Course Expectations for Projective Geometry

Eleventh Grade Main Lesson for Jamie York Math Academy

Course Overview. This course is largely considered to be the pinnacle of the Waldorf geometry curriculum. Projective geometry transcends how we think of geometry. It is both profound and perplexing. Much of the learning will be through drawing; much of the thinking will take us beyond our normal sense-perceptible world.

Basic Expectations.

- Recorded Lectures.
  - Each day, you will watch between two and four recorded video "modules" (lectures), ranging in length from 5 to 40 minutes.
  - **The lecture schedule is on the next page.**
  - The links for the assignments and modules (lectures) were sent to you as part of your 11th Grade "Welcome Email" for Quarter #2.
  - Keep in mind that these lectures are taken from a projective geometry workshop I gave in 2019 to a group of math teachers over four and a half days. I have edited the video modules to work best for 11th grade students over the course of three weeks. In general, I deleted the portions of the videos that pertained only to teachers.
  - The title of each module consists of a code that indicates the week, day, and module number. Note that this three-week main lesson falls during weeks #16-18 in the Math Academy. For example, the lecture titled "JYMA – G11 – W16 – D3 – M2" indicates that this is 11th Grade, Week #16 (which is the first week of the main lesson), Day #3, Module #2.
- Assignments/Drawings.
  - Your main lesson book will simply be a collection of drawings. These drawings are assigned and explained in the lectures. You will work on the drawings both on your own (at home), and in class with your classmates.
  - Some of the assignments will require you to download and print a document from our projective geometry assignment page, which (again) is found in your "Welcome Email" for Quarter #2.
  - During the final week of the course, you will complete a "final project", which is a drawing done on larger paper and with extra care.
  - Try your best; don't give up! Ask questions and ask for help when needed.
- Group Meetings. During this three-week block, there are no group assignments. However, you may wish to meet with your group friends to share drawings, discuss your experience, and help each other out. It is up to you whether to meet, or not, during these three weeks.
- Friday Tutorial Sessions. Each Friday we will meet together live, in order to ask and answer questions, and generally to go over the content of the week. You may wish to save some of your broader and less urgent questions for this tutorial session. More urgent questions can be directed to your tutor.
- Drawing Standards
  - Accuracy is most important. Sharp pencils will help accuracy.
  - Many drawings will have to first be done as a rough draft, before a final version is more carefully completed and put into the main lesson book.
  - Construction lines should all be done lightly in lead pencil, and (usually) should be visible in the final drawing.
  - Artwork. Shading is usually not necessary. When needed, any use of color or contrasting shade should be done so that it emphasizes the most important aspect of the drawing.
  - Pages *should not* have a border.
  - Every (final) drawing should have a neat handwritten title. For each theorem, one page should also contain a neatly written statement of the theorem.

Lecture Schedule for Projective Geometry

- First Week (JYMA Week #16)
  - *Day #1* (Mon), Module #1: Introduction
    Module #2: Theorem of Desargues – Part I
    Module #3: The Complete Triangle in Movement
  - *Day #2* (Tues), Module #1: Theorem of Desargues – Part II
    Module #2: Kepler's Propeller
    Module #3: Theorem of Pappus
  - *Day #3* (Wed), Module #1: Projectivity – Part I
    Module #2: Projectivity – Part II
    Module #3: (optional) Harmonic Conjugates)
  - *Day #4* (Thurs), Module #1: Review of Day #1
    Module #2: Theorem of Desargues – Part III
    Module #3: Projectivity – Part III
    Module #4: Hanging Questions
- Second Week (JYMA Week #17)
  - *Day #1* (Mon), Module #1: Review of Day #2
    Module #2: Playing with Infinity – Part I
    Module #3: Projectivity – Part IV
  - *Day #2* (Tues), Module #1: Dual of pappus
    Module #2: Pascal & Brianchon – Part I
    Module #3: Answering Hanging Questions
  - *Day #3* (Wed), Module #1: Projectivity – Part V
    Module #2: Pascal & Brianchon – Part II
    Module #3: Projectivity – Part VI
  - *Day #4* (Thurs), Module #1: Playing with Infinity – Part II
    Module #2: One Triangle, One Conic
    Module #3: Polarity – Part I
- Third Week (JYMA Week #18)
  - *Day #1* (Mon), Module #1: Review of Day #3
    Module #2: Polarity – Part II
  - *Day #2* (Tues), Module #1: Playing with Infinity – Part III
    Module #2: Polarity – Part III
  - *Day #3* (Wed), Module #1: History of Projective Geometry
    Module #2: Polarity – Part IV
    Module #3: Skit (live!)
  - *Day #4* (Thurs), Module #1: Polarity – Part V
    Module #2: Inscribed Quadrilateral Theorem
    Module #3: Closing Thoughts