



MathGenius Course Curricula

MathGenius focuses on building strong Critical Thinking and Problem Solving skills in children. It is designed for children who are already doing well in Math at school. These skills will help in (a) preparing for Math competitions such as Mathcounts, AMC8/10, Math Kangaroo, NSF Math Bee, **MathGenius** online National competition etc, (b) building a strong foundation for SAT, challenging AP courses, and Ivy college admissions, and (c) developing a flexible and analytical mindset that helps in acing high paying future careers such as Data science, Artificial intelligence, Neuroscience, Genetics (with heavy Math inputs), Nano-science etc.

Parents are advised to note that Critical Thinking is a journey and not a crash course. It takes time to attain a flexible mindset and patience is paramount. Students who stayed with us for multiple years get tremendously benefited. Please visit www.mathusacademy.com and click 'Testimonials' from top menu for the current/past parents first hand comments.

This program is offered in 7 levels (MG1 to MG7), and is suitable for students in grades 2 - 9 who are already doing well at school Math. For students graduating from MG7, AMC10 and AIME courses are available. Levels will be decided based on an assessment/discussion with parents. It available both online and onsite. Some centers may only offer certain levels.

Here is an outline of the high level curriculum for each level. Many topics will sound familiar, as they should, but the key is depth.

MathGenius Level 1(MG1):

- Recognizing and extending simple patterns
- Introduction to Logic
- Multiplication
- Multiplication with rectangles and squares
- Estimation
- Mental addition and subtraction
- Concepts in money
- Introduction to counting problems
- Introduction to solving problems by drawing pictures
- Introduction to solving problems by making tables
- Introduction to solving problems by working backwards
- Geometry
- Introduction to Algebraic thinking

MathGenius Level 2 (MG2):

- Problem solving methodology - 1
- Understanding and extending patterns – arithmetic sequence
- Working backwards/finding missing digits with additions, subtractions and word problems
- Solving problems by drawing pictures - 1
- Solving problems by making tables – 1
- Introduction to prime numbers
- Finding sum of natural numbers – Carl Gauss formula
- Geometry: lines and lengths – 1
- Geometry: angles and triangles – 1
- Geometry: squares and rectangles
- Solving problems with fractions and ratios
- Introduction to averages
- Data interpretation
- Introduction to Platonic Solids

MathGenius Level 3 (MG3):

- Problem solving methodology - 2
- Understanding and extending patterns – geometric sequences including difference between compound and simple interest and recurring patterns
- Working backwards/finding missing digits with multiplication and word problems
- Finding sums of natural numbers and arithmetic sequences – Carl Gauss formula
- Introduction to series (sequence vs. series)
- Solving problems by drawing pictures - 2
- Solving problems by making tables - 2
- Geometry: lines and lengths – 2
- Geometry: angles and triangles - 2
- Geometry: quadrilaterals and other polygons - 1

MathGenius Level 4 (MG4):

- Problem solving methodology - 3
- Classification of numbers
- Problems in whole number arithmetic
 - Finding missing numbers in complex situations
 - Understanding and solving parity
- Problems in rational number (fractions and decimals) arithmetic
 - Solving for complex fractions
 - Understanding and shortcuts to convert terminating/recurring decimals to fractions and vice-versa
 - Having fun with cyclical numbers
- Ratios and proportions
 - Critical thinking with ratios and proportions and solving complex problems
- Rate problems
- Problems in exponents - 1
- Scientific notation
- Algebra: understanding the concept of algebra before learning the algebraic procedure
- Algebra: Expressions, equations – converting real world problems to algebraic concepts
- Algebra: Solving linear algebraic equations and translating them to real world solutions
- Algebra: Linear inequalities
- Geometry: angles and triangles – 3
- Geometry: applying critical thinking to creatively solve geometric problems

MathGenius Level 5 (MG5):

- Problem solving methodology – 4
- Applying prime factorization to solve simple and advanced problems
 - Rainbow method
 - Number of factors without listing or counting the factors
 - Number of odd factors and even factors
 - Sum and product of factors
- Number bases: decimal, binary, hexadecimal and other base systems
- Understanding the properties of units digits and solving problems
- Exponents and radicals - 2
- Modular arithmetic – 1
 - Concept of modulo
 - Concept of congruence
 - Problem solving with congruence and modulo



- Counting: blank method, permutations and combinations, path grids
- Probability - 1
- Algebra: linear algebra on coordinate plane, slope, intercepts and making a mental connection between algebraic equations and coordinate geometry
- Algebra: Understanding system of linear equations on coordinate plane, meaning of 'solving' equations and finding number of solutions
- Geometry: Polygons – 2
- Geometry: Circles
 - Problems involving circles, triangles and other geometric objects
- Geometry: Solid Geometry (rectangular prisms, rectangular pyramids, cylinders and cones)

MathGenius Level 6 (MG6):

- Advanced Prime factorization – 2
- Advanced Exponents and radicals – 3
- Advanced Number bases - 2
- Advanced Modular arithmetic – 2
- Advanced counting - 2
- Statistics
- Advanced Probability – 2
- Mathcounts and AMC8

MathGenius Level 7 (MG7):

- Complex problems of Mathcounts
- Introduction to AMC10
- Introduction to AIME

MathGenius AMC10 (next level of **MathGenius** for select students preparing for AMC10)

MathGenius AIME (next level of **MathGenius** for select students preparing for AIME)