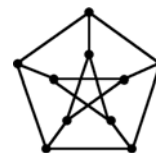




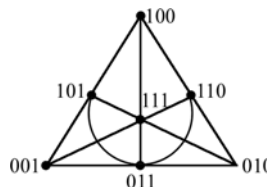
## A New Fun Math Club Class: Discrete Mathematics for Young Mathematicians



In their elementary education, young students discover that mathematics is first learning concepts like numbers and shapes, then learning properties and facts about these concepts, and finally learning and applying problem solving methods that use the concepts, properties, and facts. Generally, students are neither required nor expected to formally validate the properties or facts, or to understand why the problem solving methods work. The Discrete Mathematics for Young Mathematicians class takes the next step in a student's mathematics education, namely an introduction to formally defining the concepts, to proving that the facts and properties are valid, and to understanding the underlying mathematics of the problem solving methods. Despite the more rigorous nature of this class, it still maintains the "fun" approach of other Fun Math Club classes.

More information about this class is presented below in the form of a FAQ. For additional questions please contact:

Yul Inn  
Fun Math Club  
Web: <http://www.FunMathClub.com>  
Email: [Yul.Inn@FunMathClub.com](mailto:Yul.Inn@FunMathClub.com)  
Phone: 408 718-9177



## Discrete Mathematics for Young Mathematicians FAQ

### What is discrete mathematics?

Discrete mathematics comprises a number of branches of mathematics including, for example, combinatorics, graph theory, and coding theory. These areas are relatively new fields of mathematics that have, over the last half century, become critically important in applications to modern science, engineering, and technology.

### If discrete mathematics is so important, why is it not included in the California Mathematics Standards?

Although discrete mathematics is not explicitly mentioned in the California standards, the National Council of Teachers of Mathematics recognized the importance of discrete mathematics and references it in their standards documents:

The 1989 Curriculum and Evaluation Standards for School Mathematics introduced a Discrete Mathematics Standard in grades 9–12. In Principles and Standards, the main topics of discrete mathematics are included, but they are distributed across the Standards, instead of receiving separate treatment, and they span the years from prekindergarten through grade 12. As an active branch of contemporary mathematics that is widely used in business and industry, discrete mathematics should be an integral part of the school mathematics curriculum, and these topics naturally occur throughout the other strands of mathematics.

### Why use discrete mathematics as an introduction to higher level mathematics?

Many concepts and methods of discrete mathematics are exemplified in problems that do not require the two to three years of high school level mathematics from geometry through calculus. For example, consider the following assertion:

*In any group of six people, there are either three people who have all spoken with one another, or three who have never spoken to one another.*

This curious fact is an instance of a powerful theorem from discrete mathematics yet its statement and proof are simple enough to be explained without the need for algebra, geometry, or higher level mathematics. This is one example of how using problems from discrete mathematics enables introducing more formally important mathematical concepts, tools, and techniques.

### Where does the idea for this class come from?

This class is inspired by a course created by Andy Liu, a mathematics professor at University of Alberta. Liu has offered a very successful mathematics class for liberal arts majors that uses *The Puzzling Adventures of Dr. Ecco* as a “text.” This book, a popular puzzle book written in prose form by Dennis Sasha, a professor of mathematics at New York University, is a collection of problems that draws from discrete mathematics as well as other areas of mathematics and computer science.

### What are the prerequisites?

Prospective students must be proficient at the grade seven of the California math standards; it would be helpful (but not necessary) to have some knowledge of or to have begun studying the Algebra I level skills as well. Core skills and knowledge required include fluency in integer and rational arithmetic, the use of variables, exponents, and expressions, multiplying and factoring linear and quadratic polynomials, and the solving linear equations in one or two variables. Furthermore, prospective students *must have an interest in and an aptitude for mathematics.*

### What is the format of the class?

One or two one-hour classes are held each week. The number of classes in a session is flexible, but a series of at least eight classes is recommended in order to provide enough time to investigate topics in some detail. Most class meeting will have homework assigned. There will be no tests or formal assessments but summaries of each week’s class work will be sent to the students’ parents to keep them informed about topics covered and students’ progress.

### How much does the class cost?

Class size is limited to five or fewer students. The cost per class is \$90 for one or two students and \$120 for three to five students.

$$\binom{n}{k} = \binom{n}{n-k}$$
