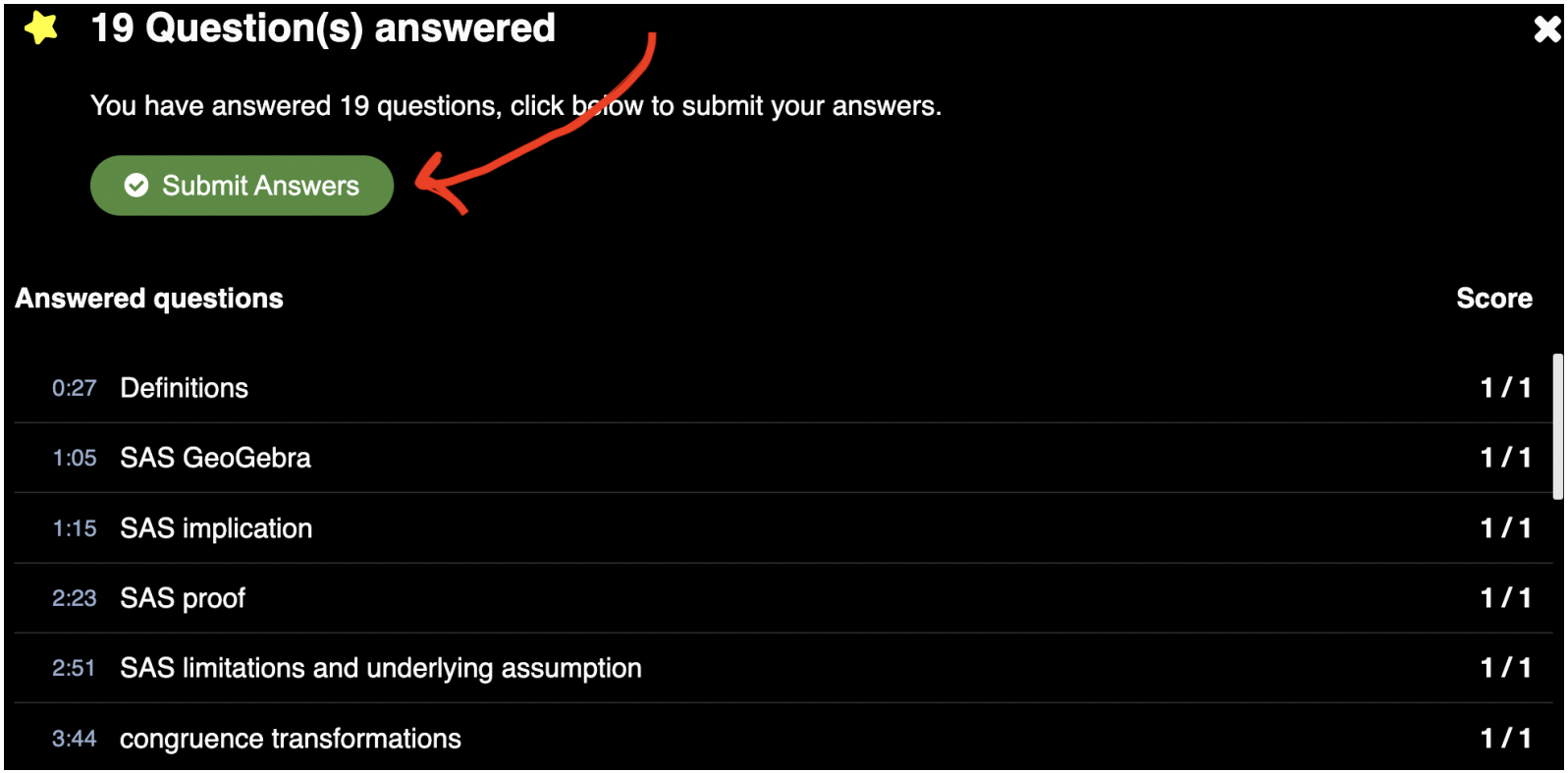
- axiomatic systems and cons...
- 3610 course intro interactiv...
- turn in first class active lear...
- obtain free rental book from...
- syllabus & course policies
- add ASULearn profile pictur...
- update Zoom to the latest v...

If you have a laptop, tablet, ...



Interactive Videos, Repeatable

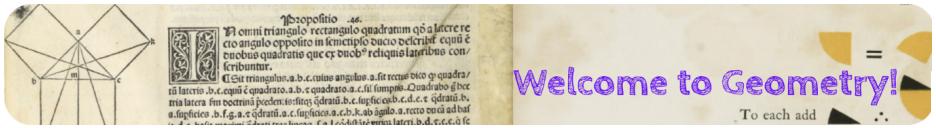
Pause regularly to take notes that you can bring with you to class, especially on concepts, proofs, Interactive Geometry Software and other visualizations, and any questions.



✎ In your notes, which you'll turn in at the end of the semester, write the title of this video "Axiomatic Systems and Constructions 1" as well as instructions for assembling a peanut butter and jelly sandwich that a robot could

need help?/course info

Collapse all



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

in-class items, video slides and more

Dr. Sarah's announcements

t-shirt Wed

hw due by the start of class:

- [ ] axiomatic systems and constructions 1 interactive video (slides, interactions)
- [ ] 3610 course intro interactive video (slides, interactions)
- [ ] ASULearn turn in prior class worksheet as a PDF: active learning
- [ ] If you have a laptop, tablet, or phone that you can bring to classes, in advance, dow

or open the GeoGebra Geometry App or GeoGebra Geometry.

- [ ] obtain rental book
- [ ] read the syllabus
- [ ] add ASULearn profile picture
- [ ] ~~update Zoom and add a profile~~ picture

class: learning goals worksheet

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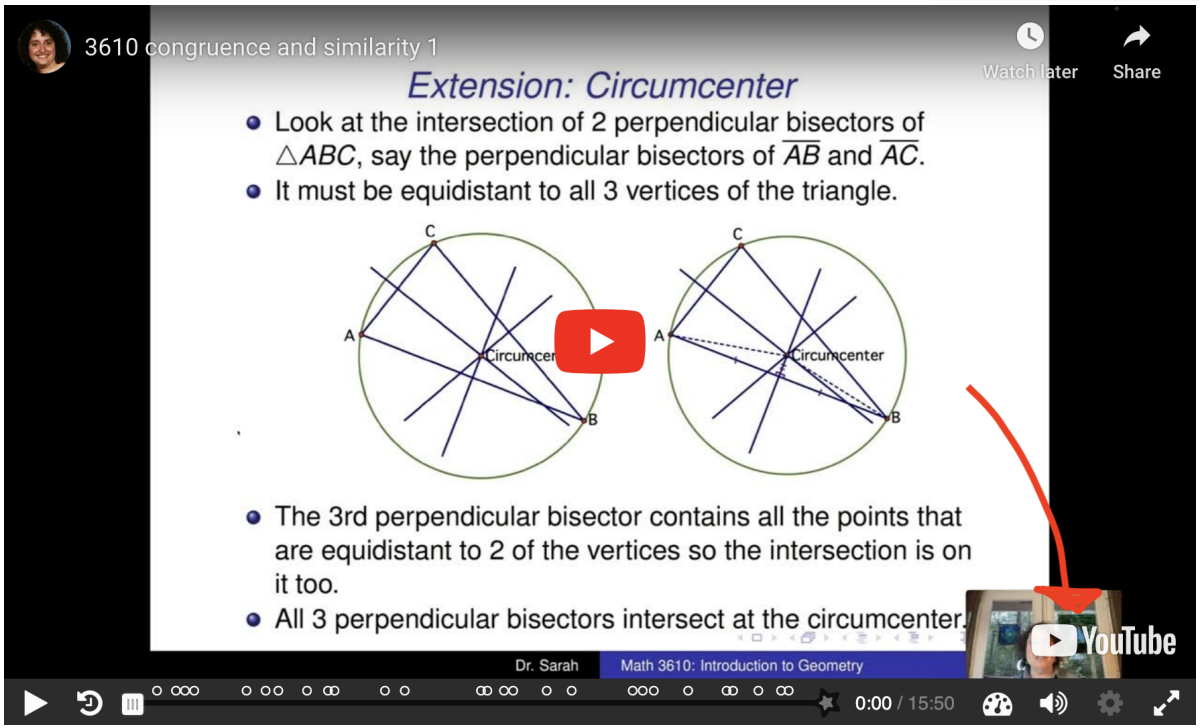
class: active learning worksheet, handout 2, handout 3, Euclid's *Elements* handout, sli



Turn In Worksheets from Class

Add submission

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

Files

name.pdf

Accepted file types:

PDF document .pdf

Save changes Cancel

Feedback—Keep Scrolling!

Graded by  Sarah Greenwald

Feedback files

Sarah Greenwald
greenwaldsj_1375481_assignsubmission_file_3610worksheetpythagorean1.pdf
November 3 2023, 3:57 PM

Grade breakdown

scale				
	no grade	Padawan (still training)	**Jedi**	Jedi Master

See your personalized feedback file

- Padawans are training to become a Jedi. resubmit
- Both Jedi and Jedi Master ratings earn completion.
- I'll respond with feedback on your PDF

Projects

Project 2: Euclidean & Spherical Geometry Applied to Course Topics

In this project, we will use intuition from previous Euclidean geometry knowledge along with research you conduct. The purpose of this assignment is an introduction to topics in the course catalog description and syllabus as we explore diverse geometric perspectives.

Six Project Components:

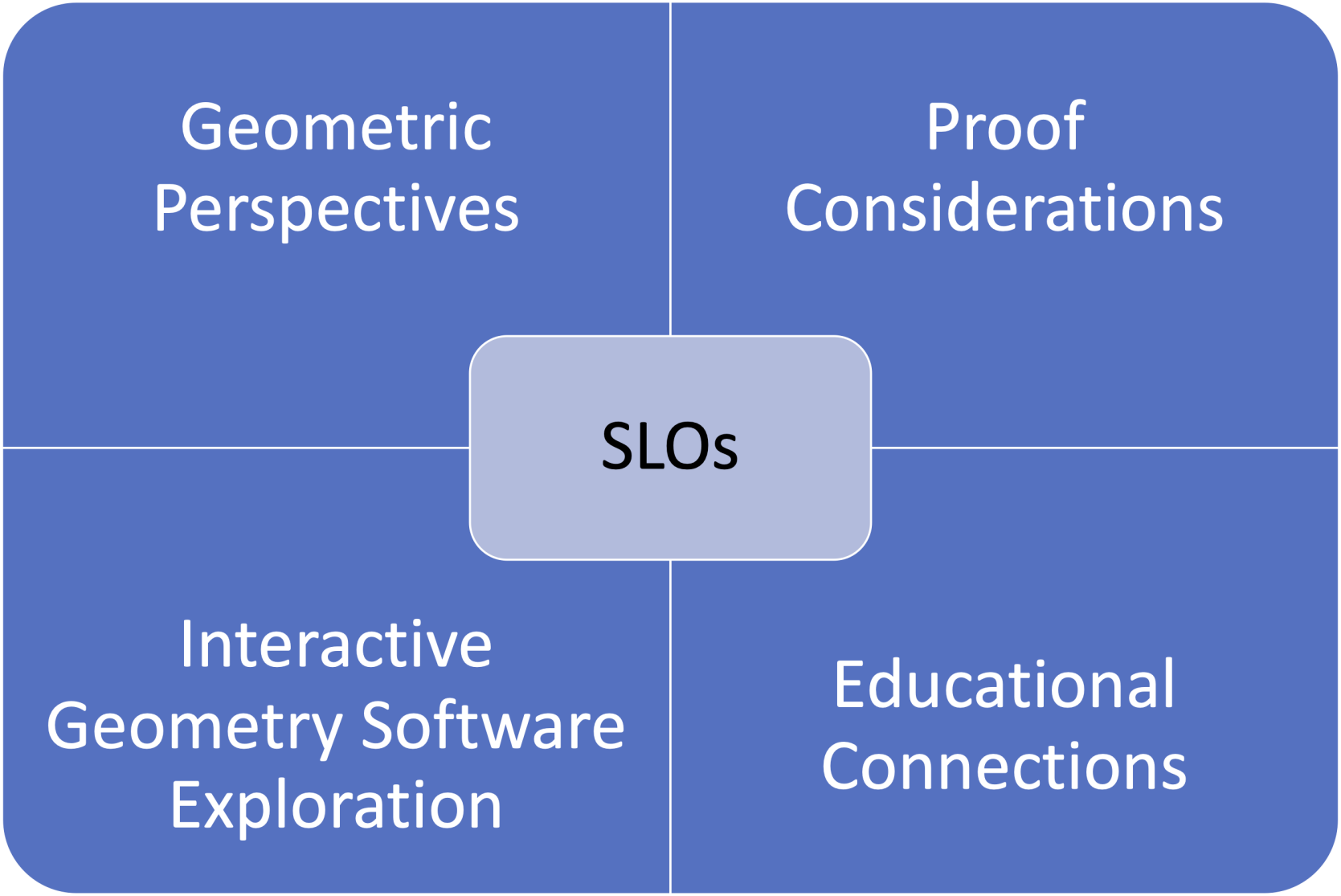
1) **select topic for project 2 in the ASULearn choice feature for project 2**. Using the ASULearn feature, select a topic for project 2. There is a limit on the number of people for each topic. If you select the same topic as someone else then you may either work alone or together. If you work together, you will create one written product together and one presentation together. You may wish to read the sphere problem that connects to the topic before selecting—see below.

To turn in to the Project 2 Assignment on ASULearn:

As you respond to 2–4 below, summarize the ideas in your own words using the language of our class or own group's words using the language of our class to turn in to one of your assignments in ASULearn.

2) **Review content related to your problem that applies to the geometry of the plane / Euclidean geometry / flat geometry.** For example, if you have Problem 1 (see below for the problems) then you might review the definitions of lines in the plane and how to calculate them, for Problem 9 you might review some information related to area in the plane, for Problem 10 you might review coordinate systems of the plane... You may use our book, the internet, or other sources, but be sure to keep track of them.

Learning Goals

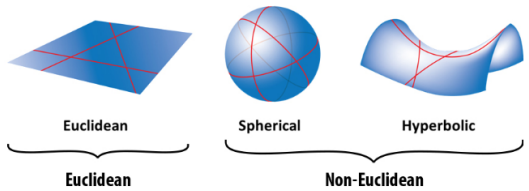


Reflections

Carmen Cerrito
Dr. Sarah
MAT 3610

Reflection

For Reflection 5, I chose to do Geometric Perspectives, which will compare and contrast multiple geometric perspectives. First, we will explore the relationship between Euclidean and non-Euclidean (hyperbolic and spherical) geometries. Below I have included an image



demonstrating how each of these looks (Liu). All of these forms of geometry are rather different. Euclidean geometry is for two-dimensional shapes, and non-euclidean is for three-dimensional shapes. Additionally, Euclidean triangles can be solved using the typical Pythagorean theorem: $a^2 + b^2 = c^2$. Non-Euclidean triangles are solved by using two different equations. For those in the spherical geometry realm, we use $cos(a) \times cos(b) = cos(c)$ or $a^2 + b^2 < c^2$, and those in hyperbolic geometry, we use the equation $cosh\,(a) \times cosh\,(b) = cosh(c)$. In hyperbolic geometry, $cosh = \frac{(e^x + e^{-x})}{2}$, but for the sake of simplicity, we abbreviate it $cosh$, where the h stands for hyperbolic (Merriam-Webster). We have to use different equations for Euclidean and non-Euclidean geometry because they both explore opposite geometric fields. Euclidean geometry seeks to understand the geometry of flat, two-dimensional spaces, and non-Euclidean geometry studies curved surfaces (Study.com).

Furthermore, in a conversation with Chloe Osborne on the *spherical perspectives worksheet,* we recalled that straight paths in Euclidean geometry are the shortest distance paths between two points, and in non-Euclidean geometry, a curved or intrinsically straight line is the shortest path between two points. In class, we tested this on a ball, and on a flat surface, the hypotenuse is longer than the spherical hypotenuse. Therefore, on a sphere, $a^2 + b^2 < c^2$, which was stated previously and demonstrated on the balls we used in class. As a visual learner, I enjoyed this activity because it was a strong visual tool to understand the concept further, and I will implement an activity like this if I end up teaching geometry.

On the other hand, Euclidean and non-Euclidean geometries have some similarities. For example, they both obey Euclid's first four axioms, and they all deal with triangles. Additionally, there are some instances where Euclidean geometry and either hyperbolic or spherical are true. In Euclid's 5th, that, if a straight line falling on two straight lines makes the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which are the angles less than the two right angles, hyperbolic geometry fails, and Euclidean and spherical geometry are the only ones that remain true. In proposition I-31, through a given point to draw a straight line parallel to a given straight line, spherical geometry fails, and hyperbolic and Euclidean geometry are true. Then, in Playfair's, given a line and a point off that

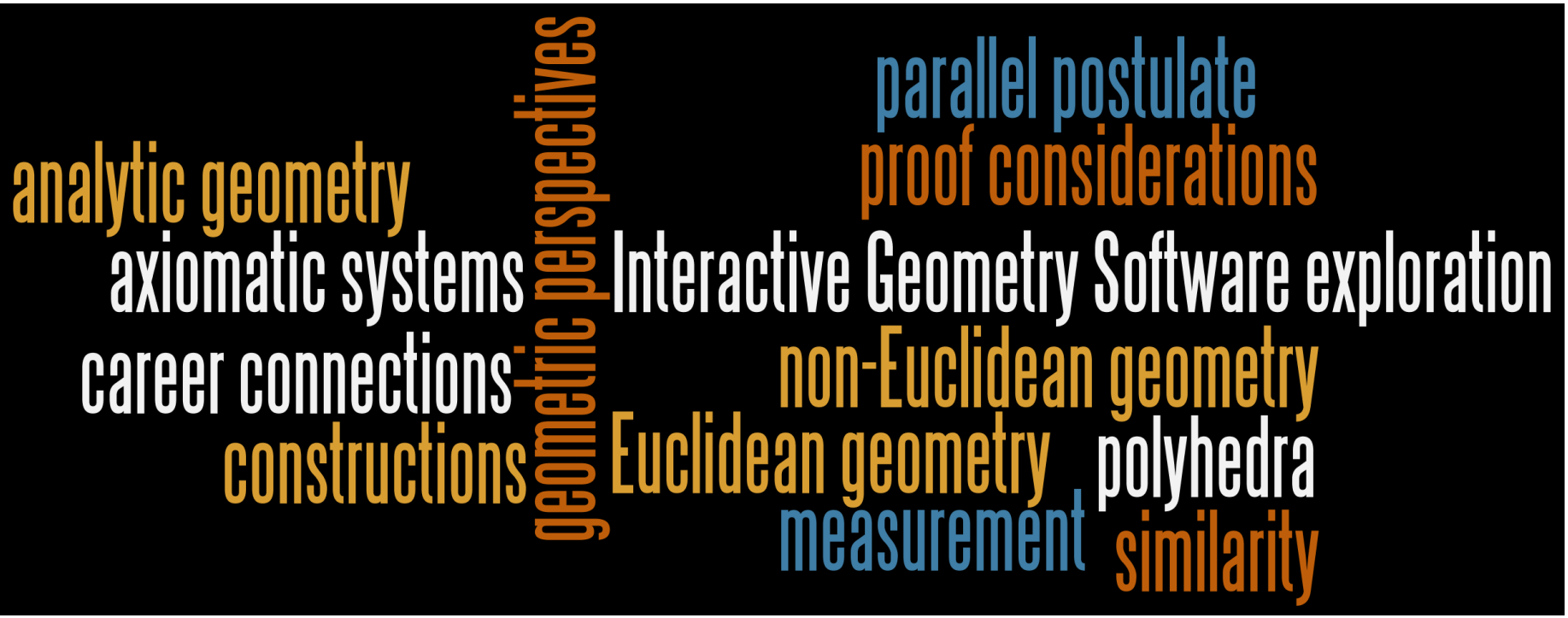
Reflections

- specifically address every word in the learning goal:
  "discover relationships"
  "seem"—IGS is never a proof
  "wide variety of examples"
- AB versus $\overline{AB}$
- you is not typical in reflections—we or I is better
- personalizing
- too informal: got, thing, math...
- text itself in standard font
  typically at least 2–3 pages single spaced

University Writing Center
Read it out loud or have a software program do so

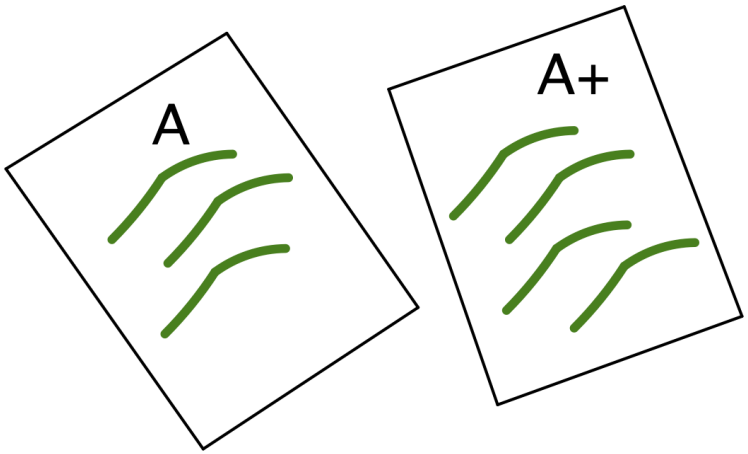
Final Assessment

- interactive video notes portfolio
- individual component
- group component



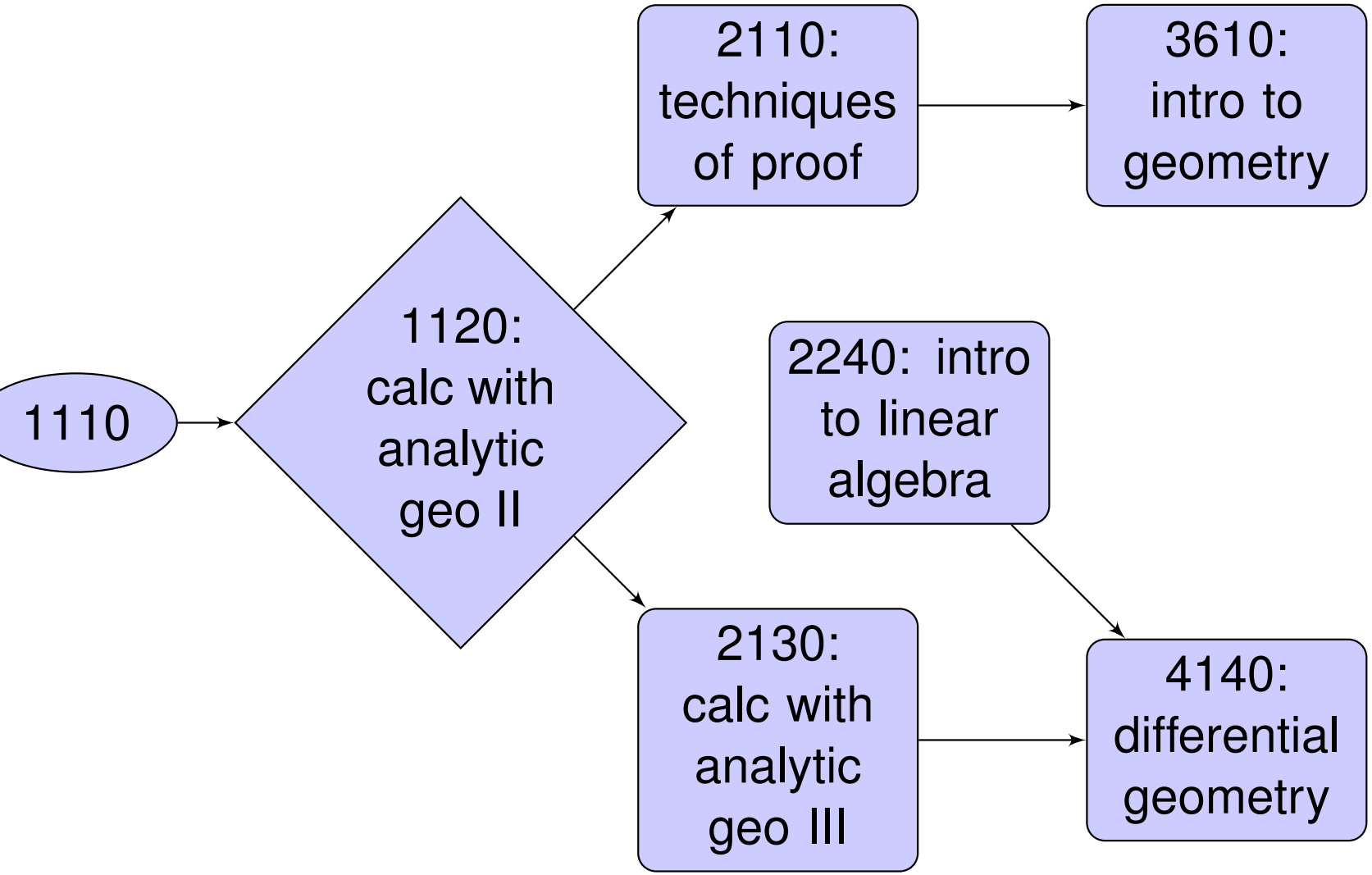
Grades

- Effective ASULearn Engagement 30%
- Projects 30%
- Reflections 20%
- Final Assessment 15%
- Effective Class Engagement 5%



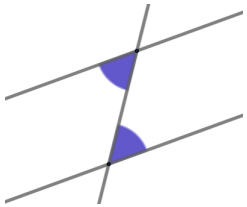
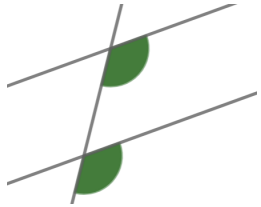
The grading scale is:
$A \geq 93; 90 \leq A- < 93; 87 \leq B+ < 90...$

Geometry in the Mathematics Major at Appalachian



Material from 1120, 2110 and Prior Courses

- AAA $\rightarrow$ similarity while SAS & SSS $\rightarrow$ congruence in $\triangle$
- alternate interior angles corresponding angles

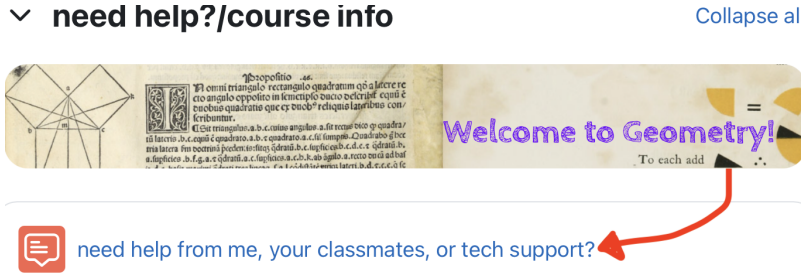



- applying correct algebra and recognizing errors
  $c^2 - (\frac{c}{2})^2 = \frac{3c^2}{4}$
  $\sqrt{a \pm b} \neq a \pm b$ as square root does not distribute
- coordinate geometry applications of (x, y) and (x, y, z)
- law of cosines $c^2 = a^2 + b^2 - 2ab\cos C$ in $\triangle$
- length, area and volume, including integrals
- proof writing like
  to prove $A \Rightarrow B$ we assume A and prove B
  to prove $A \not\Rightarrow B$ we show $A \cap \sim B$
- quadratic formula

$$ax^2 + bx + c = 0\text{: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Where to Get Help!

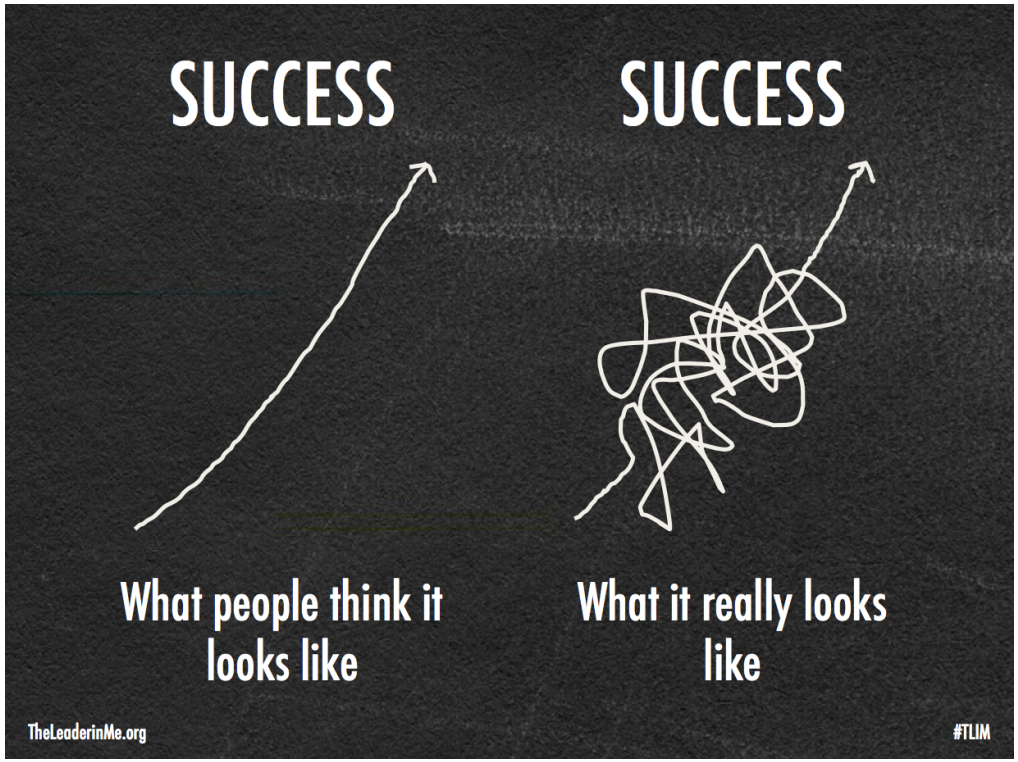
- Required class meetings and optional e-Z check-in
- need help from me, your classmates, or tech support forum



- use my instant feedback and later feedback to help you learn
  keep scrolling down
- library and writing center

I care about you and your success!

http://alangregerman.typepad.com/.a/6a00d83516c0ad53ef0168e783575e970c-800wi



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https://www.leaderinme.org/blog/the-power-of-a-growth-mindset/