



Syllabus for AIME (AIME 教学大纲)¹

PROFESSOR CHEN EDUCATION PALACE (陈教授教育学院)

OBJECTIVES (教学目标)

We expect students to achieve the following goals after taking this course:

(学生通过我们的课程培训可以实现以下目标)

1. Master most problem-solving skills to analyze the greatest number of problems in AIME.
(掌握用于解答绝大部分AIME题目的解题技巧)
2. Receive a competitive grade in AIME and aim at advancing to USAMO or USAJMO.
(在AIME取得有竞争力的好成绩, 并且争取晋级USAMO或者USAJMO)

Duration (总课时)

This is a 30-hour course (全课程总计 30 小时).

TEXTBOOKS (教材)

We use our own course packet developed by Steven Chen (我们用Steven Chen亲自编写的教材).

COURSE CONTENTS (教学内容)

¹ Copyright © Professor Chen Education Palace. All Rights Reserved. No part of this document may be copied or reproduced without the written permission of Professor Chen Education Palace. (该版权属于陈教授教育学院。陈教授教育学院保留所有的权利。未经陈教授教育学院的允许, 任何个人或机构不允许复制、截取、使用该文件。)



Module 1: Algebra (第一模块：代数)

1. Complex numbers (复数)
 - (a) Skills of using the exponential form of complex numbers to analyze complex number problems (使用复数的指数形式分析复数问题的技巧)
 - (b) Skills of using complex conjugate to solve problems (使用共轭复数分析复数问题的技巧)
 - (c) Skills of using the complex numbers method to analyze trigonometric problems (使用复数方法分析三角函数问题的技巧)
 - (d) Skills of using the complex numbers method to analyze geometry problems (使用复数方法分析几何问题的技巧)
2. Polynomial functions (多项式函数)
3. Intensive training on solving challenging AIME algebra problems (强化训练AIME代数题目)

Module 2: Geometry (第二模块：几何)

1. Triangles, quadrilaterals, polygons (三角形)
 - (a) Law of cosines (余弦定理)
 - (b) Law of sines (正弦定理)
 - (c) Skills of using the law of cosines and the law of sines without adding auxiliary lines (不添加辅助线，完全使用余弦定理和正弦定理求解几何问题的技巧)
2. Skills of analyzing general quadrilateral problems (分析一般四边形的方法)
3. Skills of analyzing problems with triangular centers: centroids, incenters, circumcenters, orthocenters (分析三角形各种心的方法，包括重心，内心，外心，垂心)
4. Intensive training on solving challenging AIME geometry problems (强化训练AIME几何题目)

Module 3: Combinatorics and probability (第三模块：排列组合和概率)

1. Combinatorics identities (组合恒等式)



2. Sets, mapping, combinatorics (集合, 映射, 组合)
3. Recursive equations method in counting and probability (递归方程方法在排列组合和概率问题中的应用)
4. Intensive training on solving challenging AIME combinatorics and probability problems (强化训练AIME排列组合和概率题目)

Module 4: Number theory (第四模块: 数论)

1. Modular arithmetic (同余运算)
 - (a) Skills of using the Fermat's little theorem and the Euler's theorem to compute remainders (利用费马小定理和欧拉定理计算余数的技巧)
 - (b) Skills of using the binomial theorem to compute remainders (利用二项式定理计算余数的技巧)
 - (c) Skills of using the properties of special moduli (特殊模数性质的使用技巧)
 - (d) Skills of using the Chinese Remainder Theorem to analyze problems with large moduli (利用中国余数定理分析很大模数的问题)
2. Skills of solving Diophantine equations
3. Intensive training on solving challenging AIME number theory problems (强化训练AIME数论题目)