如何获得美国教授写的推荐信?

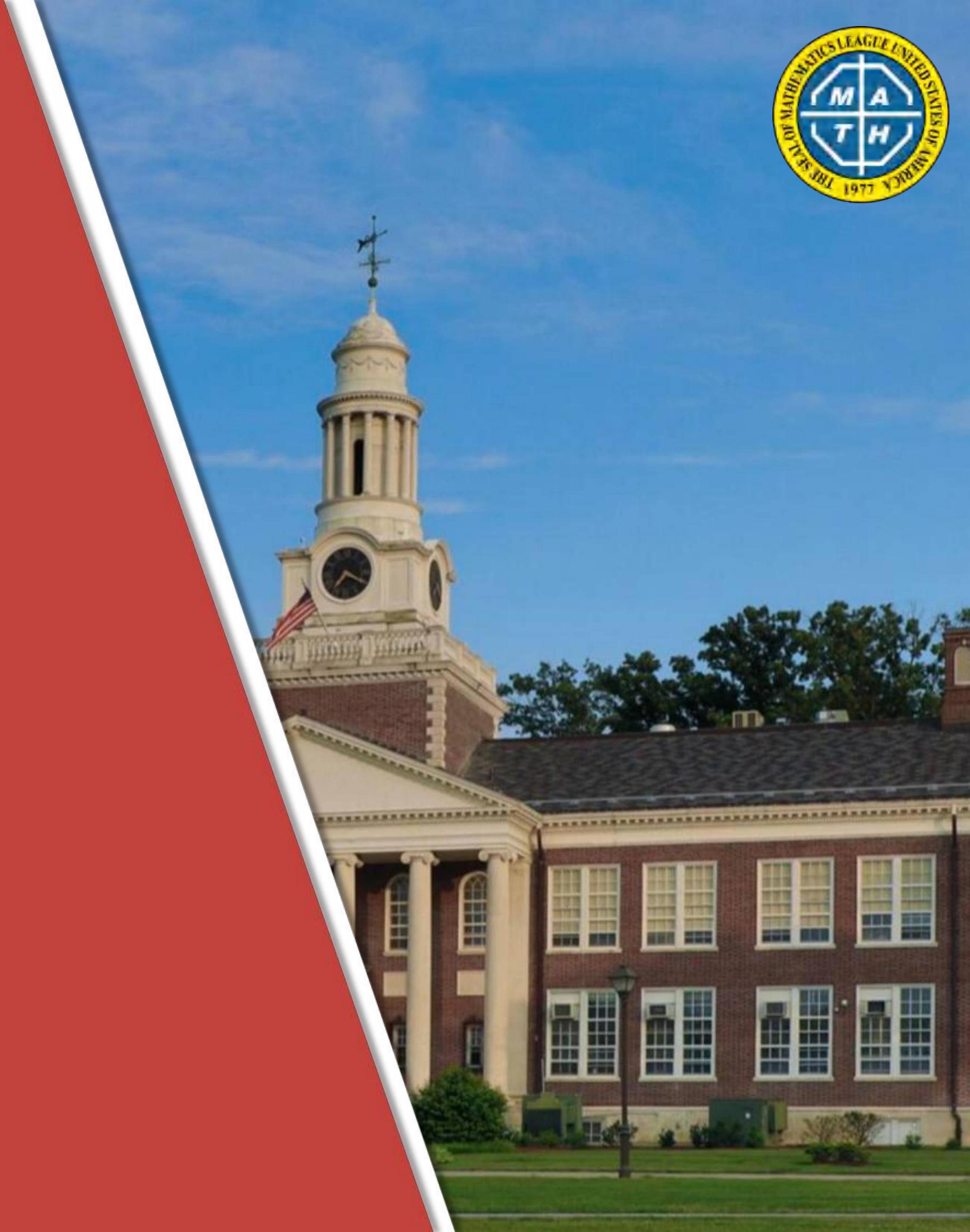
美国 Math League 给你机会!

2025年4月

目录

CHAPTER 1

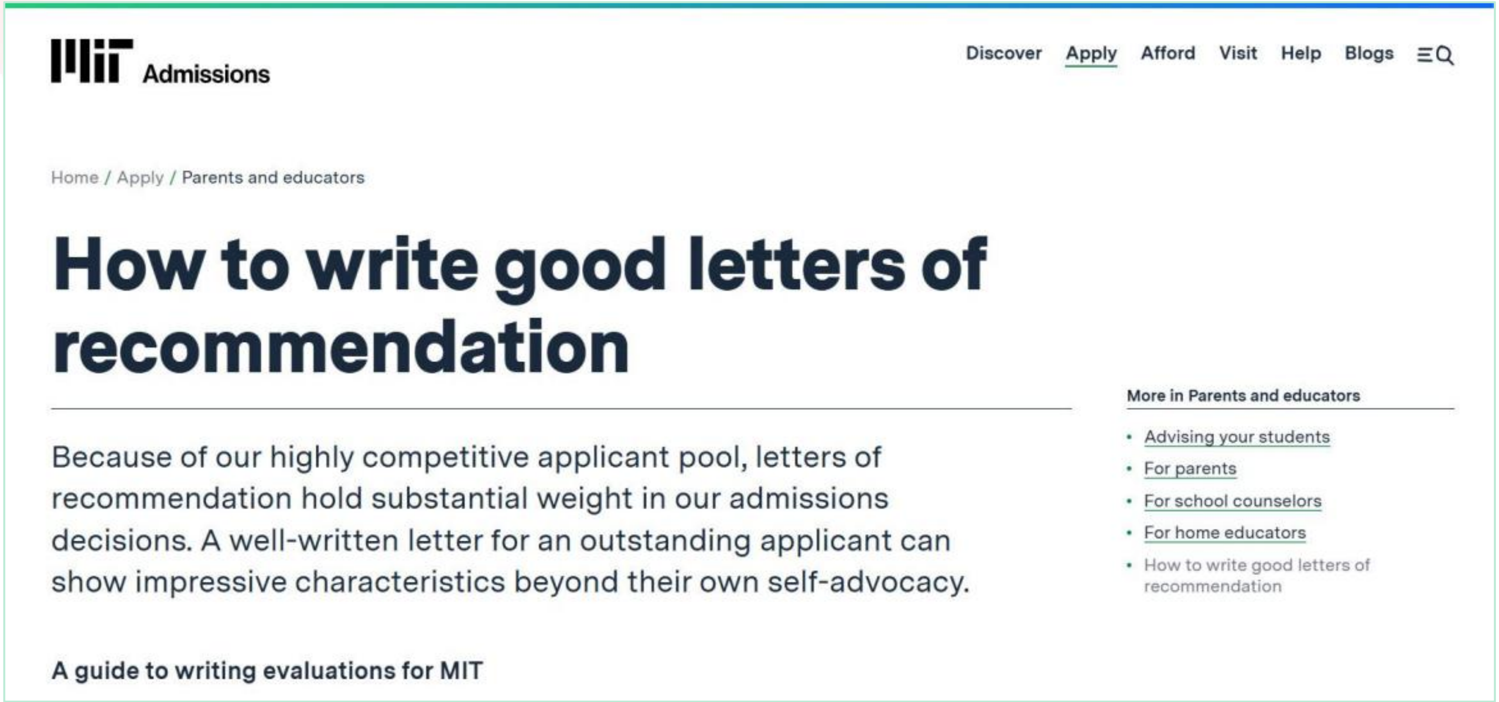
推荐信的重要性



MIT在官网提出:

最好的推荐信撰写人应该由既熟悉学生为人，

又了解学生学习能力的教师担任。



Admissions

Discover Apply Afford Visit Help Blogs

Home / Apply / Parents and educators

How to write good letters of recommendation

Because of our highly competitive applicant pool, letters of recommendation hold substantial weight in our admissions decisions. A well-written letter for an outstanding applicant can show impressive characteristics beyond their own self-advocacy.

More in Parents and educators

- Advising your students
- For parents
- For school counselors
- For home educators
- How to write good letters of recommendation

A guide to writing evaluations for MIT

参考网址：https://mitadmissions.org/apply/parents-educators/writingrecs/

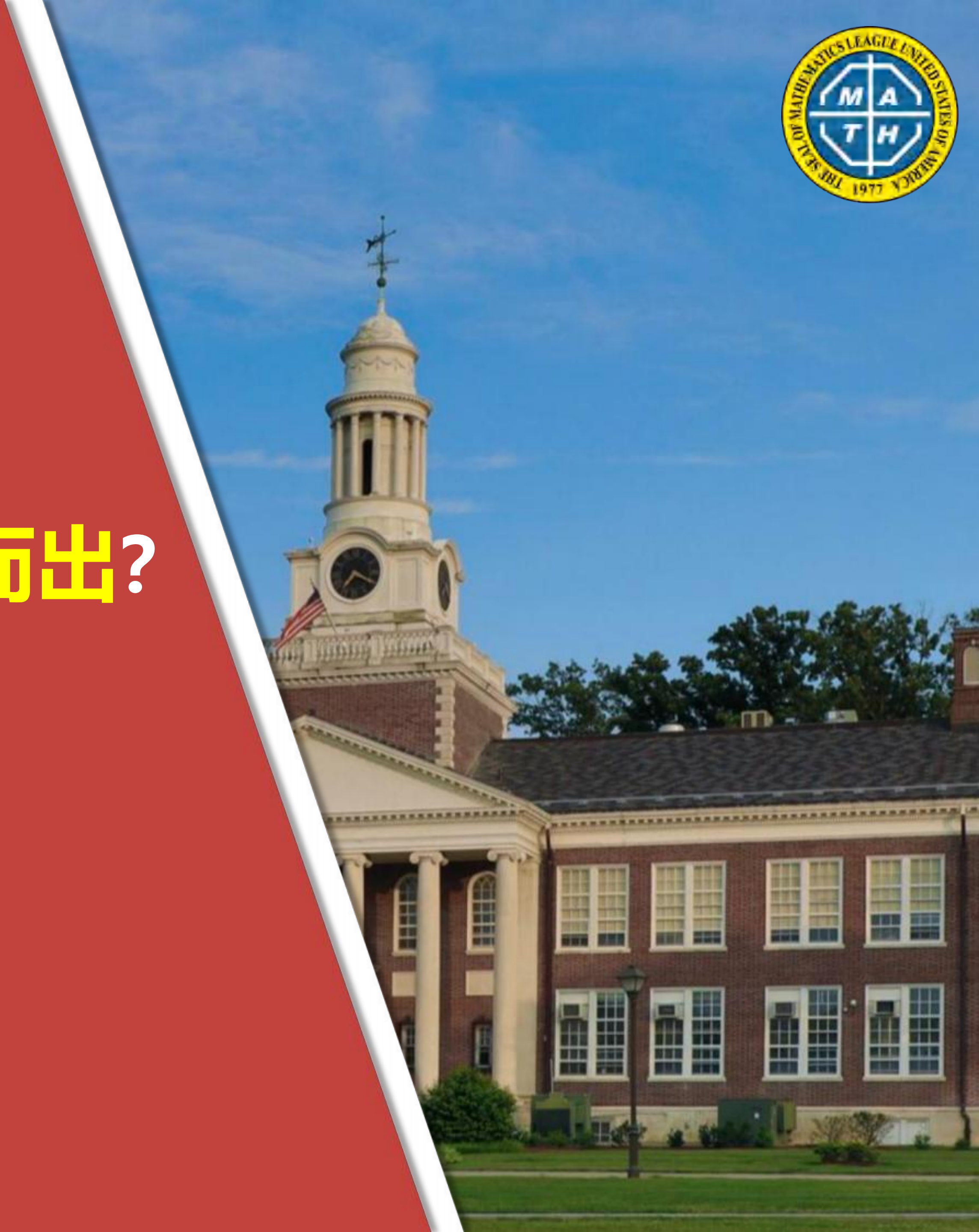
推荐信的数量：3份

- 第1封：学校老师
- 第2封：升学导师
- 第3封：教授或者其他专业人士

第三封推荐信

如何使学生在众多申请者中**脱颖而出**？

让招生官们**眼前一亮**？



三个维度之一

撰写人是谁？

三个维度之二

撰写人和学生的关系

三个维度之三

推荐信的内容

送你一个大瓜

推荐信的保密性

面临以下问题：

如何找到合适的老师作为推荐人?

如何确保推荐人在学术上足够有分量，而且对学生足够了解?

如何让这位老师愿意为学生写推荐信，并且能够尽可能突出个人的亮点和优势?

CHAPTER 2

美国 Math League
决赛和夏令营给你机会!

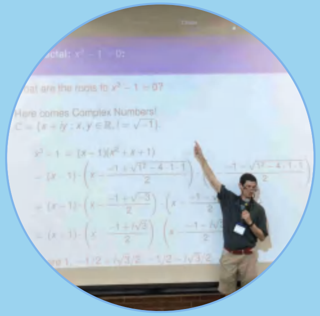
2024 年 7 月

在美国新泽西州

M 教授

2024年暑期推荐信回顾

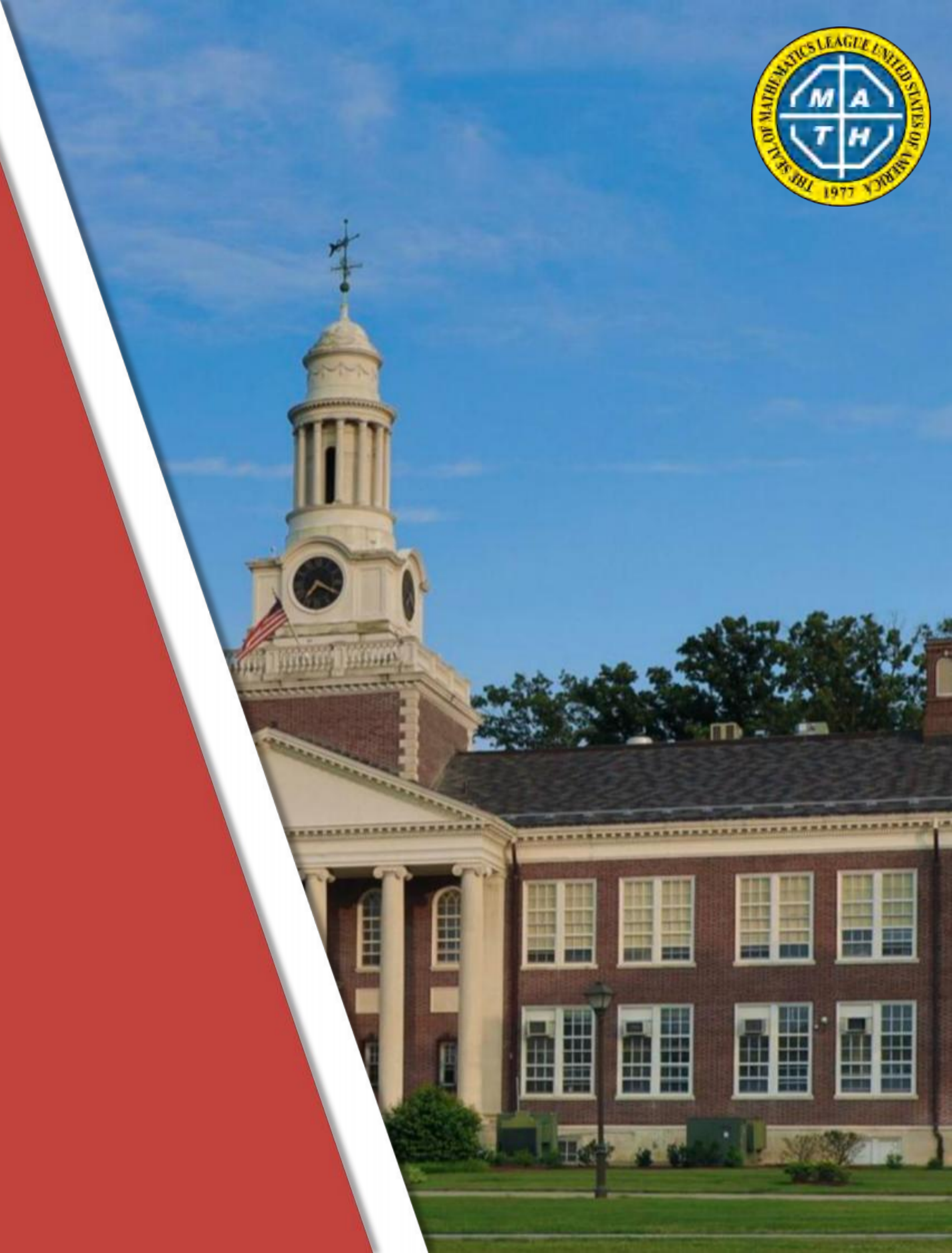
有三名中国学生，他们经过自己的不懈努力以及和教授的反复交流，他们证明了第 3 道题目，获得了教授的认可。



教授答应可以随时给他们写推荐信(在他们需要的时候)。

CHAPTER 3

3 questions



3 Questions

1. Using a method similar to the one in the paper, prove that $\sqrt{7}$ is irrational. (使用与论文中类似的方法，证明 $\sqrt{7}$ 是无理数。)
2. Using a similar method, prove that $\sqrt[3]{2}$ is irrational. (使用类似的方法，证明 $\sqrt[3]{2}$ 是无理数。)
3. The paper uses six triangles with a triple intersection to prove that $\sqrt{6}$ is irrational — can you instead use a similar method to the paper's proof of $\sqrt{5}$ being irrational, but with hexagons to prove $\sqrt{6}$ is irrational? (论文中使用六个三角形的三重交点来证明 $\sqrt{6}$ 是无理数 —— 你能否改用与论文中证明 $\sqrt{5}$ 是无理数的类似方法，但用六边形来证明 $\sqrt{6}$ 是无理数？)

有理数和无理数

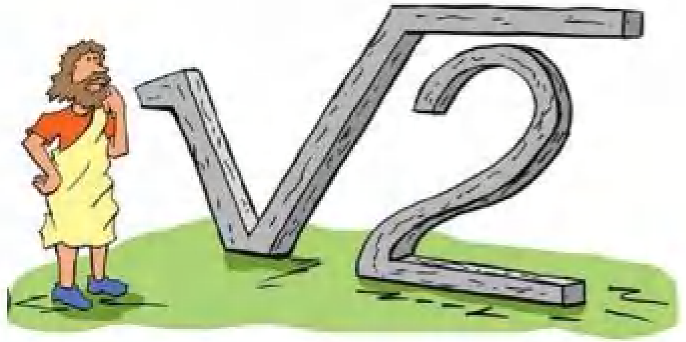
毕达哥拉斯学派是公元前 6 到 5 世纪的一个古希腊哲学与数学流派，他们认为**数字是宇宙的基础**。他们相信：

- 宇宙中的一切都可以通过**整数和比例**来解释；
- 数字及其**比值**（如音乐中的音程、几何中的比例）揭示了宇宙的**秩序与和谐**。
- **所有的数字都是有理数**，也就是说，每一个数都可以表示为**两个整数的比值**（比如 3/4、5/2 等等）。

问题出现了：无理数的发现

这一信念在有人（可能是**希帕索斯 Hippasus**）发现 $\sqrt{2}$ （一个边长为 1 的正方形的对角线）**无法表示为两个整数的比值**之后，被彻底推翻。

- 这意味着 $\sqrt{2}$ 是一个**无理数 (irrational)**；
- 这直接与毕达哥拉斯学派关于“万物皆数”（这里的“数”指的是有理数）的核心信念相矛盾。



$\sqrt{2}$是无理数的证明(代数)

要证明：
$\sqrt{2}$ 是无理数
也就是说，$\sqrt{2}$ **不能表示为两个整数之比（即一个分数）**

假设（用于反证法）：
我们假设相反的情况 ——
$\sqrt{2}$ 是有理数
那么，**就存在两个互质整数** a 和 b（即 a 和 b 没有公因数），使得：

$$\sqrt{2}=\frac{a}{b}$$

两边平方：

$$2=\frac{a^2}{b^2}$$
$$\Rightarrow a^2=2b^2$$

推论 1：
从上式可以看出：
a^2是 2 的倍数$\Rightarrow a^2$是偶数
那么 a 也必须是偶数（因为奇数的平方是奇数）

我们设 a = 2k（k 为整数）

代入回去：

$$a^2=(2k)^2=4k^2$$
$$\Rightarrow 4k^2=2b^2$$

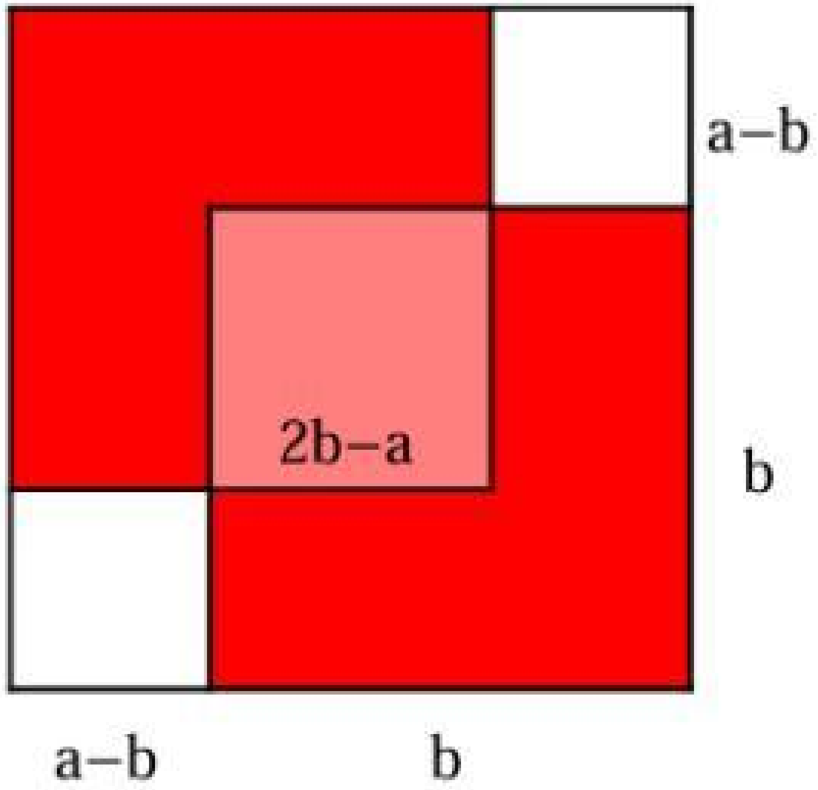
两边除以 2：

$$2k^2=b^2$$

推论 2：
这说明：
b^2是 2 的倍数$\Rightarrow b^2$是偶数$\Rightarrow$b 也是偶数

矛盾来了：
我们刚才设定：
a 和 b 是互质的（没有共同因数）
但我们现在证明了：
a 是偶数
b 也是偶数
→ 所以 **a 和 b 至少有 2 这个公因数**！
这与我们的假设**矛盾**！

$\sqrt{2}$是无理数的证明(几何)



$$a^2 = 2b^2$$

这一次，我们从**几何的角度**来解释它：
两个边长为 b 的正方形的面积（也就是 $2b^2$）等于一个边长为 a 的正方形的面积（即 a^2）。下图，我们可以看到，两个边长为 b 的正方形（包括重叠的粉色区域被计算了两次）所覆盖的总面积，等于一个边长为 a 的大正方形的面积。因此，那个**被重复计算的粉色区域**（边长为 $2b - a$ 的正方形）的面积，正好等于两块**未被覆盖的白色小正方形**（每个边长为 $a - b$）的总面积。

换句话说，满足：

$$(2b - a)^2 = 2(a - b)^2$$

即：

$$\sqrt{2} = \frac{2b - a}{a - b}$$

但这意味着我们找到了一个比 $\frac{a}{b}$ **更小的解**，这与我们最初假设 a 和 b 是最小正整数对的前提**矛盾**。
注: 如何证明 $2b - a < a$? 这个不难，因为 $b < a$, $2b < 2a$, $2b - a < a$. 同样我们可以证明 $a - b < b$. (否则的话， $a \geq 2b$, $a/b \geq 2 > \sqrt{2}$).

这就完成了一个**几何意义下的反证法证明**，证明了 $\sqrt{2}$ 是无理数。

$\sqrt{6}$是无理数的证明(几何)

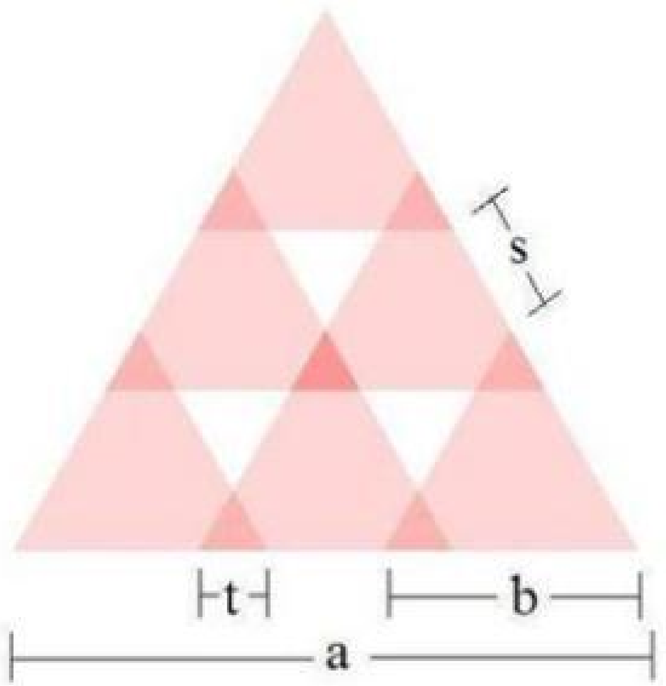


FIGURE Geometric proof of the irrationality of $\sqrt{6}$.

3 Questions

1. **Using a method similar to the one in the paper, prove that $\sqrt{7}$ is irrational. (使用与论文中类似的方法，证明 $\sqrt{7}$ 是无理数。)**
2. **Using a similar method, prove that $\sqrt[3]{2}$ is irrational. (使用类似的方法，证明 $\sqrt[3]{2}$ 是无理数。)**
3. **The paper uses six triangles with a triple intersection to prove that $\sqrt{6}$ is irrational — can you instead use a similar method to the paper's proof of $\sqrt{5}$ being irrational, but with hexagons to prove $\sqrt{6}$ is irrational? (论文中使用六个三角形的三重交点来证明 $\sqrt{6}$ 是无理数 —— 你能否改用与论文中证明 $\sqrt{5}$ 是无理数的类似方法，但用六边形来证明 $\sqrt{6}$ 是无理数？)**

发表论文 (The Fibonacci Quarterly)

GEOMETRIC PROOFS OF THE IRRATIONALITY OF SQUARE-ROOTS FOR SELECT INTEGERS

ZONGYUN CHEN, STEVEN J. MILLER, CHENGHAN WU

1. Introduction

The positive integers $1, 2, 3, \dots$ are not surprisingly one of the most important sequences in mathematics, and typically the first encountered. Quickly one meets interesting sub-sequences, such as the primes $(2, 3, 5, 7, 11, \dots)$, the perfect squares $(1, 4, 9, 16, 25, \dots)$ and the Fibonacci numbers $(1, 2, 3, 5, 8, \dots)$ to name just a few. These are well studied and arise in numerous places; see the On-line Encyclopedia of Integer Sequences [OEIS] for details and properties of these and others.

Almost all integers have irrational square-roots, with the percent of $n \le x$ with $\sqrt{n} \notin \mathbb{Q}$ approximately $100 \cdot x^{-1/2}\%$. The standard proof uses the property that if a prime p divides a product xy then $p|x$ or $p|y$ or both (see for example [MS] for a proof) and the Fundamental Theorem of Arithmetic (every integer can be written uniquely as a product of primes in increasing order; see [HW]).

> Assume a non-square $n > 1$ has a rational square-root; thus we can write $\sqrt{n} = a/b \in \mathbb{Q}$ with a, b relatively prime integers and without loss of generality it suffices to consider n that are square-free, as if $n = m_1 m_2^2$ then $\sqrt{n} = \sqrt{m_1} \cdot m_2$. Then $nb^2 = a^2$. As $n > 1$ is square-free, there is a prime p that divides n. Thus $p|a^2$ so $p|a$ and we can write a as αp. Substituting yields $nb^2 = \alpha^2 p^2$; as n is square-free and a multiple of p, we must have n/p is an integer relatively prime to p and thus $p|b^2$. A similar argument now shows $b = \beta p$, contradicting a and b are relatively prime and therefore $\sqrt{n}$ is irrational.

There's a lot of interesting history on this proof; if we don't use the property that if a prime divides a product then it divides at least one factor, we can mimic the above argument, but only by essentially reproving the result case by case. For example, if $n = 2$ then we would have $2b^2 = a^2$. If $a = 2\alpha + 1$ is odd then $a^2 = 4\alpha^2 + 4\alpha + 1$ is odd, and thus cannot be a multiple of 2, and thus $a = 2\alpha$. Similarly if $n = 3$ we would have $3b^2 = a^2$ and 3 must divide the right hand side as it divides the left. We can write $a = 3\alpha + r$ with $r \in \{0, 1, 2\}$ and note

$$a^2 \;=\; 9\alpha^2 + 6\alpha r + r^2 \;=\; 3(3\alpha^2 + 2\alpha r) + r^2,$$

which is only a multiple of 3 when $r = 0$ as $1^2 = 1$ and $2^2 = 4$ are not multiples of 3. Do we need the fact that if a prime divides a product it divides at least one factor? It turns out we can verify enough of this property for any specific prime, in particular we can show if p

为什么这对你很重要？

Why is it important to you?

难者不会
会者不难

CHAPTER 4

美国 Math League 决赛和夏令营

决赛和数学夏令营概述

2025年美国 Math League 决赛和数学夏令营 由美国 Math League 思维探索活动和普林斯顿大学数学系 (Princeton University Mathematics Department)、哥伦比亚大学数学系 (Columbia University Mathematics Department)、威廉姆斯学院 (Williams College) 联合举办。

日期安排：

4-5 年级组：7月12日（check-in date）至7月19日（check-out date）

6-9 年级组：7月20日（check-in date）至7月28日（check-out date）

参与学生：

来自美国、 加拿大、中国等世界各地成绩优异的学生

活动内容：

包括决赛、数学讲座、夏令营活动等

纽约时报(The New York Times)报道

关于美国 Math League 决赛

和数学夏令营的报道

The New York Times

NUMBERPLAY

Breaking the Grip of the Gaokao, China's SAT

By GARY ANTONICK   *August 31, 2015 12:00 pm*

Gary Antonick (center front) with the China Math League team outside Wallenberg Hall at Stanford University on Aug. 19, 2015. Gary Antonick

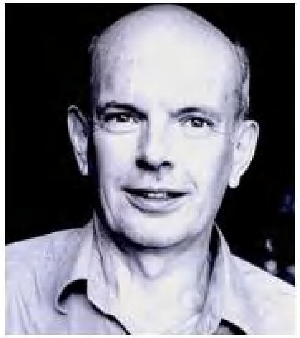
The notorious *Gaokao*, (高考, or "High Test") is China's SAT on steroids, with a score on the nine-hour test being the sole criterion for admission to Chinese universities. Preparing for the test is a years-long obsession for both students and parents. (In case you missed it: Brook Larmer's *Inside a Chinese Test-Prep Factory*.) And for many, the unfortunate consequence is that the lengthy preparation destroys, rather than enhances, academic ability. Student enthusiasm and curiosity are crushed.

Although many in China are aware of the Gaokao's impact, the test has a 1,300-year history and will not be easily killed. Instead, perhaps the best way to break the Gaokao's life-draining grasp is indirectly, through clubs and activities that rejuvenate kids' sense of curiosity and fun. And two weeks ago I discovered one such extra-curricular activity that's becoming popular among Chinese math-lovers: The Math League, an organization based in New Jersey committed to having kids worldwide enjoy math and discussions about problem-solving.

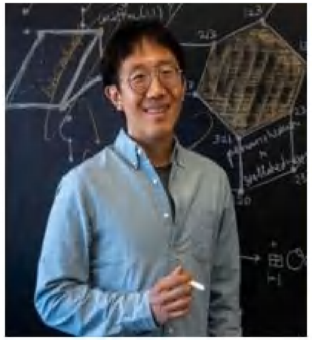
授课教授
(部分)

Mark Saul
Mathematical Association of America

Doron Zeilberger
Rutgers University

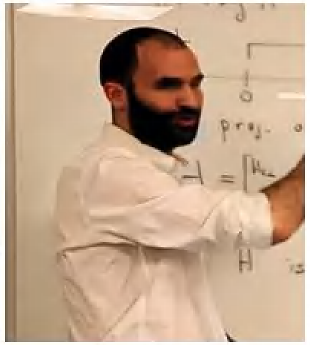


Neil Sloane
AT&T Bell Labs

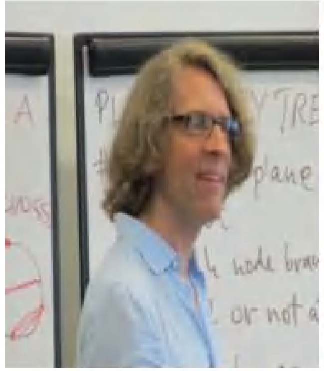


June Huh
Princeton University

Matt Weinberg
Princeton University



Jacob Shapiro
Princeton University



Michael Thaddeus
Columbia University

Arthur Benjamin
Harvey Mudd College

Pravesh Kothari
Princeton University

Steven Miller
Williams College

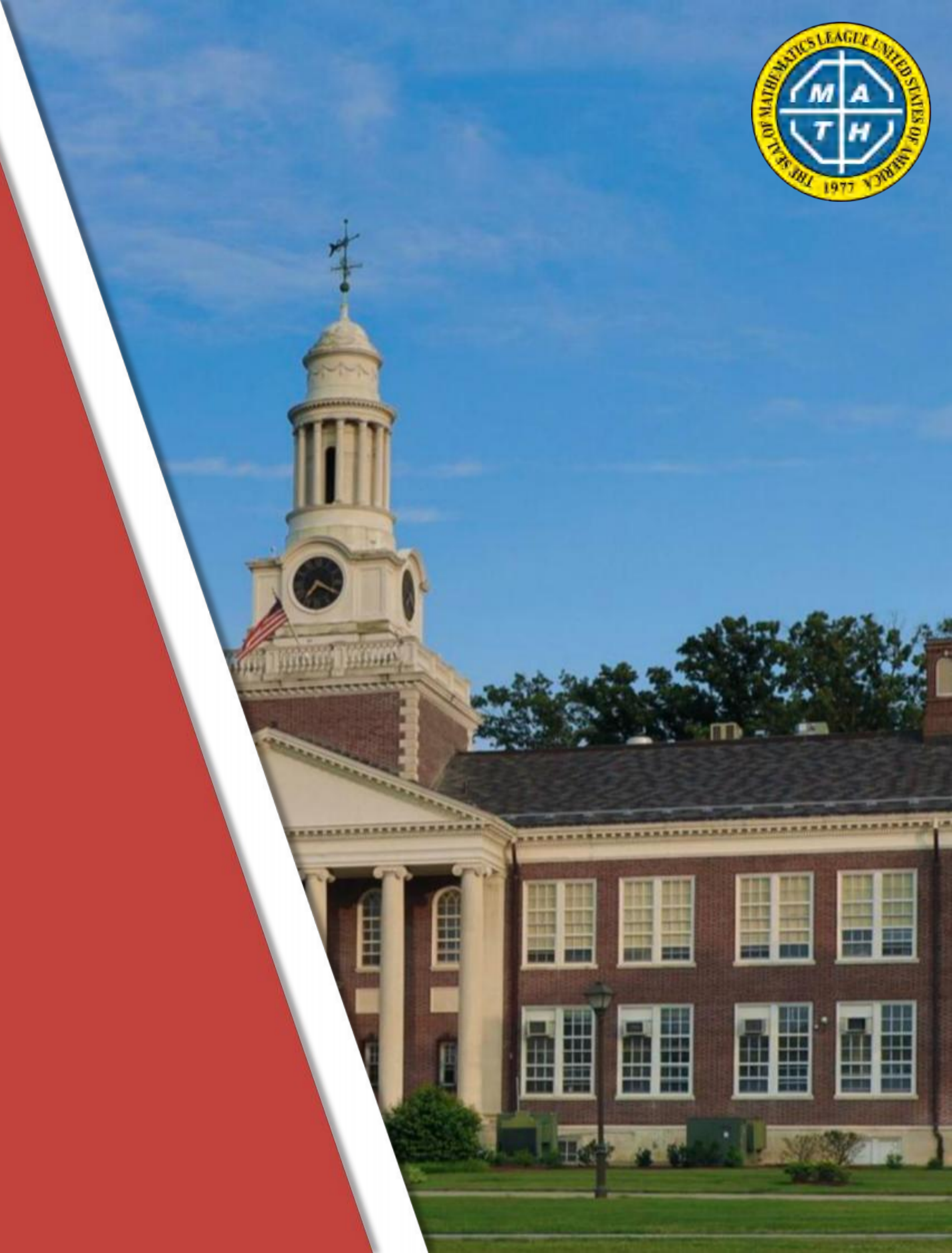
Glen Whitney
National Museum of Math

Pat Devlin
Swarthmore College

往届授课内容

1. From the Quadratic Formula to Differentiation (从二次公式到微分)
2. Mathematics in History, Applications, and Enjoyment (数学的历史、应用和乐趣)
3. Mathematics and Music (数学与音乐)
4. The Wonderful World of Permutations (奇妙的排列世界)
5. Using Randomness in Proofs (在证明中使用随机性)
6. Mathematics and Games (数学与游戏)
7. Stable Machine (稳定的机器)
8. Famous Sequence (著名序列)
9. Tensegrity Polyhedra (张力多面体)
10. Grundy's Game (格兰迪游戏)
11. Apollonian Circle Packings (阿波罗尼安圆填充)
12. Diving into Dimensions (维度探索)
13. How to Use Math to Build a Safe World? (如何用数学构建一个安全的世界？)
14. What's Your Favorite Number? (你最喜欢的数字是什么？)
15. The Art of Problem Solving (解题的艺术)
16. Unlocking Math Magic: Exploring Numbers with AR & VR (揭开数学魔法：用AR和VR探索数字)
17. Knot Theory (结理论)
18. Checking Divisibility Using Finite Automata (使用有限自动机检查可除性)
19. NIM and JIM
20. Introduction to Mathematical Physics (数学物理导论)
21. Modular Origami (模块折纸)

学生在决赛和数学夏令营的收获



学生在决赛和数学夏令营的收获

国际交流

- 参与世界级数学竞赛决赛，获得证书
- 在顶尖教授指导下学习数学，拓展视野
- 与全球优秀学生交流、学习，建立友谊

学术提升

- 有机会获得教授推荐信，和教授建立长期的联系，合作发表数学论文
- 许多学生被世界顶尖大学录取（哈佛、斯坦福、普林斯顿等)

决赛和数学夏令营证书

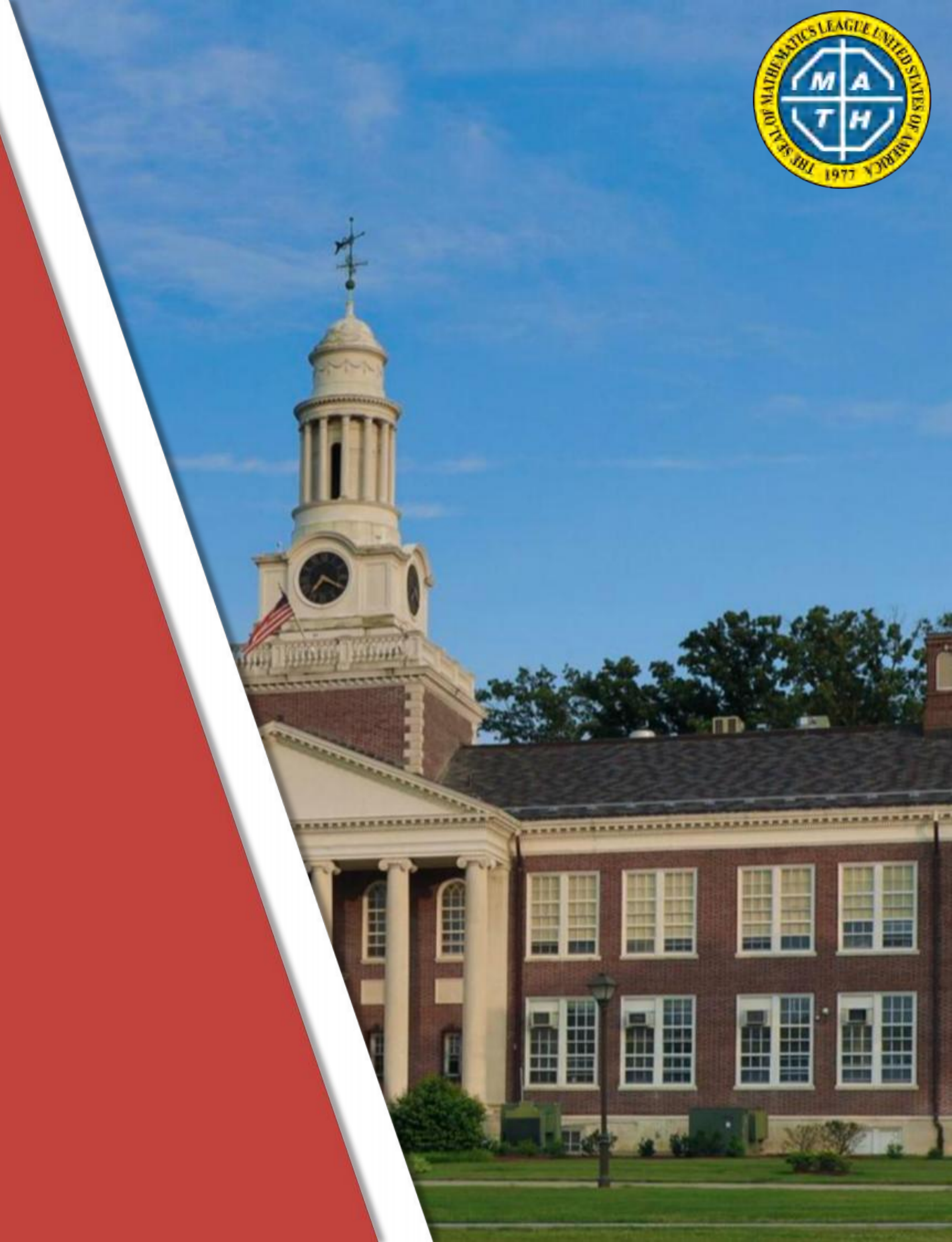
个人赛决赛证书

团体赛决赛证书

结业证书

志愿者证书

什么样的学生适合参加夏令营？



适合参加的学生

✓ 热爱数学和科学，愿意挑战自我

✓ 希望拓展国际视野或未来有出国留学计划

✓ 渴望在全球化环境中成长

美国 Math League 历史

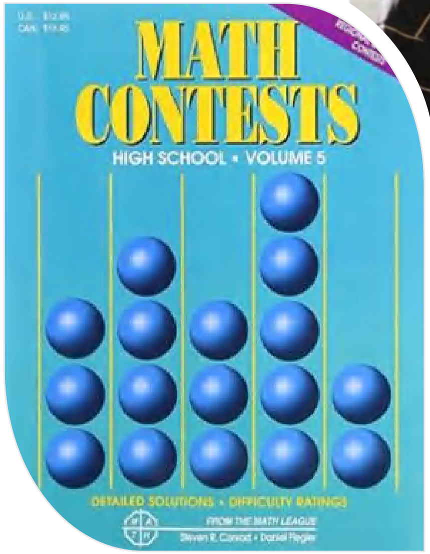
历史悠久：自1977年起，每年持续举办

卓越影响力：美国及北美地区具有卓越影响力的中小学数学思维探索活动

创始人：Mr. Steven R. Conrad 和 Mr. Daniel Flegler
美国著名数学教育家

创始人荣誉奖项：

- 1977年Mr. Daniel Flegler获得普林斯顿大学颁发的“卓越中学教育奖”
- 1985年荣获由里根总统颁发的“杰出数学和科学教育总统奖”(PAEMST), 全美国数学和科学教育最高奖
- 担任了很多数学杂志的主编和审阅人
- 美国十五个州和地区的数学竞赛组委会主任委员或委员
- 六年美国SAT 组委会会员
- 共同出版了18本书



决赛赛制

个人决赛：

Individual Round：

参赛学生独立完成10-15道题目，每道题限时7～10分钟不等(题目相对比较难)。

Speed Round：

在45分钟内完成60道填空题，考察答题速度和准确度。

团体决赛：

Team Round：

团队成员在1-2小时内共同完成10-15道题。

Relay Round：

以接力赛的形式，一共4道接力题，每道接力题包含4个独立的问题。每4个团队成员排成一列，依次解题并传递答案，最终以第四人提交的答案判定得分。

社交生活

放松时刻

才艺表演

参观普林斯顿大学

颁奖典礼

营地管理

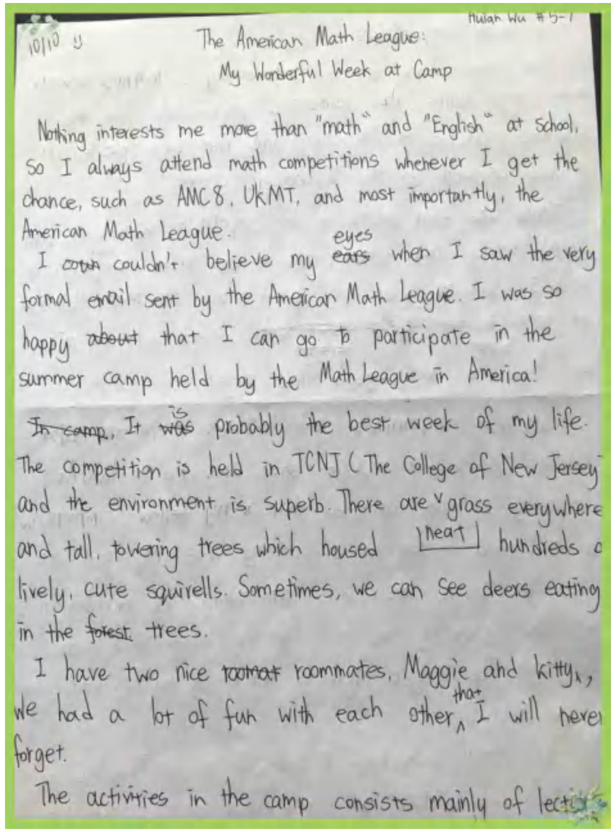
每12名学生一组

每组2名负责老师

全程监管 统一安排

学生小结

✓ 以下是学生写的关于决赛和数学夏令营的随笔



Hulan Wu #5-7

10/10

The American Math League:
My Wonderful Week at Camp

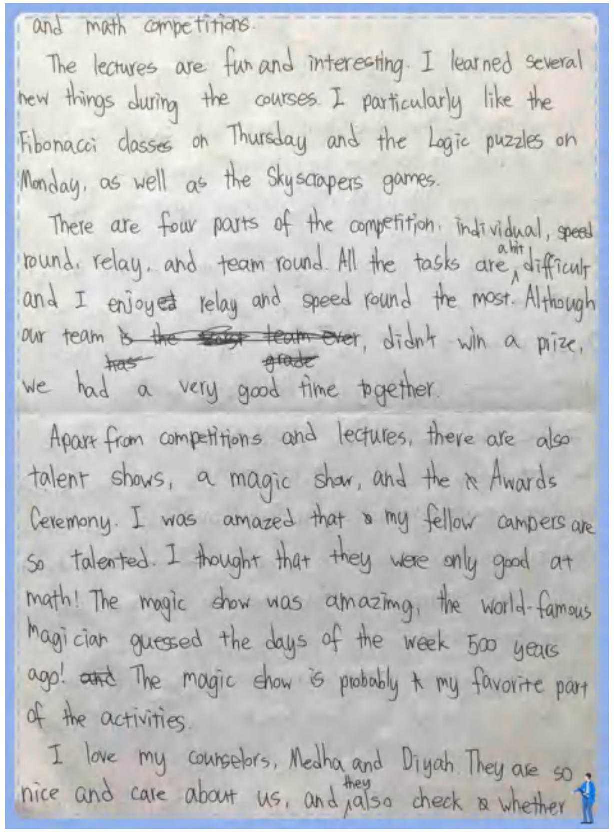
Nothing interests me more than "math" and "English" at school, so I always attend math competitions whenever I get the chance, such as AMC 8, UKMT, and most importantly, the American Math League.

I ~~coun~~ couldn't believe my ~~ears~~ eyes when I saw the very formal email sent by the American Math League. I was so happy ~~about~~ that I can go to participate in the summer camp held by the Math League in America!

~~In camp.~~ It ~~was~~ is probably the best week of my life. The competition is held in TCNJ (The College of New Jersey) and the environment is superb. There are grass everywhere and tall, towering trees which housed [neat] hundreds o[f] lively, cute squirells. Sometimes, we can see deers eating in the ~~forest~~ trees.

I have two nice ~~roomat~~ roommates, Maggie and kitty, we had a lot of fun with each other, that I will never forget.

The activities in the camp consists mainly of lect[ures]



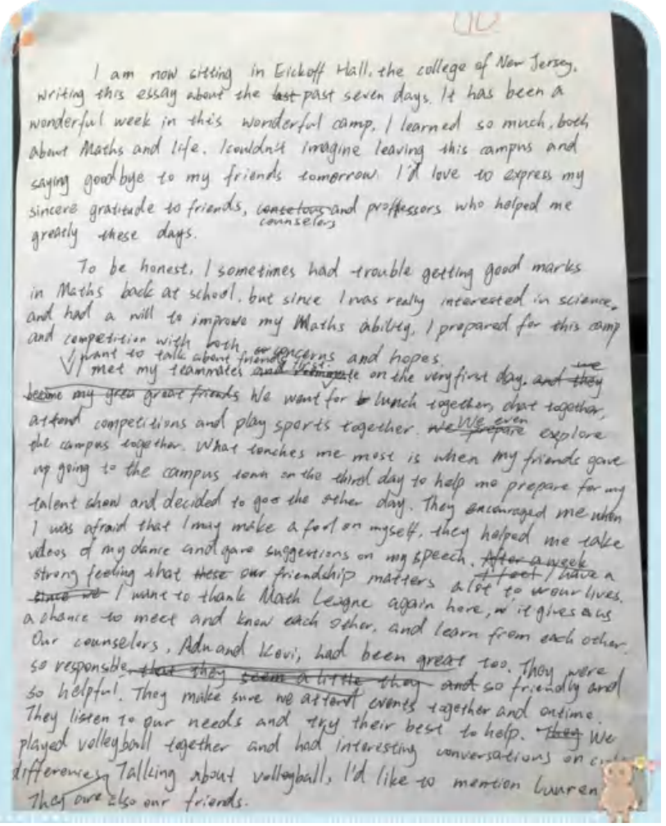
and math competitions.

The lectures are fun and interesting. I learned several new things during the courses. I particularly like the Fibonacci classes on Thursday and the Logic puzzles on Monday, as well as the Skyscrapers games.

There are four parts of the competition: individual, speed round, relay, and team round. All the tasks are a bit difficult and I enjoyed relay and speed round the most. Although our team ~~is the~~ ~~has~~ ~~best~~ ~~team~~ ~~grade~~ ~~ever~~, didn't win a prize, we had a very good time together.

Apart from competitions and lectures, there are also talent shows, a magic show, and the Awards Ceremony. I was amazed that my fellow campers are so talented. I thought that they were only good at math! The magic show was amazing, the world-famous magician guessed the days of the week 500 years ago! ~~and~~ The magic show is probably my favorite part of the activities.

I love my counselors, Medha and Diyah. They are so nice and care about us, and they also check whether



I am now sitting in Eickoff Hall, the college of New Jersey, writing this essay about the ~~last~~ past seven days. It has been a wonderful week in this wonderful camp. I learned so much, both about Maths and life. I couldn't imagine leaving this campus and saying goodbye to my friends tomorrow. I'd love to express my sincere gratitude to friends, ~~conselours~~ counselors and proffessors who helped me greatly these days.

To be honest, I sometimes had trouble getting good marks in Maths back at school, but since I was really interested in science, and had a will to improve my Maths ability, I prepared for this camp and competition with both ~~or~~ concerns and hopes.

I want to talk about friends first. I met my teammates ~~and~~ on the very first day. ~~and they became my great great friends~~ We went for lunch together, chat together, attend competitions and play sports together. ~~we prepare~~ We even explore the campus together. What touches me most is when my friends gave up going to the campus town on the third day to help me prepare for my talent show and decided to go the other day. They encouraged me when I was afraid that I may make a fool on myself, they helped me take videos of my dance and gave suggestions on my speech. ~~After a week~~ ~~I feel~~ I have a strong feeling that ~~these~~ our friendship matters a lot to our lives. I want to thank Math League again here, it gives us a chance to meet and know each other, and learn from each other.

Our counselors, Adn and Kevi, had been great too. They were so responsible ~~that they seem a little they~~ ~~and~~ so friendly and so helpful. They make sure we attend events together and ontime. They listen to our needs and try their best to help. ~~They~~ We played volleyball together and had interesting conversations on c[ultural] differences. Talking about volleyball, I'd like to mention Lauren. They are also our friends.

日程安排

4-5年级组

2025年美国 Math League 决赛和数学夏令营4-5年级组课程表 (暂定，TBD: 细节有待确定):

Math League 2025 Schedule (Grades 4-5, tentative)

Time	Saturday 12-Jul	Sunday 13-Jul	Monday 14-Jul	Tuesday 15-Jul	Wednesday 16-Jul	Thursday 17-Jul	Friday 18-Jul	Saturday 19-Jul
8:00 AM 8:30 AM		Breakfast	Breakfast	Breakfast	Breakfast	Breakfast		Breakfast
9:00 AM 9:30 AM 10:00 AM		Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Tournament (Speed Round, location: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Depature Day (International students)
10:30 AM 11:00 AM 11:30 AM		Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Tournament (Individual Round, Part I, location: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD) Departure (for North American Students)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	
12:00 PM 12:30 PM 1:00 PM		Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
1:30 PM 2:00 PM 2:30 PM	Arrival at Campus (All students) Opening dinner	Math Tournament (Team Round, location: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Field Trip (Princeton Univeristy and Vicinity)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	
3:00 PM		Break	Break	Break	Break		Break	
3:30 PM 4:00 PM 4:30 PM		Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Tournament (Individual Round, Part II, location: TBD)	Math Tournament (Relay Round, location: TBD)	Math Lecture & Math Activities(Professor:, Topic: TBD)		Tournament Summary ( )	
5:00 PM 5:30 PM		Recreational activities ()	Recreational activities ()	Recreational activities ()	Recreational activities ()		Recreational activities ()	
6:00 PM 6:30 PM		Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	
7:00 PM 7:30 PM 8:00 PM 8:30 PM 9:00 PM 9:30 PM		Talent Show, Part 1 (location: TBD)	Talent Show, Part 2 (location: TBD)	movie night	Math League Award Ceremony (location: Cromwell Lounge)	Reading, Journal Writing, Quiet time	Reading, Journal Writing, Quiet time	
10:00 PM	Lights out	Lights out	Lights out	Lights out	Lights out	Lights out	Lights out	

TBD: To be decided

日程安排

6-9年级组

2025年美国 Math League 决赛和数学夏令营6-9年级组课程表 (暂定，TBD: 细节有待确定):

Math League 2025 Schedule (Grades 6-9, tentative)

Time	Sunday 20-Jul	Monday 21-Jul	Tuesday 22-Jul	Wednesday 23-Jul	Thursday 24-Jul	Friday 25-Jul	Saturday 26-Jul	Sunday 27-Jul	Monday 28-Jul
8:00 AM 8:30 AM			Breakfast	Breakfast	Breakfast	Breakfast	Breakfast		Breakfast
9:00 AM 9:30 AM 10:00 AM		Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Tournament (Speed Round, location: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Depature Day (International students)
10:30 AM 11:00 AM 11:30 AM		Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Tournament (Individual Round, Part I, location: TBD)	Math Lecture & Math Activities (Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD) Departure (for North American Students)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	
12:00 PM 12:30 PM 1:00 PM		Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
1:30 PM 2:00 PM 2:30 PM	Arrival at Campus (International students) Opening dinner	Math Lecture & Math Activities(Professor: TBD, Title: TBD) Arrival at Campus (North America students)	Math Tournament (Team Round, location: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Field Trip (Princeton University and Vicinity)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	
3:00 PM		Break	Break	Break	Break	Break		Break	
3:30 PM 4:00 PM 4:30 PM		Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Lecture & Math Activities(Professor: TBD, Title: TBD)	Math Tournament (Individual Round, Part II, location: TBD)	Math Tournament (Relay Round, location: TBD)	Math Lecture & Math Activities(Professor:, Topic: TBD)		Tournament Summary ( )	
5:00 PM 5:30 PM		Recreational activities ()	Recreational activities ()	Recreational activities ()	Recreational activities ()	Recreational activities ()		Recreational activities ()	
6:00 PM 6:30 PM		Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	
7:00 PM 7:30 PM 8:00 PM 8:30 PM 9:00 PM 9:30 PM		Orientation	Talent Show, Part 1 (location: TBD)	Talent Show, Part 2 (location: TBD)	Movie night	Math League Award Ceremony (location: TBD)	Reading, Journal Writing, Quiet time	Reading, Journal Writing, Quiet time	
10:00 PM	Lights out	Lights out	Lights out	Lights out	Lights out	Lights out	Lights out	Lights out	

TBD: To be decided

行程简介和活动照片

✓ 在夏令营期间，组委会会发布每日的活动简介和照片

2024年美国 Math League 决赛和数学夏令营6-9年级组 行程简介和照片

请点击以下链接查看每日的活动简介和照片：

Day 1 The Excitement Begins

Day 2 Lectures

Day 3 Filed Trip (Franklin Institute), Arrival at Campus (North American students), Openning Night Dinner & Ice-Breaker, and Fire Drill

Day 4 Team Round and Lectures

Day 5 Individual Round, Lectures, and Talent Show (Part I)

Day 6 Speed Round, Lectures, Relay Round, and Talent Show (Part II)

Day 7 Lectures and Awards

Day 8 Lectures, Scavenger Hunt, and Field Trip (Princeton Univeristy and Vicinity)

Day 9 Lectures

Day 10 Depature Day

Day 2 Practical Applications of Mathematics

点击这里查看 Day 2 照片(部分)

Jan 14, 2024

Today we learned about the importance of mathematics historically and in today's world. Steven Miller of Williams College began the day by discussing how to solve linear equations and quadratic equations, before showing us the very complicated formula for solving third degree equations. He then discussed how to approximate the value of the square root of 3 more accurately than a calculator can. Students on each team were challenged to find their best approximation of the square root of 3 using a simple algorithm that he provided. We eventually found an approximation of the square root of 3 that was accurate to about 20 places. When asked what was the practical value of having such an accurate approximation. Professor Miller explained that when we use Google Maps, the directions would be inaccurate without such approximations.

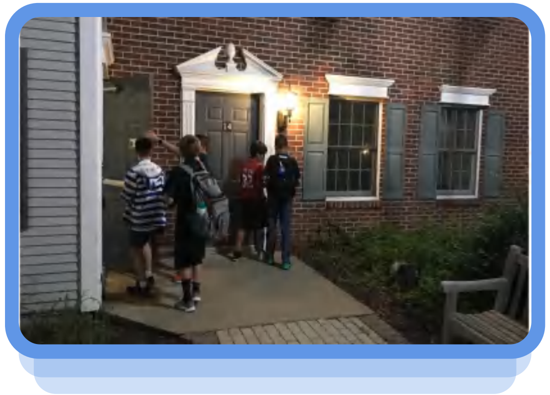
安全与保障

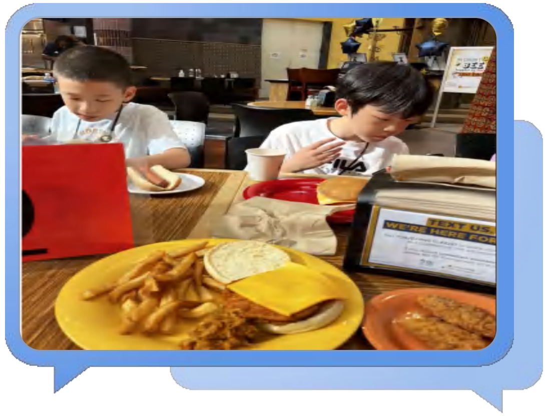
全程监管，统一安排

学生在营地期间所有学习和活动均由学校老师全程监管和统一安排，学生不能自由行动，每 12名学生有2名学校老师24小时监管。

医疗保障服务

感冒、发烧、肚子痛等小病，学校医院可以立即治疗；其他情况，学校老师会送学生前往附近的医院就诊。





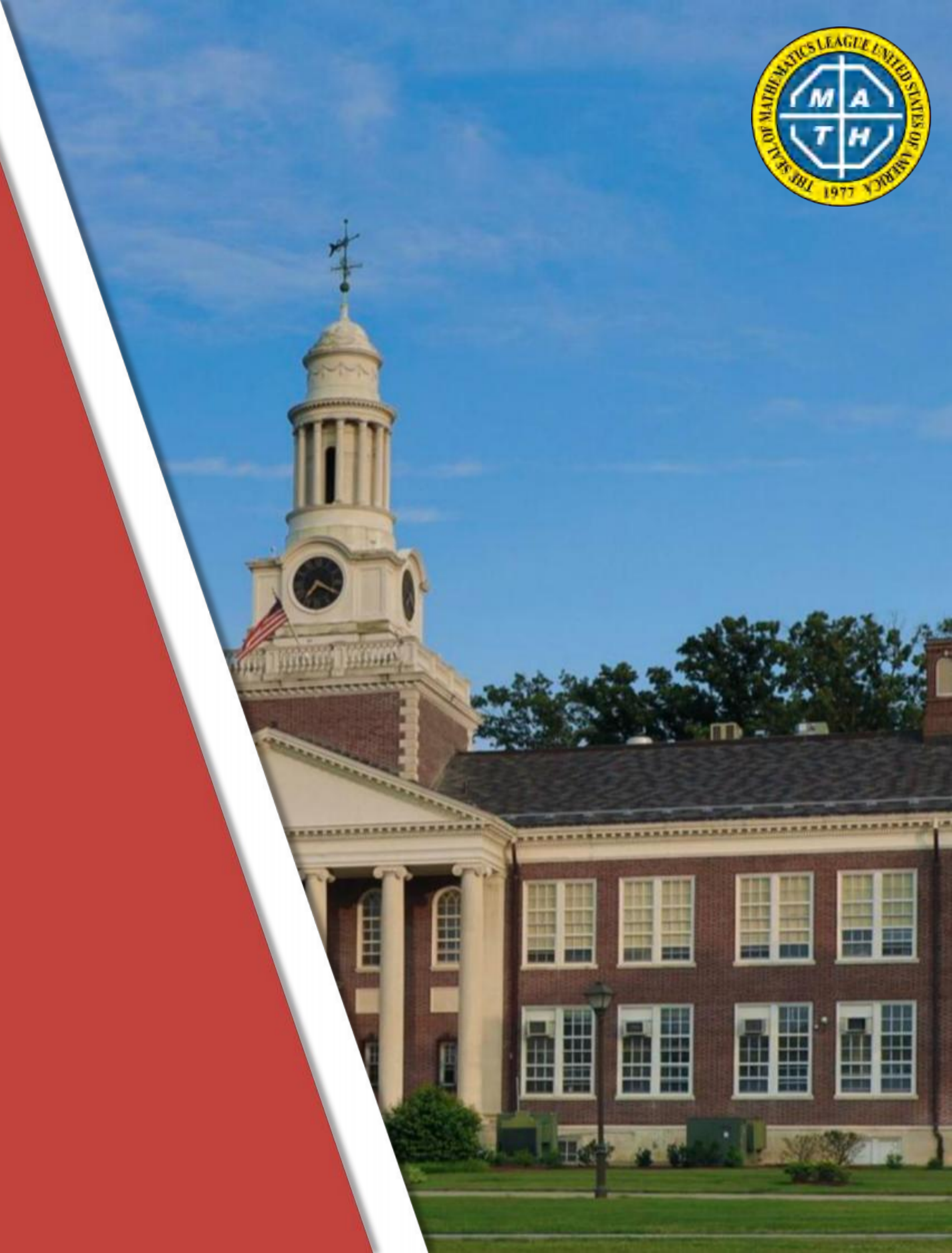
大学宿舍，标准用餐

标准大学学生宿舍，单人间，浴室和卫生间标准美国学生用餐(自助餐)。

接机与送机服务

如有需要，组委会提供接送机服务。组委会老师去机场接学生或者送学生去机场，帮助学 生值机、托运行李等。

赛前学习和培训



赛前学习与培训

赛前学习与培训的内容

- 美国“天才班”课程及练习，培养学生的创造性思维、批判性思维及解决问题能力
- 往届决赛试题解析，学习数学的英文思维，掌握数学英文词汇，深刻理解数学问
- 决赛和夏令营期间教授授课内容预习，帮助学生更好地理解和吸收夏令营课程
- 美国其他顶尖数学竞赛试题解析，开拓视野
- 数学与创新
- 中美教育对比，帮助学生更好地适应美国教学方式

学习安排

赛前8周，每周发给学生**学习资料和评测题(电子版)**，由美国 Math League 思维探索活动和哥伦比亚大学、普林斯顿大学、威廉姆斯学院的教授共同制作。

培训方式

直播授课：5次直播授课，共计7.5小时，由资深教授讲解2024、2023、2019年Math League决赛部分真题，解答学生问题。

以下是参加美国 Math League 决赛和夏令营的两名学生(一名小学生和一名初中生)在 Steven Miller 教授 (Williams College)的指导下撰写的 数学论文 (已在著名数学学术期刊上发表)。

GEOMETRIC PROOFS OF THE IRRATIONALITY OF SQUARE-ROOTS FOR SELECT INTEGERS

ZONGYUN CHEN, STEVEN J. MILLER, CHENGHAN WU

1. Introduction

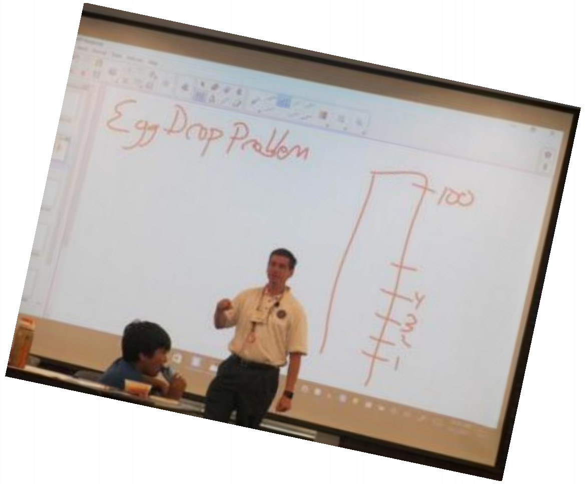
The positive integers $1, 2, 3, \dots$ are not surprisingly one of the most important sequences in mathematics, and typically the first encountered. Quickly one meets interesting sub-sequences, such as the primes $(2, 3, 5, 7, 11, \dots)$, the perfect squares $(1, 4, 9, 16, 25, \dots)$ and the Fibonacci numbers $(1, 2, 3, 5, 8, \dots)$ to name just a few. These are well studied and arise in numerous places; see the On-line Encyclopedia of Integer Sequences [OEIS] for details and properties of these and others.

Almost all integers have irrational square-roots, with the percent of $n \le x$ with $\sqrt{n} \notin \mathbb{Q}$ approximately $100 \cdot x^{-1/2}\%$. The standard proof uses the property that if a prime p divides a product xy then $p|x$ or $p|y$ or both (see for example [MS] for a proof) and the Fundamental Theorem of Arithmetic (every integer can be written uniquely as a product of primes in increasing order; see [HW]).

> Assume a non-square $n > 1$ has a rational square-root; thus we can write $\sqrt{n} = a/b \in \mathbb{Q}$ with a, b relatively prime integers and without loss of generality it suffices to consider n that are square-free, as if $n = m_1 m_2^2$ then $\sqrt{n} = \sqrt{m_1} \cdot m_2$. Then $nb^2 = a^2$. As $n > 1$ is square-free, there is a prime p that divides n. Thus $p|a^2$ so $p|a$ and we can write a as αp. Substituting yields $nb^2 = \alpha^2 p^2$; as n is square-free and a multiple of p, we must have n/p is an integer relatively prime to p and thus $p|b^2$. A similar argument now shows $b = \beta p$, contradicting a and b are relatively prime and therefore $\sqrt{n}$ is irrational.

There's a lot of interesting history on this proof; if we don't use the property that if a prime divides a product then it divides at least one factor, we can mimic the above argument, but only by essentially reproving the result case by case. For example, if $n = 2$ then we would have $2b^2 = a^2$. If $a = 2\alpha + 1$ is odd then $a^2 = 4\alpha^2 + 4\alpha + 1$ is odd, and thus cannot be a multiple of 2, and thus $a = 2\alpha$. Similarly if $n = 3$ we would have $3b^2 = a^2$ and 3 must divide the right hand side as it divides the left. We can write $a = 3\alpha + r$ with $r \in \{0, 1, 2\}$ and note

$$a^2 = 9\alpha^2 + 6\alpha r + r^2 = 3(3\alpha^2 + 2\alpha r) + r^2,$$



如果我想报名，我需要做什么?

联系我们

- 美国 Math League 组委会邮箱:
  INFO@LTHOUGHTS.COM

- 微信人工客服

- 公众号(扫码关注，获取更多资讯)

- 美国 Math League 官网：www.mathleague.world

感谢聆听，欢迎报名参加，期待在美国与你相聚！

Thank you for your time!