# Essay for Math 303:

Oral presentation for about 10 minutes (avoid exceeding your quota) in the class at the scheduled time

Topics of essays should be taken before December 1

## Oral presentation

1. Planning (3 points): write a plan of presentation in one page (can be 2 sides), distribute it to the others (make 20 copies, one of them for the instructor). Tell the title of subject, your name, the topics to be discussed, important names with the dates of life, the events, and Math claims.
2. Historical content (5 points): choose facts which are *directly related* to your topic, write *essential* names of mathematicians and dates of events on the blackboard. Avoid repetitions of what was already said in the lectures. Mention the whole story focusing mainly on the ancient period.
3. Mathematical part (5 points): select a few mathematical illustrations to your subject which can be presented sufficiently clear in a short time; state precisely the claims and give a sketch of proofs if your limit of time permits. Write the formulas and sketch figures on the blackboard.
4. Oratory skill (4 points): speak dynamically, start with a questions, and finish with a conclusion.
5. Bonus (3 points): if presentation is ready in scheduled time, and if the speaker is able to answer questions which appear in process of presentation. Extra point for presentations in October.
6. If a reporter for some reason cannot give a presentation as scheduled, then it may be given only if there is available time on the next lectures, or it can be canceled in case of a long delay.

## The final (written) shape of an essay (to be submitted in December, 15-25th)

1. The title page (3 points) should include the title of the topic, student’s name with Id-number, the name and year of the course and instructor’s name (Math 303, Fall 2015, Instr.: S.Finashin). It should include also a picture (printed in color) that symbolizes the content of your topic. These elements should be of a reasonable size and placed naturally on the title page.
2. Composition (4 points): the size of an essay is about 2 pages of typewritten text of normal size (totally 60-80 lines of text), not including formulas and figures that may add to your text 1-2 pages more. Divide your text into several sections, each of them to be titled according to its content. Start with an introduction posing a question, and give a conclusion summarizing your story. Give at least 3 references that you used in the end of your essay, which should include at least one book and the others can be internet references (Wikipedia articles are not counted).
3. Historical content (5 points): select important and interesting facts, write with your own words avoid simple copying from the sources. Avoid long and not related digressions from your topic.
4. Mathematics (5 points): state clearly the claims, give short proofs or comments. Be logical.
5. Artwork (3 points): include 2-4 figures or images (better in color) relevant to your topic.

#  Grading Policy

Midterm 1: 25% Midterm 2: 25% Final: 30% Presentation: 20% Bonus for working in the class: 5%

# Topics for presentations

1. History of Zero (as a sign and a number)
2. History of fractions
3. Pythagorean triples (History, proof of the formula)
4. History of Triangular numbers and Pascal Triangle (from Babylonians to Pascal)
5. Golden Ratio and Pentagram (History and math meaning)

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1. History of squares and square roots
2. History of number and its calculation (Relation to quadrature of circle)
3. Problem of Trisection of angle
4. Four Pythagorean Means
5. Perfect and amicable numbers

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1. History of primes
2. History of Logic and Proofs
3. Construction of regular polygons
4. Arithmetic and Geometric Series
5. Axiom on parallel lines (5th postulate)
6. History of circle
7. History of polyhedra
8. History of conic sections
9. History of curves
10. History of calendar
11. History of irrationals (incommensurables)
12. History of Early Calculus (Method of Exhaustion of Eudoxus-Archimedes, Pappus)
13. History of negative numbers
14. History of trigonometry and its motivation by the problems in Astronomy
15. History of Algebra and mathematical symbolism
16. Archimedes on the triangles inscribed and circumscribed in parabola
17. History of the quadratic equation
18. History of the cubic equation
19. Spherical Geometry
20. Cross-ratio and theory of perspective
21. Limits in Arabic Math
22. Geometry in Arabic Math