



华夏数学 数学竞赛类



目标: 针对数学有兴趣特长及具备一定基础的学生。通过训练。帮助同学在各种比赛中取得优异成绩。

课程: **Number Sense**
小学数学竞赛 初级, 中级和高级
中学数学竞赛 **AMC 8**, **AMC10**

辅导老师: 刘秋华 博士
于成飞 博士
刘怡君 博士
刘 滨 博士
刘立峰 老师

课程设置:

| Level | First Semester | Second Semester | Reference |
|-------|-------------------------------|-------------------|----------------------------------|
| L1 | Number sense | "Pre prealgebra" | Math league / TMSCA / BA5 |
| L2 | Prealgebra 1 - 7 | Prealgebra 8 - 15 | AOPS / AMC8 |
| L3 | Algebra 1 + CP | Geometry + NT | AOPS / AMC8 |
| L4 | Algebra 2 + CP | Geometry + NT | AOPS / AMC8 / AMC 10 / Mathcount |
| L5 | Algebra 2 + CP (intermediate) | Geometry + NT | AOPS / AMC8 / AMC 10 / Mathcount |

NUMBER SENSE

Instructor: 于成飞博士

Dr. Yu received her B.S in chemical engineering from Tianjin University and PhD in Chemical Engineering from University of Houston. She currently works as a senior quality engineer。

Course Syllabus

Number Sense is geared toward students in grades 4-5, and focuses on improving the speed and accuracy of their calculations. The Number Sense test is a 10 minute, 80-question mental math test covering all basic math concepts and operations: addition, subtraction, multiplication, division, square, square root, fraction, decimal, percentage, probability, geometry, number theory, Roman numerical, base conversion, sequence, and estimation. In addition, shortcuts need to be developed and practiced in order to compete and finish the test.

Prerequisites

Students should already be familiar with basic four operations: addition, subtraction, multiplication and division, and the students should know about fractions and decimals.

Course Descriptions & learning objectives:

After taking Number Sense, students will have a solid foundation of fundamental mathematical techniques and its various shortcuts. This class is very helpful for those wishing to do competition math in the future, or for those wishing to build a stronger mathematical foundation for school.



2021 新开课

Pre Prealgebra

Instructor: 刘怡君 博士

Course Syllabus

Pre prealgebra is geared toward students in grades 4-5, who has finished number sense class. This class focuses on the preview for the hard concepts in pre-algebra such as exponent, root, Geometry and counting and probability. In addition, number sense tricks are reviewed as well.

Target Students:

4-5年级的孩子，已经上过number sense，但是还没有 ready prealgebra的学生

为将来学习pre-algebra打基础。

这个课程会预习pre-algebra课程的难点概念比如 exponent, root, Geometry, Counting and probability.

复习，巩固 number sense class所学的内容。

小学数学竞赛初级

Dr. Liu received her B.S in Physics from Peking University and Ph. D in Electrical Engineering from Duke University. She currently works as an AI engineer.

刘老师北京大学物理专业本科毕业，杜克大学电子工程专业博士毕业，目前是人工智能工程师

Instructor: 刘秋华博士

Course Syllabus

Pre-Algebra: Topics include the properties of arithmetic, exponents and exponent laws, primes and prime factorization, fractions, linear equations, inequalities, decimals, ratios, proportions, rates, percents, square roots, basic geometry, statistics, counting and probability

基础代数，包括小学数学比赛的基本知识点：四则运算的性质，指数，分数，小数，百分比的运算和性质，比值问题，质数，合数，单位换算，线性方程，不等式，平方根，基础几何，基础统计及概率。

Target Students:

Advanced 4th and 5th grade students who just starts math contest.

开始参加小学数学竞赛的四五年级学生。

Course Descriptions & learning objectives:

This course will be focusing on prealgebra topics that appears in elementary school math contests, including mathleague, MOEMS, and TMSCA.

小学数学竞赛基础代数知识点。

Required Prerequisites

Regular Elementary school math

小学数学基本知识点

Required Text & Resources:

Book: AOPS Pre-Algebra

小学数学竞赛中级

EDUCATION BACKGROUND

- Graduated from Shanghai Jiaotong University and majored in Electrical Engineering with Bachelor Degree
- Peking University in major of Master of Business Administration (MBA)
- Fordham University in major Master of Business Administration (MBA)
- Participated in China Mathematical Olympiad (CMO) and China Physics Olympiad (CPhO) in 1991 (High School)

Instructor: 刘立峰老师

Course Syllabus

Algebra: Order of Operations, Linear Equations, Multi-variable Linear Equations, Ratios, Percents, Propotion, Graphing Lines, Inequalities.

Target Students:

Advanced 5th to 6th grade students who completed pre-algebra.

Course Descriptions & learning objectives:

This course will be focusing on the first half of the book of AOPS Introduction to Algebra.

Required Prerequisites

Pre-Algebra 初级代数

Required Text & Resources:

Book: AOPS Introduction to Algebra

AMC 8

老师：刘滨

本课程数学老师Dr. Liu一直关心并参加华夏中文学校的数学教育工作。在华夏中文学校成立的早期。首次开设与数学竞赛有关的数学课程。20多年来对全国数学竞赛系列AMC 8/10/12/AIME, MATHOUTS, 和德州数学竞赛TMSCA和NumberSense, UIL general math 都有很深的研究。Dr. Liu上课内容生动，侧重于挖掘逻辑推理能力，强调基础知识的灵活运用，并善于引导学生开拓解题思路。受到广大同学的欢迎。

“Competition Math for Reasoning”课程主要采用美国数学竞赛（AMC）试题系列。AMC是美国数学协会举办的，已有70年历史的项目。该项目为初中，高中学生设置了一系列的比赛（AMC8/10/12, AIME, USA(J)MO等）。其题目以数学基础知识为根本，强调学生的分析能力，并不追求难题偏题。通过对AMC的系列训练，学生们分析解决问题的能力得到了极大地提高。目前全世界每年有超过三十万的学生参加AMC系列比赛。许多美国名校非常注重学生在AMC系列比赛中取得的成绩。

American Mathematics Competitions (AMC), a program organized by the Mathematical Association of America, is a nation-wide competition that strengthens the mathematical capabilities of problem-solvers. The annual competition has increased to over 300,000 student participants.

It is easy for students to be entwined by the complexity of mathematics problems. However, for students to advance their analytical skills in competitive problem solving, it is key for them to understand how to explore and simplify intricate questions by employing fundamental knowledge in mind. The course “Competition Math for Reasoning” will allow students to adapt to “making complex ideas simple and not making simple ideas complex”, which will help students enhance their potential for problem solving. There will be two classes every week for total five weeks. Each class’s duration will be two hours. The class will use AMC 8 problems to cover core curriculum material and additional MATHCOUNTS problems will be used for supplemental learning.

为提高数学水平，以及数学竞赛能力，我们计划将开设“Competition Math for Reasoning”课程。该课程是基于如下想法：

1. 对知识的融会贯通非常重要。解题思路是化繁为简。只做难题偏题，事倍功半。
2. 要引导学生开拓思维。一道题得到了正确答案不是最重要的，也不是终点，要鼓励教导学生一题多解。对同一个问题进行不同角度的分析，归纳总结，提高认知。
3. 循序渐进，能力提高了，认知水平提升了，成绩就是水到渠成。