

Advanced Geometry - Final Exam Outline (Fall 2011)

The final exam for this course will have two parts. One will be administered on Wednesday, January 18, 2012, and the other will be administered on your scheduled final exam date (January 20, 2012) ** tentative pending exam schedule **. Please realize that this outline serves as a way of organizing yourself and the major ideas; I reserve the right to include twists on these ideas on the exam.

Part I (Wednesday, January 18, 2012 **) : Constructions and Proofs

Constructions (10% of final exam grade)

Compass and Straightedge

- ▶ Be able to construct any of the following...
 - » Equilateral Triangles, Isosceles Triangles, Right Triangles, Kites, Parallelograms, Rhombuses, Rectangles, Squares
 - » Be able to duplicate a figure
 - » Be able to duplicate an angle
 - » Be able to construct an inscribed or circumscribed circle given a triangle
 - » Be able to find the orthocenter (via construction) in a triangle
 - » Be able to find the centroid of a triangle via construction
- ▶ Be able to construct a circle (these 2 follow the same idea)
 - » Given 3 points on the circle
 - » Given part of the arc of the circle

Compass, Straightedge, and Protractor

- ▶ Be able to perform a dilation

Proofs (20% of final exam grade)

6 Total Proofs

- 1.) You must "fill-in-the-blanks" on a partially completed proof.
 - 2.) You must prove the Pythagorean Theorem using one of the methods we studied.
 - 3.) You must prove an "easy" result.
 - 4-5.) You must prove two "medium / average" difficulty results.
 - 6.) You must complete a "challenging" proof.
 - 7.) There will be a bonus proof, worth up to an extra 5% of this section's value.
- ▶ Know how to prove two triangles congruent (SAS, SSS, AAS, ASA)
 - » Watch for vertical angles, isosceles triangle theorem, etc
 - » Watch for Segment/Angle addition or Overlapping Segments/Angles
 - » Watch for properties of special angles with parallel lines
 - » Watch for properties of parallelograms
 - ▶ Know how to get results from congruent triangles
 - » Corresponding Sides / Angles are congruent by PCP.
 - ▶ Definitely look over what we did in Unit 4 for this section!

You will have the full time Wednesday for this test. Any remaining time should be used for independent review for the multiple choice section.

Items you may use on this section: Compass, Ruler, Protractor *only*.
(Bring these to class! I cannot guarantee I will have enough supplies for everyone!)

Part II (Friday, January 20, 2012 ** Tentative pending final exam schedule.)

Multiple Choice questions over the entire course. (70% of final exam grade)

This section will consist of 55 multiple choice items. Each is worth 2 points. It will be graded out of 100. (That is, the maximum score on the multiple choice section is 110%.)

You will have the entire time allotted to complete this section, approximately 90 minutes.

Items you may use: Calculator (required); Ruler, Compass, Protractor, (Optional - Probably won't help.)
**** BRING YOUR CALCULATOR TO CLASS****

NOTE: You are permitted to use a 3"x 5" note card (front and back) with any information throughout the course you want to have on it. There are a few stipulations:

- 1.) Your name must appear on the note card
- 2.) The note card must be in YOUR HANDWRITING
→ Not computerized
→ Not written by someone else
- 3.) Your note card will be given to Mr. Hamilton to inspect before you may use it.
- 4.) Your note card will be submitted with your test.

*** If your note card violates any rules, then I will not permit you to use it on the test. This is ONLY for the MULTIPLE CHOICE section of the test!!

(Regarding content: You may have whatever you want on your note card.)

This list below highlights the major ideas from each unit, though **anything we covered in class is fair game**. I would suggest looking through each individual test outline to help you prepare for the final as well.

It's wise to look at all Written Assignments, Quizzes, Test Outlines, and Unit Reviews prior to the final exam.

U1 Introduction to Geometry

- » Box Principle (What are the boxes, what are the pigeons, etc)
- » Arithmetic and Geometric Sequences (Find the general rule given some guidelines)
- » Geometric Probability (What is the probability a randomly chosen segment contains P...)
- » Inductive Reasoning / Sequences
 - Be able to find the nth term of a sequence
 - Be able to find the most likely next item in a sequence using inductive reasoning
 - Picture Patterns here too
- » Be able to use the Angle Addition and / or Segment Addition Postulate
 - To solve for missing angle values
 - Might involve a system of equations
- » Be able to identify the incenter, orthocenter, circumcenter, and / or centroid of a triangle.
- » Know the names of the lines that intersect at those four special points.

U2 Introduction to Logic / Proofs (mostly addressed in Part I: Proofs / Constructions)

- » Know the following:
 - Conditional, Converse, Inverse, Contrapositive
 - Biconditional
 - Logical Chain
 - Logical Syllogism
 - Euler Diagram

U3 Measures of Angles / Transversals

- » Know special angle pairs and their properties (Corresponding, Alternate Interior, etc.)
- » Be able to determine which lines are parallel (setup systems of equations and solve first?)
- » Know how to work with interior and exterior angles in polygons
- » Know how to work with interior and exterior angles in regular polygons
- » Find the possible missing points for a special quadrilateral in the coordinate plane
- » Be able to recognize, apply, and state transformation rules in the coordinate plane [ie, what does $T(x, y) = (x + 4, -y)$ do to a figure in the plane?]

U4 Triangle Congruence (mostly addressed in Part I: Proofs / Constructions)

- » Be able to take a given pair of figures and recognize any appropriate congruence statement
- » Be able to state which "shortcuts" worked to show two triangles are congruent
- » Be able to apply properties of special quadrilaterals in computational problems
- » Know the properties of special quadrilaterals (POP)

U5 Similarity and Trig

- » Be able to determine if two figures similar.
- » Find a missing length (Part vs Whole -- When can you use the Side-Splitting Theorem)
- » Watch for clever ways to use the Side-Splitting Theorem; (Systems of equations always possible)
- » Be able to find missing side lengths in 30-60-90 or 45-45-90 right triangles (exact form)
- » Use trig ratios to solve problems (applications / regular polygons / area / etc)
- » Use inverse trig ratios to solve for missing angle values
(Watch out for word problems with angles of elevation and depression!!)

U6 Area and Perimeter

- » Be able to find either the area or perimeter of any of the following:
 - Rectangles, Parallelograms, Triangles, Kites, Trapezoids, Circles, Sectors, Segments, and any other "composite figures" I might create (as a blend of these).
- » Know how to work with arc length in a circle
- » Know how to solve "dog on a leash" type problems (sectors of circles)
- » Clock Problems... when the hands overlap...
- » Watch out for areas of overlapping regions involving circles
- » Calculate the probability of a randomly thrown dart landing in a shaded region
- » Of course, you must be able to apply trig ratios to solve for unknowns in the problems

U7 Surface Area and Volume

- » Be able to use the trig ratios and area properties to find volumes and surface areas of figures.
 - Prisms (both right and oblique)
 - Cones and Pyramids
 - Composite Figures
- » Sewer Pipe Problem is fair game
- » Volume of figures requiring similar triangles (frustrum: cone with top removed)
- » Simple Swimming Pool Problem involving unit conversions is fair game
- » Meatball / Unit Conversions problems are fair.

U8 Circles

- » Anything we cover in the final unit is fair game for the final.
(This should be the easiest to boot, as it will be most recent in your mind.)

As has been the case throughout the course, extra help is available each school day from 7:00 – 8:00 AM.
If you have many lengthy questions, it is best to arrive no later than 7:15 AM.

After school help is unavailable, due to my coaching responsibilities for the Speech and Debate Team.

Waiting until the last minute to prepare for the final exam is not a wise idea.

In the end, your grade in the course will be what you have earned through demonstrating your mastery of the concepts throughout the four grading periods and the final exam.

As stated on the syllabus and in the class, to find your grade for the course,
I average the four grade periods with the final exam:

$$Grade = \frac{GP1 + GP2 + GP3 + GP4 + Final}{5}$$