NEW YORK STATE
COMPETITION

MARCH 18, 2017

SPONSORED BY:
THE NEW YORK STATE SOCIETY
OF PROFESSIONAL ENGINEERS

HOSTED BY:
RENSSELAER POLYTECHNIC INSTITUTE
Test your Math Skills

Warm-Up 1

1. _______ years A time capsule was sealed in 1940 and will be opened on the same date in 2017. How long will the capsule remain sealed?

2. _______ large paper clips The length of 5 small paper clips is equal to the length of 2 large paper clips. The length of 8 small paper clips is equivalent to the length of how many large paper clips? Express your answer as a mixed number.

3. _______ paths In the figure shown, if no cell may be visited more than once and not every cell must be visited, how many paths start in cell 1 and end in cell 7?

4. _______ What is the value of $4 + \frac{2}{3} - 5$?

5. _______ What is the absolute difference between $\frac{1}{2}$ and $\frac{1}{3}$? Express your answer as a common fraction.

6. _______ cm If the perimeter of rectangle ABCD is 34 cm and AB = 5 cm, what is the perimeter of ΔABD?

7. _______ Harvey has a fair eight-sided die that has a different number from 1 to 8 on each side. If he rolls this die twice, what is the probability that the second number rolled is greater than or equal to the first number? Express your answer as a common fraction.

8. _______ In scientific notation, what is the product of $1.2 \times 10^2$ and $1.4 \times 10^3$? Express your answer to two significant figures.

9. _______ When the integer $n$ is squared, the result is less than 150. What is the sum of all possible values of $n$?

10. _______ Minnie paid a one-time registration fee of $30 for dance lessons. Additionally, she paid $20 per lesson. If she took seven lessons, how much did she pay altogether?
Welcome to the 2017 New York State Mathcounts Competition

AGENDA

8:00 AM  
REGISTRATION  in  THE COMMONS - LOWER LEVEL

9:00 AM  
COMPETITION START  in  THE COMMONS - CAFETERIA
Coaches and competing students only

12:00 PM  
LUNCH  in  THE COMMONS - CAFETERIA
Lunch tickets may be purchased at the LUNCH TICKET station

12:30 PM  
COUNTDOWN ROUND  in  DARRIN COMMUNICATION CENTER 308
Open for all to watch - seating is limited

2:00 PM  
AWARDS PRESENTATION  in  DARRIN COMMUNICATION CENTER 308

2:30 PM  
COMPLETION

PLEASE NOTE THE TIMES LISTED ABOVE AFTER THE COMPETITION START ARE APPROXIMATE DEPENDING ON THE NUMBER OF VOLUNTEERS AVAILABLE TO HELP IN THE SCORING ROOM.
PARTICIPATING SCHOOLS

**Brooklyn (Kings) Chapter**
- Basis Independent
- Berkley Carroll Middle School
- Cunningham IS 234
- Mark Twain IS 239

**Bronx Chapter**
- Horace Mann Middle School
- Riverdale Country School
- Twin Parks Upper PS 129
- Leadership and Community Service
  - Academy CIS303
  - Tech International Charter School

**Broome Chapter**
- Boynton Middle School
- Dewitt Middle School
- Vestal Middle School

**Capital District Chapter**
- Acadia Middle School
- The Albany Academies
- Farnsworth Middle School
- Iroquois Middle School
- Shaker Junior High School

**Cattaraugus/Chautauqua Chapter**
- Allegany Limestone Central School
- Frederick Law Olmsted Middle School

**Champlain Valley Chapter**
- Chazy Central Rural School
- Saranac Lake Middle School
- Stafford Middle School

**Dutchess Ulster Chapter**
- Lagrange Middle School
- Orville Todd Middle School
- Van Wyck Junior High School

**Long Island**
- Great Neck South Middle School
- Jericho Middle School
- Progressive School of Long Island
- South Woods Middle School
- William T. Rogers Middle School
PARTICIPATING SCHOOLS

**Manhattan Chapter**
Hunter College High School
NEST+m
The Speyer Legacy School
Collegiate School
NYC Lab Middle School

**Monroe Chapter**
Barker Road Middle School
Calkins Road Middle School
The Harley School
Spry Middle School

**Oneida-Mohawk Valley**
Holland Patent Middle School

**Orange Sullivan Chapter**
Fallsburg Central School District
Liberty Central School District
Minisink Valley Central School District

**Queens**
Baccalaureate School for Global Education
Marie Curie Middle School MS 158
Nathaniel Hawthorne Middle School MS 74
Russell Sage Junior High School 190

**Rockland Chapter**
Felix Mesta Middle School
South Orangetown Middle School

**Tri-County Chapter**
Maple Avenue Middle School
Schuylerville Junior/Senior High
Greenwich Junior/Senior High School

**Westchester/Putnam Chapter**
Robert E. Bell Middle School
Scarsdale Middle School
Ardsley Middle School
Mildred E. Strang Middle School
Edgemont Middle School
For competing Mathletes & Their Coaches...

♦ Students are assigned seating for the Sprint and Target rounds. The table assignment is given to the coach on 4 index cards. The number on the card corresponds to each student’s table for that round. Individuals and alternates have open seating at any table so designated for Individuals or Alternates. The number in the circle on your packet corresponds to the table assignment for the team round.

♦ Students are responsible to make sure their names are on each part of the written exam. Coaches, before handing in your student’s papers, please make sure all have names. We will not be able to match up blank papers. Also, please make sure your students label their papers with the words Alternate or Team Captain when appropriate.

♦ At the end of the Team round, lunch will be served in the Commons. We ask that all schools assist us in clean up of the Commons. Please dispose of any food leftovers or garbage.

For Coaches...

♦ As this competition is about the Mathletes, we ask that you remain in the competition room with your students and remain attentive to their needs, in terms of proctoring, distributing and collecting papers, scrap paper, etc.

♦ This competition is a National competition that takes place during the month of March. There have been instances (luckily not in NY) where tests have been taken from the room and passed along to other states, prior to other competitions. For this reason, we are tightening our security on the distribution of extra copies. Please do not take additional copies of the exam other than those needed to distribute to your students.

For Volunteers...

♦ We are always in need of volunteers to help in the scoring room. If your school has come with two or more coaches/parents, we ask that one of you assist our scoring room team with the grading. In deciding which role to assume, please consider English fluency as the activity in the scoring room moves very quickly.

For Spectators...

♦ We are asking that all parents, siblings or other spectators wait outside the competition room during the written portion of the competition. Only individuals with a coaches wristband will be allowed in the competition room while the exam is in progress.

For Mathletes, Coaches Volunteers and Spectators Alike...

♦ Please keep the noise level to a minimum during announcements and during the written exam.

♦ No photography or video recording of any of the Mathcounts booklets or Countdown round questions is allowed. You will be asked to leave the competition room if you are found taking pictures of the questions/booklets.
About the MATHCOUNTS
Competition Series

The MATHCOUNTS Competition Series is a national program that provides students the opportunity to compete in live, in-person contests against and alongside their peers. Created in 1983, it is the longest-running MATHCOUNTS program and is open to all sixth-, seventh- and eighth-grade students.

The Competition Series has 4 levels of competition—school, chapter, state and national. Each level of competition is comprised of 4 rounds—Sprint, Target, Team and Countdown Round. Altogether the rounds are designed to take about 3 hours to complete.

- **Sprint Round**: focuses on speed and accuracy. Students have 40 minutes to complete 30 math problems without a calculator.
- **Target Round**: focuses on problem-solving and mathematical reasoning. Students receive 4 pairs of problems and have 6 minutes to complete each pair, assuming the use of a calculator.
- **Team Round**: focuses on problem-solving and collaboration. Students have 20 minutes to complete 10 math problems, assuming the use of a calculator. *Only the 4 students on a school’s team can take this round officially.*
- **Countdown Round**: focuses on speed and accuracy. Students have a maximum of 45 seconds per problem without a calculator. *This round is optional at the school, chapter and state level.*

The Competition Format

<table>
<thead>
<tr>
<th><strong>Sprint Round</strong></th>
<th><strong>Target Round</strong></th>
<th><strong>Team Round</strong></th>
<th><strong>Countdown Round</strong></th>
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<tbody>
<tr>
<td>40 minutes</td>
<td>Approx. 30 minutes</td>
<td>20 minutes</td>
<td>Maximum of 45 seconds per problem</td>
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<tr>
<td>30 problems total</td>
<td>9 problems total</td>
<td>10 problems total</td>
<td>Students with highest scores on Sprint and Target Rounds compete head-to-head. This round is optional at the school, chapter and state level.</td>
</tr>
<tr>
<td>no calculators used</td>
<td>9 problems total</td>
<td>no calculators used</td>
<td></td>
</tr>
<tr>
<td>focus on speed and accuracy</td>
<td>calculators used</td>
<td>focus on problem-solving and mathematical reasoning</td>
<td></td>
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</tbody>
</table>

The problems are given to students in 4 pairs. Students have 6 minutes to complete each pair.

Only the 4 students on a school’s team can take this round officially.
Commons and Campus Maps
Local Chapter Coordinators

A special thanks to all the local chapter coordinators who volunteer their time to plan and host the second round of the Mathcounts competition series. Without their efforts, the state competition would not be possible.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Coordinator</th>
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<tbody>
<tr>
<td>Bronx Chapter</td>
<td>Gee Eng</td>
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<td>Broome Chapter</td>
<td>Frank Roma</td>
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<td>Broome Chapter</td>
<td>Joseph McDonald</td>
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<td>Broome Chapter</td>
<td>Walter Bray</td>
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<td>Capital District Chapter</td>
<td>David Hansen</td>
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<td>Central NY Chapter</td>
<td>Peter Lautensack</td>
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<td>Champlain Valley Chapter</td>
<td>Jocelyn Bombard</td>
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<td>Champlain Valley Chapter</td>
<td>Terrie Breyette</td>
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<td>Chautauqua/Cattaraugus Chapter</td>
<td>Angela Colomaio</td>
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<td>Dutchess/Ulster Chapter</td>
<td>Daneil Barbuto</td>
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<td>Kings Chapter</td>
<td>Greg Scordato</td>
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<td>Long Island Chapter</td>
<td>Laura Pellizzi</td>
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<tr>
<td>Long Island Chapter</td>
<td>Trey Wehrum</td>
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<td>Manhattan Chapter</td>
<td>Eve Drucker</td>
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<td>Monroe NY Chapter</td>
<td>Tiphaine Ketch</td>
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<td>Oneida/Mohawk Chapter</td>
<td>Dave Perkins</td>
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<td>Robert LoPinto</td>
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<td>Rockland Chapter</td>
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<td>St. Lawrence/Franklin Chapter</td>
<td>Katie Fowler</td>
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<td>Steuben Chapter</td>
<td>Susan Prescott</td>
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<td>Tri-County Chapter</td>
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<td>Mark Ritter</td>
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<td>Westchester/Putnam Chapter</td>
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The Scoring Room

Scoring of the student papers takes place during the competition in a location remote from the competition room. A cadre of willing and well-trained volunteers is needed to make this happen behind the scenes so that we are able to keep the competition on schedule and have the results available for the countdown round.

Our thanks to our unseen and unsung 2017 Mathcounts scoring room team.

Susan DeSimone, PE
Paul Adel, PE
Sal Ervolina, PE
Kathy Ervolina
Jim Galarneau, PE
Anne Garrity, PE

And a special thanks to all the Professional Engineers, coaches and parents who help out with the scoring.
YOUR 2017 MATHCOUNTS

PLANNING TEAM

Laura Pellizzi, PE
NYS Mathcounts Coordinator

Don Aulenbach, PE
NYS Mathcounts Coordinator, Emeritus

Peter Krumdieck, PE

John Sucharski, PE

Jaclyn Peranteau, PE

Arlene Buonorno
Event Sponsors

Planning and putting on an event like the 2017 NYS Mathcounts competition takes time, effort and money. This competition has been made possible by the generous contributions of our sponsoring organizations. Members of The New York State Society of Professional Engineers provide much of the volunteer labor that goes into running this competition and coordinating the fundraising opportunities. Additional financial support is provided through a generous grant funded by Capital District E-week. Rensselaer Polytechnic Institute has been a long-time supporter of this event by hosting here on their campus. And the Foundation for Engineering Education provides the accounting services for the competition.

SPONSORING ORGANIZATIONS

NEW YORK SOCIETY OF PROFESSIONAL ENGINEERS

FOUNDATION FOR ENGINEERING EDUCATION

CAPITAL DISTRICT E-WEEK

RENSSELAER POLYTECHNIC INSTITUTE
The New York State Society of Professional Engineers (NYSSPE) represents the interests of professional engineers, totaling more than 25,000 licensees in New York State, practicing in all disciplines (civil, structural, mechanical, electrical, geotechnical, environmental, etc) and practicing in all practice settings (private sector consulting, industry, government, and education). NYSSPE members consist of engineering professionals, engineers in training and engineering students from all disciplines and employment sectors that advocates licensure, promotes the ethical, competent and lawful practice of engineering, and enhances the image and interests of its members and the engineering profession. The dues paid by members allows NYSSPE to protect the engineering license as well as the health, safety, and welfare of the citizens of New York State.

The NYSSPE promotes and defends the lawful and ethical practice of engineering. Our legislative program ensures that the laws in New York State provide the best possible working environment for licensed professional engineers (PEs). Our close attention to public relations maximizes the exposure of professional engineers to the general public. Overall, our goal is to protect and promote professional engineers in all disciplines and areas of practice.

**Mission**

The New York State Society of Professional Engineers is an organization of engineering professionals from all disciplines and employment sectors that advocates licensure, promotes the ethical, competent and lawful practice of engineering, and enhances the image and interests of its members and the engineering profession.

**NYSSPE Core Values**

Protection of the public
Licensure
Ethical conduct
Professionalism
Competency
Fulfillment of member needs
Service to the public
Enhanced image and well-being of the profession
Mathcounts National Sponsors

Founding & National Sponsor
The National Society of Professional Engineers (NSPE), in partnership with State Societies, is the organization of licensed Professional Engineers (PEs) and Engineering Interns/Engineers in Training (EIs/EITs). Through education, licensure advocacy, leadership training, multi-disciplinary networking, and outreach, NSPE enhances the image of its members and their ability to ethically and professionally practice engineering.

www.nspe.org

Founding Sponsor
The National Council of Teachers of Mathematics is the public voice of mathematics education, supporting teachers to ensure equitable mathematics learning of the highest quality for all students through vision, leadership, professional development, and research.

www.nctm.org

Founding & National Sponsor
The CNA Foundation is an Illinois-based nonprofit corporation that supports cultural, health and human service, and educational programs. It is funded in part by contributions from CNA Financial Corporation, one of the world's premier insurance organizations and one of the largest U.S. insurance groups.

www.cna.com

Test Your Math Skills Answers

Warm-Up 1

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www.cna.com
Mathcounts National Sponsors

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Bentley Systems Inc

Brookhill Institute of Mathematics

The National Council of Examiners for Engineering and Surveying

Pricewaterhouse Coopers LLP