

Syllabus for Math 107

Fall 2007

Text used at UAF is *Precalculus*, Third Edition, by Blitzer, ISBN 0-536-22113-8 (this is a custom edition with the Trigonometry chapters removed)
The times listed below indicate actual lecture hours, apart from exams and other in-class activities. Items with ** by them are considered optional sections and are not required to appear on the final exam.

I. Fundamental Concepts of Algebra—7 hours

*Algebraic operations

*Factoring

*Algebraic fractions

*Complex numbers

*Exponents and radicals

II. Linear and quadratic equations—5 hours

*Slope and forms of equations

*Linear equations with applications

*Linear inequalities with applications

*Algebra of absolute value

III. Polynomial equations- 8 hours

*Circles

*Complex numbers

*Quadratic equations

*Equations reducible to quadratic form

*Applications of quadratics

IV. Polynomial and rational inequalities—1 hour (+ 1)

**Variation (1hr)

V. Functions—8 hours

*Basics of functions and their graphs

*The difference quotient

*Transformations and graphing techniques

*Combinations and compositions

*Inverse functions

VI. Polynomial and rational functions—7 hours (+ 1.5)

*Graphing techniques for polynomials

*Synthetic (long) division and remainder theorem

*Rational zeros

**Approximating real zeros (1.5 hrs)

*Asymptotes

*Graphing techniques for rational functions

VII. Exponential and logarithmic functions—6 hours

*Properties of exponential and logarithmic functions

*Solving equations involving logs and exponentials

*Applications of logs and exponentials

VIII. Systems—4 hours (+ 4.5)

*Linear systems

*Non-linear systems

- *Systems of inequalities
- *Applications involving systems
- **Matrix solutions to systems (3 hrs)
- **Linear Programming (1.5 hrs)

****IX. Conic sections—3 hours**

X. Arithmetic and Geometric Sequences and Series—3 hours

XI. Probability—3 hours

The Math 107 final exam should ideally contain representative questions from each of the main (bold) categories with the possible exception of category IX. The criteria upon which the Core Assessment Committee evaluates the Math 107 finals are listed below.

1. Students have mastered the prerequisite material for the course.
2. Students master problem-solving skills.
3. Students learn to manipulate abstract symbols.
4. Students learn and appreciate the rigorous use of deductive arguments in mathematics.
5. Students learn a broad spectrum of mathematical applications:
 - a) Understanding the nature of functions;
 - b) Solving equations;
 - c) Graphing basic functions (polynomial, rational, exponential, and logarithmic functions, and functions containing radicals);
 - d) Understanding the properties of exponential and logarithmic functions.

To that end, a question is chosen from the final exam representing each of these eight criteria and sub-criteria. It has often been the case in the past that one exam question served to cover more than one criterion. It is not our intention to create conditions leading to inordinately long or redundant final exams for the purpose of meeting Core Assessment Committee demands. However, Math 107 instructors should be aware of the criteria while preparing their final exams.