



Life After MATHCOUNTS

A 3D isometric graphic of a cube composed of smaller colored cubes (blue, green, and yellow) arranged in a complex pattern, possibly representing a mathematical structure like a magic cube or a complex geometric arrangement.

Richard Rusczyk
www.artofproblemsolving.com



Why **MATHCOUNTS** is Important

- Rewards excellence
- Encourages students to go above and beyond the classroom
- Introduces subjects of vital importance at an early age to the next generation of engineers, scientists, and mathematicians



MATHCOUNTS

prepares students for the future by...

- presenting challenges like the ones students will face in college
- preparing students for the intellectual challenges of many different careers



Thank you

to all the teachers, coaches
and parents!



Why Problem Solving Matters

- Knowledge is no longer scarce
- Computers beat humans in all computational tasks



Standard Curriculum ≠ Problem Solving education

"I certainly wish your website and materials existed when I was in high school. I went through junior high and high school without ever missing a question on a math test, and then took [Math] 103 and 104 at Princeton, which was one of the most unpleasant and bewildering experiences of my life and poisoned me on math for years."

-Princeton University alum



Standard Curriculum ≠ Problem Solving education

- Problems aren't hard enough
- Tests mimic homework
- Emphasis on memorization

The standard curriculum is not enough,
and that is not going to change anytime soon.



Standard Curriculum ≠ Problem Solving education

“While challenging and improving the mathematical problem-solving skills of high-performing students are surely every-day objectives of those who teach such students, it is not a problem, relatively speaking, of major import in American education.”

-Department of Education Grant Reviewer

So what do you do?



Three Strategies for High-performing Middle and High School Students

- Extracurricular Programs
- Independent Study
- Curriculum Overhaul



Benefits of a Math Club

- Offers more challenging mathematics
- Signals the importance of math to students
- Establishes a culture of excellence
- Provides social interaction among students with common interests



Merits of Independent Study

- Structured more like college and careers
- Removes the ceiling of the standard curriculum
- Allows students to use more appropriate materials
- Creates more mature learners
- Gives students time to indulge their academic passions

Recommendations for Curriculum Overhaul

- More Discrete Math
- Harder Problems
- Abandon Traditional Grading
- Less Emphasis on Calculus



Challenges to Serving the Top Students

- Convincing schools there's a problem
- Equity issues
- Convincing students there's a problem
- Calculus! Calculus! Calculus!

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Contests



American Mathematics Competitions

www.unl.edu/amc

AMC 8

AMC 10 and AMC 12

American Invitational Math Exam (AIME)

USA Math Olympiad (USAMO/USAJMO)

Math Olympiad Summer Program (MOSP)

China Girls Math Olympiad

International Math Olympiad (IMO)

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MIT Application

10 If you have taken the AMC 10, AMC 12, or AIME exams, list dates and scores. (If you haven't taken these exams or don't know what they are, don't worry about it.)

AMC 12/
AMC 10

Date

Score

AIME

Date

Score

Date

Score

Date

Score

CalTech Application

AMC 12

AMC12 (OPTIONAL)

Score Test Date

AIME

AIME (OPTIONAL)

Score Test Date

Many colleges ask for
AMC scores and some
even offer scholarships.

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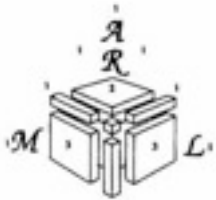


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Contests



American Regions Math League www.arml.com



Mandelbrot Competition www.mandelbrot.org



Math Prize for Girls mathprize.atfoundation.org



Purple Comet www.purplecomet.org



USA Mathematical Talent Search www.usamts.org

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Contests at Universities

- Harvard - MIT
- Princeton
- Stanford
- Rice
- Duke
- Johns Hopkins
- University near you! (Lehigh, Univ. of MD, UNM, UCSD, UNCC, ...)



Math Circles

Local opportunities for students
to learn outside their schools

Cities with Math Circles include:

Albany, Berkeley, Boston, Boulder, Charlotte, DALLAS,
Los Angeles, Mobile, Palo Alto (Stanford), Salt Lake City,
San Diego, San Francisco, San Jose, *Seattle*, Tucson

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Summer Programs

Factors to consider when choosing a program:

- Age
- Location
- Structure
- Emphasis
- Length
- Cost
- Does your child want to go?



Summer Programs

MathPath  www.mathpath.org

 **AwesomeMath**
www.awesomemath.org

**CANADA/USA
MATHCAMP**
www.mathcamp.org

HCSSiM
Hampshire
www.hcssim.org

 **Idea Math**
www.ideamath.org


MathZoom
www.mathzoom.org

 **RSI**
www.cee.org/rsi

PROMYS/Ross
www.promys.org
www.math.ohio-state.edu/ross

MATH LINKS
www.mathlinks.us

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Other Programs

- Siemens Competition (www.siemens-foundation.org)
- Intel Science Talent Search (www.intel.com/education/sts)
- Davidson Fellows Scholarship Program (www.ditd.org)
- International Science & Engineering Fair (www.sciserv.org/isef/)



Science & Computing Programs

- USA Computing Olympiad (www.usaco.org)
- USA Physics Olympiad (www.aapt.org/Contests/olympiad.cfm)
- USA Chemistry Olympiad (url too long to list)
- USA Biology Olympiad (www.cee.org/programs/usabo)
- North American Computational Linguistics Olympiad (www.naclo.cs.cmu.edu/)





The first step to succeed in
science programs is to...

**Develop strong math problem
solving skills!**



Resources for a Mathematical Problem Solving Education

BOOKS

CLASSES

WEBSITE

Richard Rusczyk



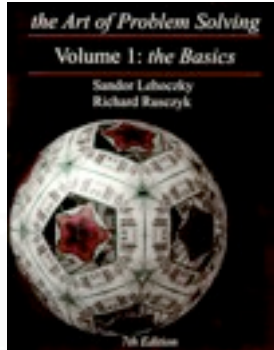
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Resources for a Mathematical Problem Solving Education

BOOKS



Art of Problem Solving Volume 1 and 2

by Richard Rusczyk and Sandor Lehoczky

- Emphasis on problem solving and contest preparation
- Used by top MATHCOUNTS and AMC students and teams for over 18 years
- Authors earned the only perfect scores on the AIME in 1989 (Rusczyk) and 1990 (Lehoczky)



Resources for a Mathematical Problem Solving Education

BOOKS

Art of Problem Solving Introduction Series

Prealgebra by Richard Rusczyk, David Patrick, and Ravi Boppana

Introduction to Algebra by Richard Rusczyk


Introduction to Counting & Probability by David Patrick

Introduction to Geometry by Richard Rusczyk

Introduction to Number Theory by Mathew Crawford

- Modern mathematics curriculum for high-performing math students
- Integrates problem solving with the mathematics curriculum
- Includes thousands of problems, many from prominent contests

Richard Rusczyk

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Resources for a Mathematical Problem Solving Education

BOOKS

Art of Problem Solving Intermediate Series

Intermediate Algebra by Richard Rusczyk and Mathew Crawford

Intermediate Counting & Probability by David Patrick

Precalculus By Richard Rusczyk

Calculus by David Patrick

- Modern mathematics curriculum for high-performing math students
- Integrates problem solving with the mathematics curriculum
- Includes thousands of problems, many from prominent contests

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Resources for a Mathematical Problem Solving Education

BOOKS

Awards won by the authors of Art of Problem Solving textbooks:

- National MATHCOUNTS Test Champion
- National MATHCOUNTS Team Champion
- Two perfect scores on the AMC exam
- Three perfect scores on the AIME exam
- Two USAMO winners
- 9 invitations to the Math Olympiad Program
- 6-time National MATHCOUNTS parent distraction

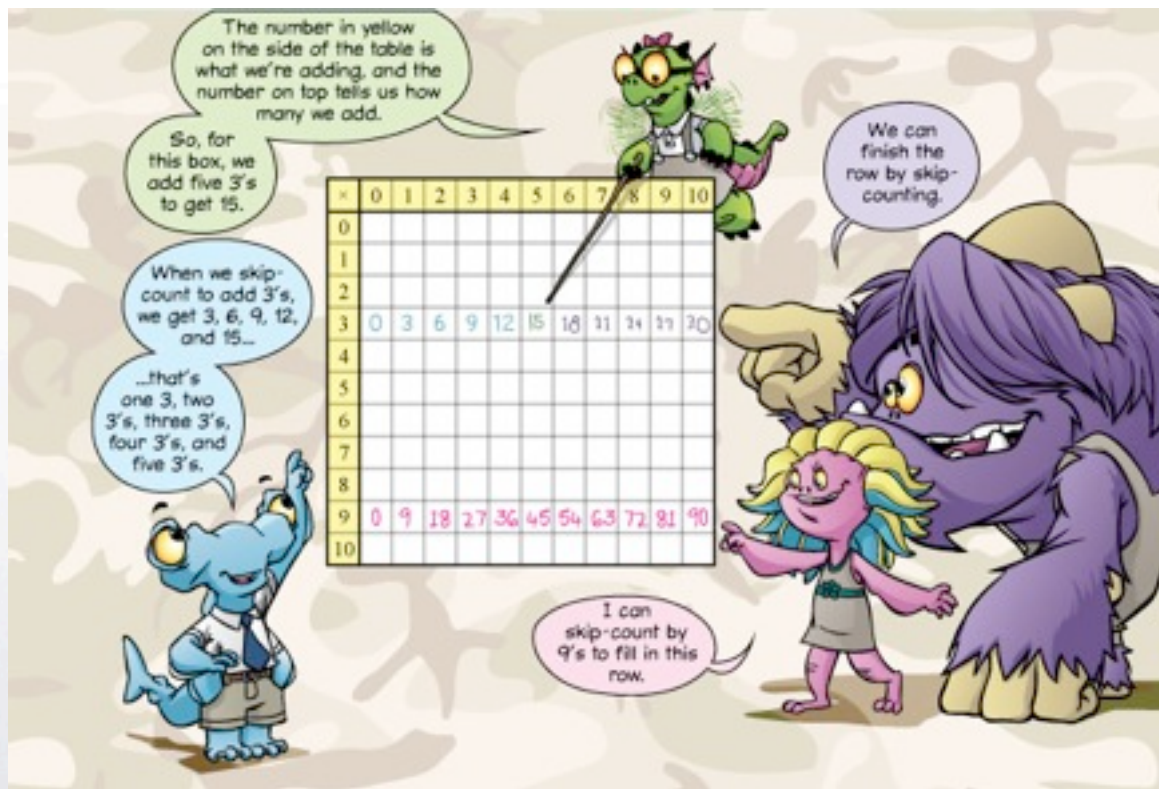
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Art of Problem Solving Resources

BOOKS

New! Beast Academy



- Math Curriculum for Grades 2-5
- Common Core Standards plus Problem Solving
- 4 Guide Books and Practice Books per grade level
- Comic Book style

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Resources for a Mathematical Problem Solving Education

CLASSES

School isn't the only option!

- Math Circles
- After School Programs
- Math Teams
- Online Classes



Resources for a Mathematical Problem Solving Education CLASSES

Art of Problem Solving Online Classes



Curriculum: *Middle School and High School*

Contest Preparation: *MATHCOUNTS, AMC, AIME*

Specialty: *Computer Programming, Group Theory*

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Resources for a Mathematical Problem Solving Education

CLASSES

Art of Problem Solving Online Classes

WOOT: Worldwide Online Olympiad Training

- 7-month Olympiad preparation and testing program
- Includes practice AIME and USAMO tests, problem sets, articles, online classes, message board
- DE Shaw, Two Sigma, and GETCO sponsorship allows MOSP students to enroll for free



Resources for a Mathematical Problem Solving Education

CLASSES

Other online programs include:

- EPGY
- CTY
- TIP
- Belin-Blank



Resources for a Mathematical Problem Solving Education

WEBSITE

www.artofproblemsolving.com

- Books
- Classes
- Articles on problem solving topics
- LaTeX tutorial for typesetting mathematical writing
- AoPSWiki
- Lists of and links to many other resources, such as books, programs, contests, scholarships, and more!

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Resources for a Mathematical Problem Solving Education **WEBSITE**

www.artofproblemsolving.com

AOPS For the Win!

A FREE online multi-player game.
Thousands of MATHCOUNTS and AMC problems.
Countdown Round format.



Resources for a Mathematical Problem Solving Education WEBSITE

www.artofproblemsolving.com



An Online Adaptive
Learning System

Thousands of problems from
major national contests



Over 7500 problems with
solutions



An intelligent learning system



Detailed progress reports



FREE!

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Resources for a Mathematical Problem Solving Education **WEBSITE**

www.artofproblemsolving.com

Largest online community of problem solvers in the English-speaking world

Over 100,000 members

Over 2.5 million posts



**Developing Problem Solving Skills
Strategies for Parents**

ORGANIZE
AGITATE
CONTRIBUTE



**TECHNOLOGY NOW ALLOWS US TO
LEVERAGE THE EFFORTS OF A FEW
TO THE BENEFIT OF THE MANY.**





**Our tomorrow
is in the hands of the
best students today.**