

MAA

MATHEMATICAL ASSOCIATION OF AMERICA

40th Annual

American Mathematics Competitions

**United States of America
Mathematical Olympiad**

-and-

**United States of America
Junior Mathematical Olympiad**

TEACHERS' MANUAL

Instructions and Reporting Forms for School Contest Managers

dates to remember:

USAMO and USAJMO --

Wednesday, April 27, and Thursday, April 28, 2011

*In this booklet, "USA(J)MO" refers to both the USAMO
and the USA Junior Math Olympiad.*

Please familiarize yourself with this information thoroughly
if you anticipate a student qualifying for the USA(J)MO.

PLEASE NOTE: AIME TEACHERS' MANUAL ON FLIP SIDE

USA(J)MO



USA (JUNIOR) MATHEMATICAL OLYMPIAD (USA(J)MO)

SAMPLE

April 2011

Dear USA(J)MO Exam Manager,

Congratulations! Your student(s) has/have qualified to take the 40th USA(J)MO. All qualified students have been sent a formal invitation to participate. You and the student(s) indicated at the time of the AIME that you would accept a USA(J)MO invitation.

The exam materials will be downloaded from the web. The USA(J)MO must be administered on Wednesday, April 27 and Thursday April 28, 2011 in two 4.5-hour sessions each day, which are to be scheduled from 12:30pm-5:00pm EDT or equivalent in your time zone. Please familiarize yourself with the "Information for Proctor" section found on page 4 of the AIME/USA(J)MO Teachers Manual. If you are not going to be the Proctor yourself, then make sure your designee familiarizes himself/herself with these materials promptly.

There is an immediate task that must be done. Please confirm that all necessary arrangements to administer the exam have been made. Fill out the *USA(J)MO Acknowledgment Response Form* (T-II form found on page 7 of the USA(J)MO Section of the AIME/USA(J)MO Teachers Manual or downloaded from amc.maa.org) and fax to 303-374-6339 (Emergency FAX to be used only if the first number fails is 402-472-6087). In addition, your qualifying student(s) has/have been notified with instructions to completely fill out the Student/Parent Response Form (S-III), with instructions for them to fax or mail the completed S-III form to our office. The Student/Parent Response Form can be found at amc.maa.org or in the AIME/USA(J)MO Teacher Manual. All completed forms (T-II and S-III) sent by fax or mailed must be received in the Lincoln office by April 20. Failure to adhere to this deadline could cause disqualification of your student(s).

The USA(J)MO is a prestigious event. Only about 500 students from about 12,000 American Invitational Mathematics Examination participants take the USA(J)MO. The top 12 participants of the USAMO will be declared Winners and honored at ceremonies on June 6, 2011, at the National Academy of Sciences, and the Mathematical Association of America (MAA) Headquarters in Washington, DC.

A Mathematical Olympiad Summer Program (MOSP) will be held from June 7-July 1 at the University of Nebraska-Lincoln. Approximately 30 of the highest scoring USA(J)MO participants will be invited, along with approximately 25 ninth grade USA(J)MO participants, all expenses paid, to the 2011 program. Selection will be based on the exams administered by the Committee on the American Mathematics Competitions (CAMC), primarily the USA(J)MO. This year, the International Mathematical Olympiad (IMO), will be held July 16-24, 2011, in Amsterdam, Netherlands. The United States will participate with a team of 6 students. The six member IMO Team will be selected from the top 12 USA(J)MO qualifiers after further testing at MOSP.

USA(J)MO Winners and all those invited to the MOSP will be notified by telephone shortly after the USA(J)MO grading on May 6-8, 2011. Information regarding the MOSP will be sent to those selected beginning May 13. A copy of the USA(J)MO with solutions and results [including the score of your student(s)] will be mailed to you after Friday, May 13. Also included will be a USA(J)MO Certificate of Participation to be presented to your student(s). Students and teachers should not inquire about results before Friday, May 13.

A good way for students to prepare for the USA(J)MO and set appropriate goals for themselves is to work on previous USA(J)MO and IMO problems (order from www.maa.org) and former USA(J)MO questions posted online.

Please note that only the student(s) listed are allowed to take the USA(J)MO at your school and the exam must be given to all of your qualifiers at the same time.

You will find the names of all 2011 USA(J)MO qualifiers at www.maa.org.

Sincerely,

Steven R. Dunbar

Director

MAA American Mathematics Competitions

American Mathematics Competitions

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AIME I	March 17, 2011	
AIME II	March 30, 2011	
AIME II due to AMC office	April 1, 2011	
USA(J)MO invitations sent via email, followed by hard copy	April 8, 2011	
USA(J)MO forms due to AMC office	April 20, 2011	
USA(J)MO, day 1	April 27, 2011	12:30pm - 5:00pm EDT
USA(J)MO, day 2	April 28, 2011	12:30pm - 5:00pm EDT
USA(J)MO grading	May 6-8, 2011	
USA(J)MO copy with solutions and results posted	May 13, 2011	
USA(J)MO copy with solutions and results sent after	May 13, 2011	
MOSP invitations sent out beginning	May 13, 2011	
USAMO Washington, DC Ceremonies	June 6, 2011	
MOSP - Mathematical Olympiad Summer Program	June 7-July 1, 2011	University of Nebraska - Lincoln
IMO - International Mathematical Olympiad	July 16-24, 2011	Amsterdam, Netherlands

I. THE USA(J)MO – GENERAL INFORMATION

The 2011 USA Mathematical Olympiad (USA(J)MO) is to be given in your school, and is scheduled for Wednesday & Thursday, April 27-28, 2011.

U. S. citizens and students legally residing in the United States and Canada (with qualifying scores) are eligible to take the USA(J)MO.

The format for the USA(J)MO is identical to the format used for the International Mathematical Olympiad. The Olympiad will consist of six essay-proof questions to be solved over two days in nine hours, three questions for 4.5 hours on Wednesday, and three questions for 4.5 hours on Thursday.

The top 12 scoring students on the USAMO will be invited to an award ceremony held in Washington, D.C., June 6, 2011, The USA International Mathematical Olympiad (IMO) Team will be chosen at the Mathematical Olympiad Summer Program (MOSP, June 7-July 1, 2011) after further testing.

We recommend that students selected for the USA(J)MO practice on prior year examinations (several recent years are posted on the AMC web site amc.maa.org/e-exams/e8-USAMO/archiveUSAMO.shtml) and study the content of the USAMO books (order from the MAA website www.maa.org/EBUSPPRO/ and search on USAMO).

The selection of the USA(J)MO participants will be made on or before April 8th. All selected students and their School Manager will receive e-mail information followed by a letter of invitation, to be mailed out no later than April 8th. Please do not inquire about the USA(J)MO invitations with anyone except the AMC Director.

The USA(J)MO must be taken on the official days under the supervision of a proctor--absolutely no exceptions. It is possible, however, for a student to take the test under the supervision of a teacher at a site other than the student's school for valid reasons. The student's teacher must call the AMC national office for permission.

II. SELECTION PROCESS

In 2011 we will have slightly revised qualification rules for the USA Mathematical Olympiad and USA Junior Mathematical Olympiad. The goal is to select approximately 500 students total for the two Olympiads, split approximately 270 for the USAMO and 230 for the USAJMO respectively. Selection for the 2011 USA Mathematical Olympiad (USAMO) and 2011 USA Junior Mathematical Olympiad (USAJMO) will be made according to the following rules:

1. U.S. citizens and students residing in the United States and Canada (with qualifying scores) are eligible to take the USAMO and USAJMO.

2. Selection to the USAMO will be based on the USAMO index which is defined as $\text{AMC 12 Score} + 10 * \text{AIME Score}$. Selection to the USAJMO will be based on the USAJMO index which is defined as $\text{AMC 10 Score} + 10 * \text{AIME Score}$.

3. Only AMC 12 A or AMC 12 B takers who are U.S. citizens and students residing in the United States and Canada will be eligible for the USAMO.

4. Only AMC 10 A or AMC 10 B takers who are U.S. citizens and students residing in the United States and Canada will be eligible for the USAJMO. This automatically limits Junior Math Olympiad participation to 10th graders and below. Students who take ONLY the AMC 10 test, whether AMC 10 A or AMC 10 B or both, will NOT be eligible for the USAMO regardless of their score on the AMC 10 or the AIME.

5. The approximately 260-270 individual students with the top AMC 12 based USAMO indices will be invited to take the USAMO. These indices will be selected from the pool of AMC 12 takers with an AIME score.

6. The approximately 230-240 individual students with the top AMC 10 based USAMO indices will be invited to take the USAJMO. These indices will be selected from the pool of AMC 10 takers with an AIME score after removing students who also took an AMC 12 test and qualified for the USAMO in rule 5. This means young students MUST take the USAMO if they qualify through an AMC 12 index.

7. We will select the student with the numerically largest index, whether AMC 10 based USAJMO index or AMC 12 based USAMO index, from each US state not already represented in either the USAMO or the USAJMO. The student will be invited to the USAMO if the numerically highest index in the state is AMC 12 based, and invited to the USAJMO if the index is AMC 10 based.

III. PRELIMINARY INFORMATION FOR THE PROCTOR

The USA(J)MO Committee has a very tight schedule. We grade the papers on May 6-8, posting results on May 13, 2011. Your help is vital.

The USA(J)MO is to be given on Wednesday, April 27 and Thursday, April 28, 2011, in two 4.5-hour sessions. The first session (Problems 1, 2, 3) is scheduled for Wednesday, April 27th and will begin at 12:30pm EDT and end at 5:00pm EDT or equivalent in your time zone. The second session (Problems 4, 5, 6) is scheduled for Thursday, April 28th and will begin at 12:30pm EDT and end at 5:00pm EDT or equivalent in your time zone. The 9-hour time limit is to be strictly enforced. Students should come prepared with a sack lunch and/or snacks due to no lunch break during the exam (Exceptions will be made for restroom breaks). Be sure that in the room you reserve for the

exam, the student(s) will have ample working space and freedom from interruptions. The student(s) must be under supervision during the entire course of the exam and only one student at a time may leave for restroom breaks. If you have more than one student who qualified, be certain there is adequate space between them.

Because the answer sheets are faxed, be sure you will have access to a fax machine when the student has finished on both days. If necessary, arrange to have someone experienced with running the machine give you a lesson in how to use it before the first day of the USA(J)MO.

You will find the following materials included in your AIME/USA(J)MO Teachers Manual or on our website at amc.maa.org:

1. T-II – 2011 USA(J)MO ACKNOWLEDGEMENT RESPONSE FORM (page 7)

Comment: This Form and the S-III – Student/Parent Response Form (page 15) must be returned to the AMC Office so that it is received by April 20. We suggest Faxing 303-374-6339 if at all possible (Emergency Fax # 402-472-6087). All information requested on these forms must be provided by you, the student and his/her parents. Missing or incorrect information could cause disqualification of your student(s).

2. Copy (for your information) of the "S-I – Letter to USA(J)MO Qualifier" (page 13), "S-II – Instructions to be Read by USA(J)MO Participants" (page 14) and "S-III Student/Parent Response Form" (page 15).

3. Follow these instructions to download the 2011 USA(J)MO from the internet:

- a. Visit our website. We will have a trial page in place one week before the test date, so you can check your ability to download the exam.

- b. Go to our web page at amc.maa.org

- c. On our home page under the heading, "What's New." There will be a link to the Questions page.

4. Enter the password to access the test page. You will receive the password in your invitation email or letter.

5. T-III (27) + T-III (28)– USA(J)MO Certification Forms (pages 9 & 11) . There are two forms, one to be used each day of the Contest.

6. USA(J)MO Answer Sheets Forms (to be copied, 1 set for each student) (in section X, starting on page 17, but un-numbered).

IV. STUDENT PRACTICE MATERIALS

Students who are selected to participate in the USA Mathematical Olympiad usually want to study from materials similar in difficulty to the USA(J)MO. For learning and practice, many fine books are available from the MAA at www.maa.org, click "Bookstore," or, from your favorite on-line book retailer. I urge you to order a set for practice and review. You may also purchase our new CD with all the AIME (1983-2008) and USAMO (1972-2008) contests and solutions, or the High School Math

Club package which comes with a CD containing the last 8 years of all the contests and solutions, including the USAMOs from that period.

In addition, the last several years' USAMO problems are available on-line at our website:

amc.maa.org/e-exams/e8-USAMO/archiveUSAMO.shtml

and

amc.maa.org/a-activities/a7-problems/problemUSAMO-IMOarchive.shtml

V. INFORMATION FOR THE 2 DAYS OF THE USA(J)MO

Please note this year's USA(J)MO 2 day format: April 27-28, 2011 and the 4.5 hour length both days, given at the following times:

12:30-5:00pm, EDT

11:30-4:00pm, CDT

10:30-3:00pm, MDT

9:30-2:00pm, PDT

Please call the AMC office (800-527-3690) if you do not fall within these time zones.

The USA(J)MO will be posted on the web 15 minutes prior to the start time. Please tell students to stay within the borders when writing their solutions and to write **DARKLY** and **LEGIBLY** so the faxed copy can be clearly read. If requested, you may let the participant have unmarked scratch paper. If, for any reason, the student submits scratch paper instead of, or in addition to, an answer form, the Problem Number and the Student Number, but NOT the student's name or school, must be on each page submitted. All papers must be anonymous at the time of the grading. You are not permitted to answer any questions about the test and should ensure that no participant has the opportunity to talk to any other student while the exam is in progress. No notes, books, headphones, cell phones, ipods, slide rules, mathematical tables, computers, calculators or calculator watches are allowed during the exam. The only instruments permitted are writing and drawing instruments (ruler, compass, protractor, graph paper, carbon paper). Students learning English as a second language, who are taking the USA(J)MO for the first time, are permitted to use a non-technical translation dictionary during the exam. However, you must examine and keep the dictionary in your possession for the 24 hours preceding the USA(J)MO, and you must announce to any other participants that the student has been given special permission to use the dictionary. Please list the name(s) of any student planning to use a non-technical translation dictionary on page T-II.

The USA(J)MO is copyrighted.

Instruct the participant to cease writing at the end of each exam session. Session 1 ends at 5:00pm EDT (or equivalent in your time zone) on April 27, 2011 and session 2 ends at 5:00pm EDT (or equivalent in your time zone) on April 28, 2011. At the end of each session:

- instruct your students to double-check that the student number on their answer forms matches the number assigned in the official invitation letter.
- make copies of the answer forms for your records,
- immediately fax (303-374-6339) the T-III certification form for the appropriate day to the AMC office, or scan and email to amcinfo@maa.org.
- If you are not using the overnight express shipping option, then also fax one complete set of answer forms per student. Please fax at least one official USA(J)MO answer sheet with student number for each problem, even if the answer sheet is blank because the student did not attempt a solution. This assures that we have received all problems from all students.

This year we are offering the option of sending the students answer pages by overnight express courier, at your schools expense for both days of the USA(J)MO, instead of faxing. This may be more convenient for you, if you have more than one student taking the exam. If you wish to use this method, there will be 2 versions:

1. Fax Day 1 answer pages (April 27), and then when the student has completed the Day 2 exam (on April 28), send one overnight package, which would hold both Day 1 and Day 2 student answer pages, or
2. Overnight the student answer pages after the completion of each exam (April 27-28), for a total of two overnight packages.

American Mathematics Competitions
University of Nebraska - Lincoln
1740 Vine Street
Lincoln, NE 68508-0658

If you have any questions concerning this exam, contact us:

AMC Office
1-800-527-3690
FAX 303-374-6339
(Emergency FAX # 402-472-6087)

VI. CANCELLATION

If for some reason the student or school cancels participation, call us immediately (800-527-3690).

VII. MATH OLYMPIAD WINNERS

The top 12 scoring students on the USAMO will be invited to attend an award ceremony held in Washington, D.C. June 6, 2011. Activities include a reception at the Mathematical Association of America Headquarters, a tour, a reception at the National Academy of Sciences, and a celebration dinner with

the mathematical sciences community at the U.S. Department of State Building.

VIII. MATHEMATICAL OLYMPIAD SUMMER PROGRAM

The top 12 scoring students on the USAMO will be invited to attend the Mathematical Olympiad Summer Program regardless of grade. In addition to the top 12 USAMO winners, 12-18 high-scoring USAMO participants, who are current juniors and below, will also be invited to participate in the Mathematical Olympiad Summer Program (MOSP).

Thanks to a grant from the Akamai Foundation, we will invite an additional (approximately) 25 ninth and tenth grade USAMO participants and the top 12 ninth and tenth grade USAJMO participants for a MOSP program aimed at preparing them for Olympiad style competitions.

The Mathematical Olympiad Summer Program will be held on the campus of the University of Nebraska - Lincoln June 7-July 1, 2011. Students will be treated to classes on advanced mathematical topics, special guest speakers, mathematical contest training, and related social and mathematical activities.

During the first week of MOSP a final "IMO" type exam will be given to the top 12 USA(J)MO students with the goal of identifying the USA IMO team. This exam will replicate an actual IMO and will consist of 6 problems to be solved over two 4 1/2 hour sessions. The 12 equally weighted problems (6 on USA(J)MO and 6 on this exam) will determine the tentative USA Team.

In order to assure that the strongest possible team has been formed, the MOSP Director/IMO Team Leader reserves the right to appoint up to one IMO team member. This appointment would happen only in a circumstance where a student's performance during the first two weeks of MOSP clearly surpasses that of an existing team member.

IX. THE INTERNATIONAL MATHEMATICAL OLYMPIAD

Each year (Amsterdam, Netherlands in 2011, Argentina in 2012) the USA sends a team of six students to the International Mathematical Olympiad (IMO). Six of the top students on the 2011 USAMO will constitute the USA's team, and two will be the alternates.

X. USA(J)MO TEACHER & STUDENT FORMS

T-II - 2011 USA(J)MO ACKNOWLEDGEMENT RESPONSE FORM

To be completed by the USA(J)MO Exam Manager

This form must be completed by the USA(J)MO exam manager and returned to the AMC Office either by FAX 303-374-6339 (Emergency FAX 402-472-6087) or mail. Confirmation (either by fax or postal mail) must be received **on or before April 20, 2011.**

.....

This is to inform you that I have received official notification of the qualified student(s) and will strictly follow the implementation instructions.

Signature: _____

Date: _____

Name (print): _____

Email: _____

Name of School: _____

CEEB: _____

School Address: _____

_____ Zip _____

School Phone: (____) _____

School Fax: (if available) (____) _____

Emergency/after business hours number (____) _____

I have received and carefully noted the password in the invitation letter. This enables me to access the USA(J)MO on the day of the contest. (If you have questions, call the AMC office.)

Please print the name(s) and USA(J)MO number(s) of your student(s) participating in the 2011 USA(J)MO below:

USAMO

USAJMO

Name	Number
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Name	Number
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

T-II

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MAA American Mathematics Competitions USA Mathematical Olympiad

T-III (27) - CERTIFICATION FORM FOR APRIL 27, 2011

1.	_____
2.	_____
3.	_____

Please fill out one form for each student you have participating in the USA(J)MO and indicate the number of pages faxed for each problem:

Please print the name and USA(J)MO Number of your student participating in the 2011 USA(J)MO below:

Name USA(J)MO number

This form must be completed and returned by fax (303-374-6339) to the AMC Office immediately following the administration of the USA(J)MO. Both the USA(J)MO School Exam Manager and the school Principal or Vice Principal must sign this form. The Principal or Vice Principal must sign at the time he or she observes the downloading of the exam. The Exam Manager must wait until all aspects of the exam process of the school have been completed.

For the Principal or Vice Principal:

I Certify that

- a) I witnessed the downloading of the test at the start of the examination;
- b) I further attest that I observed that the exam was given only to qualified students;
- c) I accept that failure to follow these rules and procedures could result in DISQUALIFICATION from official standing of all scores from our school

Signature _____ Time _____

Title _____ Date _____
(must be comparable to Principal or Vice Principal)

For the USA(J)MO School Exam Manager:

I certify that I administered the USA(J)MO on Wednesday, April 27, 2011 from 12:30pm-5:00pm EDT or equivalent in my time zone. The 4.5-hour time limit was strictly enforced. The student(s) was/were continually supervised. All other rules for administering the USA(J)MO, as detailed in the Information for Proctor, were followed.

I understand and accept for our school that any exception to these procedures as outlined on the USA(J)MO Exam Manager Letter and the Information for Proctors section, unless explicitly authorized in writing in advance, may be cause for disqualification, possibly extending beyond the current year.

Signature of USA(J)MO Exam Manager _____

Day and Date of Signature _____

Your telephone # at School (_____) _____ Emergency/after hours # (_____) _____

Email _____

Name of School _____ CEEB # _____

School Address _____

School City, State _____ Zip _____

Day and Date USA(J)MO was administered _____

Start Time _____ End Time _____

1) TOTAL number of pages faxed or mailed including the Certification Form as the cover page _____

2) I will overnight all of my student answer forms including this certification form YES NO

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MAA American Mathematics Competitions USA Mathematical Olympiad

T-III (28) - CERTIFICATION FORM FOR APRIL 28, 2011

4.	_____
5.	_____
6.	_____

Please fill out one form for each student you have participating in the USA(J)MO and indicate the number of pages faxed for each problem:

Please print the name and USA(J)MO Number of your student participating in the 2011 USA(J)MO below:

Name USA(J)MO number

This form must be completed and returned by fax (303-374-6339) to the AMC Office immediately following the administration of the USA(J)MO. Both the USA(J)MO School Exam Manager and the school Principal or Vice Principal must sign this form. The Principal or Vice Principal must sign at the time he or she observes the downloading of the exam. The Exam Manager must wait until all aspects of the exam process of the school have been completed.

For the Principal or Vice Principal:

I Certify that

- a) I witnessed the downloading of the test at the start of the examination;
- b) I further attest that I observed that the exam was given only to qualified students;
- c) I accept that failure to follow these rules and procedures could result in DISQUALIFICATION from official standing of all scores from our school

Signature _____ Time _____

Title _____ Date _____
(must be comparable to Principal or Vice Principal)

For the USA(J)MO School Exam Manager:

I certify that I administered the USA(J)MO on Thursday, April 28, 2011 from 12:30pm-5:00pm EDT or equivalent in my time zone. The 4.5-hour time limit was strictly enforced. The student(s) was/were continually supervised. All other rules for administering the USA(J)MO, as detailed in the Information for Proctor, were followed.

I understand and accept for our school that any exception to these procedures as outlined on the *USA(J)MO Exam Manager Letter* and the *Information for Proctors* section, unless explicitly authorized in writing in advance, may be cause for disqualification, possibly extending beyond the current year.

Signature of USA(J)MO Exam Manager _____

Day and Date of Signature _____

Your telephone # at School (_____) _____ Emergency/after hours # (_____) _____

Email _____

Name of School _____ CEEB # _____

School Address _____

School City, State _____ Zip _____

Day and Date USA(J)MO was administered _____

Start Time _____ End Time _____

1) TOTAL number of pages faxed or mailed including the Certification Form as the cover page _____

2) I will overnight all of my student answer forms including this certification form YES NO

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American Mathematics Competitions

S-I – LETTER TO USA(J)MO QUALIFIER

SAMPLE

April 2011

Dear USA(J)MO Qualifier,

Congratulations! Because of your excellent performance on the 2011 AMC 10/12 and AIME, you have qualified to take the 40th USA Mathematical Olympiad (USA(J)MO). Your teacher will be notified shortly of your AIME score and the final cutoff levels for a USA(J)MO invitation. Since both you and your school indicated at the time of the AIME that you would accept a USA(J)MO invitation, the exam will be posted on the Internet to be downloaded each day of the exam. A trial question will be posted one week before the USA(J)MO for teachers & students to practice obtaining & downloading. Please notify your USA(J)MO Exam Manager (math teacher or mathematics department chair) that you have received this letter and immediately complete the Form S-III (along with your parent or guardian) from the AIME/USA(J)MO Teachers Manual or downloaded from our website at amc.maa.org. The completed S-III Form must be FAXED to 303-374-6339 (Emergency FAX # to be used only if the first number fails is 402-472-6087) or mailed so that it is received by us on or before April 20.

The USA(J)MO will be given on Wednesday, April 27 and Thursday, April 28, 2011, in two 4.5-hour sessions each day, which are to be scheduled from 12:30pm-5:00pm EDT or equivalent in your time zone. Enclosed is an instruction sheet (Form S-II), which you should look over now and shortly before taking the exam. The USA(J)MO is a prestigious event. Only about 500 students from about 12,000 American Invitational Mathematics Examination participants are invited to take the USA(J)MO. The top 12 USAMO participants will be declared Winners and honored at ceremonies on June 6, 2011, at the National Academy of Sciences, the National Science Foundation and the Mathematical Association of America (MAA) Headquarters in Washington, DC.

A Mathematical Olympiad Summer Program (MOSP) will be held from June 7-July 1, 2011 at the University of Nebraska-Lincoln. Approximately 30 of the highest scoring USAMO participants will be invited, along with an additional (approximately) 25 ninth and tenth grade USA(J)MO participants, all expenses paid, to the 2011 program. Selection will be based on the exams administered by the committee on the American Mathematics Competitions (CAMC), primarily the USA(J)MO. This year, the International Mathematical Olympiad (IMO), will be held July 16-24, 2011, in Amsterdam, Netherlands. The United States will participate with a team of 6 students, all expenses paid. The six member IMO Team will be selected from the top 12 USAMO qualifiers after further testing at MOSP.

USA(J)MO Winners, and all those invited to the MOSP will be notified by telephone shortly after the USA(J)MO grading on May 6-8, 2011. Information regarding the MOSP will be sent to those selected beginning on Friday, May 13. A copy of the USA(J)MO with solutions and results (including your score) will be mailed to your USA(J)MO Exam Manager beginning on May 13. Also included will be a USA(J)MO Certificate of Participation to be presented to you.

Keep in mind that it is an achievement of the highest order merely to have qualified for the USA(J)MO. You should not be discouraged if you find problems on the USA(J)MO to be extremely challenging. A good way to prepare for the USA(J)MO and set appropriate goals for yourself is to work on previous USA(J)MO and IMO problems and to study the content of the Arbelos Journals. Please use the Publication Order Form (from our website amc.maa.org) if you wish to order the AIME/USA(J)MO CD which includes pdfs of all the AIME (1983-2008) and USA(J)MO (1972-2008) questions and solutions.

I look forward to your participation in the USA(J)MO.

Sincerely,

Steven R. Dunbar

Director

MAA American Mathematics Competitions

American Mathematics Competitions

University of Nebraska - Lincoln | PO Box 880658 | 1740 Vine Street | Lincoln, NE 68588-0658
402.472.2257/phone | 402.472.6087/fax | amcinfo@maa.org | amc.maa.org

MAA American Mathematics Competitions USA Mathematical Olympiad

S-II – INSTRUCTIONS TO BE READ BY USA(J)MO PARTICIPANTS

1. The space in the upper right-hand corner of your answer sheets is for your **Student Number**. You and your USA(J)MO proctor will be informed by mail of your assigned student number. The number at the top center is the **Problem Number**. Do NOT write your name or school anywhere on the answer sheets; all your papers must be anonymous at the time of the grading. Write only your Student Number and Problem Number (in a similar location) on any additional papers you hand in.
2. There are six equally weighted problems, for which you will be allowed a total of **nine hours**. **You will be allowed 4.5 hours on Wednesday, April 27, 2011 (12:30pm -5:00pm EDT or equivalent in your time zone) for Problems 1, 2 and 3, and 4.5 hours on Thursday, April 28, 2011 (12:30pm-5:00pm EDT or equivalent in your time zone) for Problems 4, 5 and 6.** Each problem should be started on the corresponding numbered answer sheet. You may write on only the front of the sheet. During each session, carefully look over all the problems. Then work on those which you can work well or start well. Concurrently, be aware of the total time you allocate to each problem.
3. You will be scored on your method of attack, clarity of reasoning, evidence of ingenuity, inventiveness, and general insight. In order to obtain full credit, all the claims in your solution must be PROVED. When in doubt, you should include details rather than leave them out. Examination of special cases or generalizations may lead to fruitful ideas on how to begin a problem, and partial credit may be given for constructive progress toward a solution. An unusually elegant proof or a carefully stated non-trivial extension with proof may play a role in breaking an eventual tie.
4. Your papers should be CLEAR, CONCISE, COMPLETE, and written **DARKLY**, keeping in mind it is a faxed copy being graded, not the original! This includes MATHEMATICAL CLARITY, GOOD ENGLISH and LEGIBILITY. Points will be deducted for inadequate or poorly written explanations, as well as for incorrect mathematics. Therefore, use scratch paper freely before writing the solutions you submit, and submit ONLY the final work you wish to have graded. Solutions written in languages other than English will not be graded. Please leave a 1" margin on all sides of the Answer Sheet and on any additional pages and write **DARKLY** and LEGIBLY, so your faxed copy can be easily read. A #2 lead pencil, black ink pen or marker fax best.
5. **NO** notes, headphones, cell phones, ipods, books, slide rules, mathematical tables, calculators or calculator watches are allowed during the exam. The only instruments permitted are writing and drawing instruments (ruler, compass, protractor, graph paper, carbon paper). Students learning English as a second-language, who are taking the USA(J)MO for the first time are permitted to use a non-technical translation dictionary during the exam. However, the proctor must examine and keep the dictionary in his or her possession for the 24 hours preceding the USA(J)MO. Your solutions must be faxed to 303-374-6339 immediately at 5:00pm EDT or equivalent in your time zone each day.
6. The USA(J)MO will be administered in two sessions. Students should come prepared with a sack lunch and/or snacks because there is no lunch break during the exam (exceptions will be made for restroom breaks). Your proctor is required to be present during the entire course of the exam for your papers to be valid, but is not permitted to answer any questions about the test. You are not allowed to talk to any other student while the exam is in progress. If you feel that a problem is not stated clearly, note this on your answer sheet and try to make a non-trivial restatement of the problem. Then try to solve the restated problem.
7. You will start the exam when your proctor gives the signal. When the proctor announces **after each session** that 4.5 hours are up, **immediately cease writing**. Double-check that your Student Number on your answer sheets matches with the one assigned by mail. Next, **immediately hand all Answer Sheets to the USA(J)MO Proctor (even if some sheets are blank) to be faxed to the AMC office.**
8. You may keep the problem sheets. Additional copies, a set of solutions, and the results (including your score interval) will be mailed to your Exam Manager after Friday, May 13, 2011.
9. The USA(J)MO is graded more strictly than most school examinations, so it is typical for students to overestimate the scores they will receive. The decisions of the graders are final and may not be appealed.

S-III - STUDENT/PARENT RESPONSE FORM

This Form must be completed by each USA(J)MO student and his or her parent/guardian and returned by FAX 303-374-6339 (Emergency FAX 402-472-6087) or mailed to the AMC Office so that it is received on or before April 20th.

Complete all items carefully.

Section A- USA(J)MO Participant High School Certification

I certify that my last month as a regular high school student, either due to graduation or to early enrollment in a college degree program, will be no sooner than _____(Month and year).

CITIZENSHIP Status: USA Citizen_____ Legal Resident of USA_____or Canada_____

Students who are not citizens of the USA are eligible to participate in the USA(J)MO if they are attending school in the USA or Canada.

Print Clearly

Date of Birth_____ Place of Birth_____

Signed_____ Date:_____
USA(J)MO Participant

Verified by:_____ Date:_____
Parent/Guardian

Mother's full name(s):_____

Father's full name(s):_____

Parent email address(es):_____

Complete Mailing Address: _____

Home phone #: (_____)_____

Section B
USA(J)MO/IMO PARTICIPATING STUDENT (American Citizen or Legal Resident)

I have read the "Instructions to Participate-Form S-II" and my teacher has made arrangements for me to take the USA(J)MO on Wednesday, April 27, 2011 and Thursday, April 28, 2011.

#1 Circle one: If invited, I (am or am not) willing to attend the 2011 Mathematical Olympiad Summer Program (June 7-July 1), provided I am eligible according to the selection rules. Students graduating in the current year are not eligible for MOSP unless they are a USAMO winner.

#2 Circle one: I (am or am not) able to present proof of United States citizenship or Permanent Residency.

#3 Circle one: If invited, I (am or am not) willing to serve as a USA Team Member at the IMO, July 16-24, 2011, in Amsterdam, Netherlands.

Signature:_____ Date:_____

Home phone(____)_____ Email:_____

Full Name (please print, including initial):

May/June Mailing Address _____

_____ Zip _____

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PROBLEM 1

2011 Olympiads

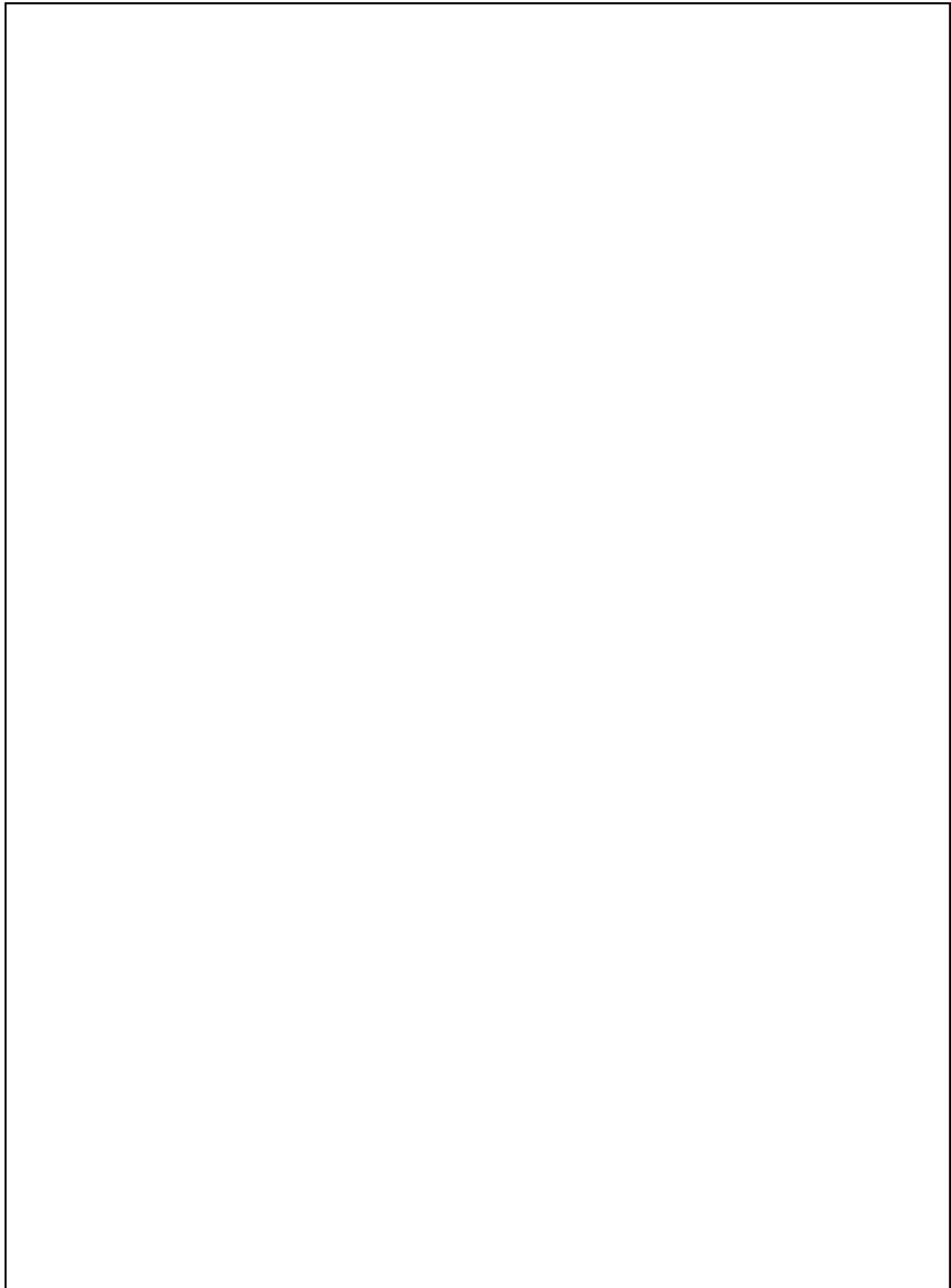
Student #

1. Stay within the borders when writing your solution.
2. Write **DARKLY** and **LEGIBLY** so your faxed copy can be clearly read; points will be taken off if graders can't read your work!

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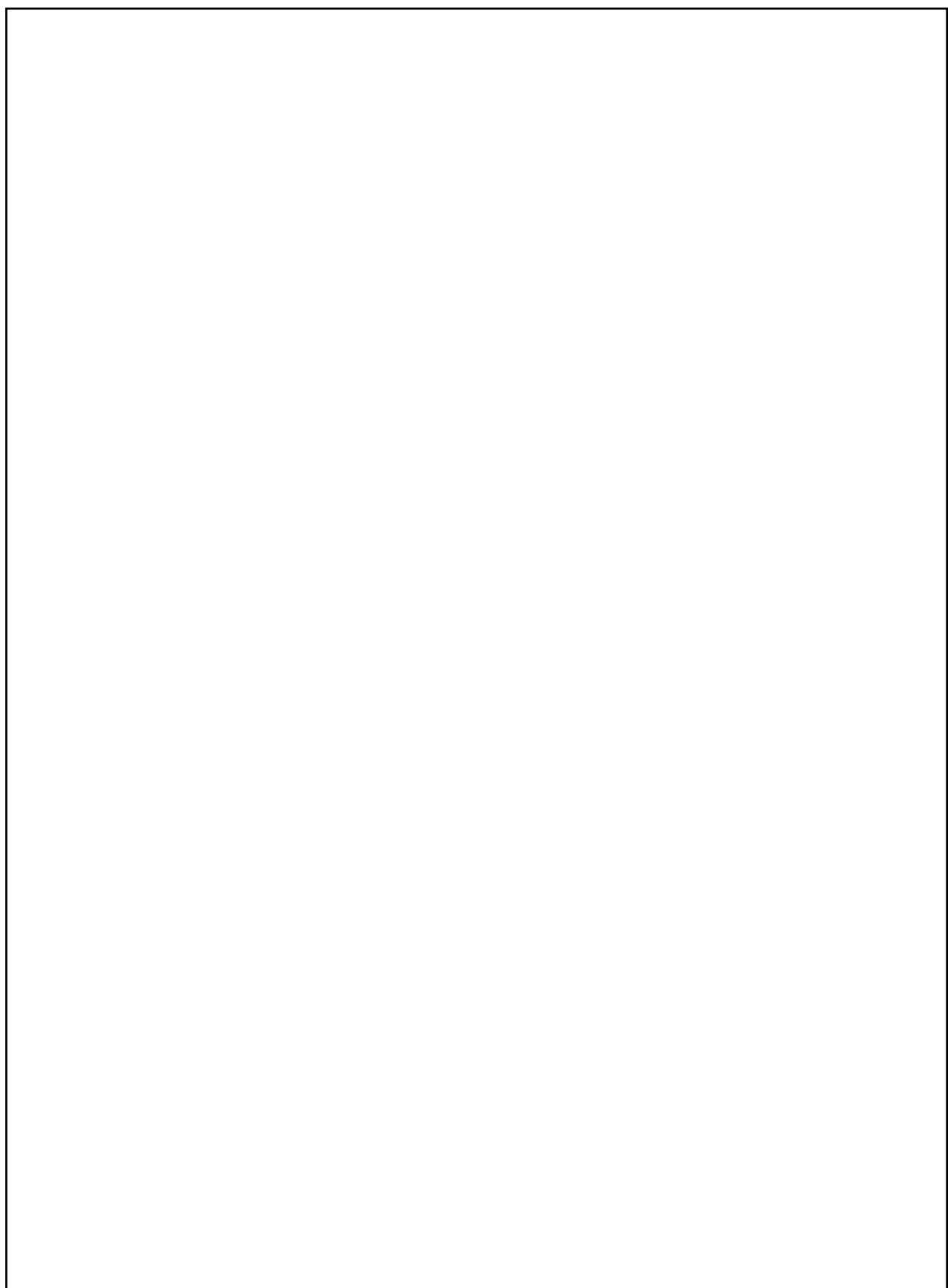
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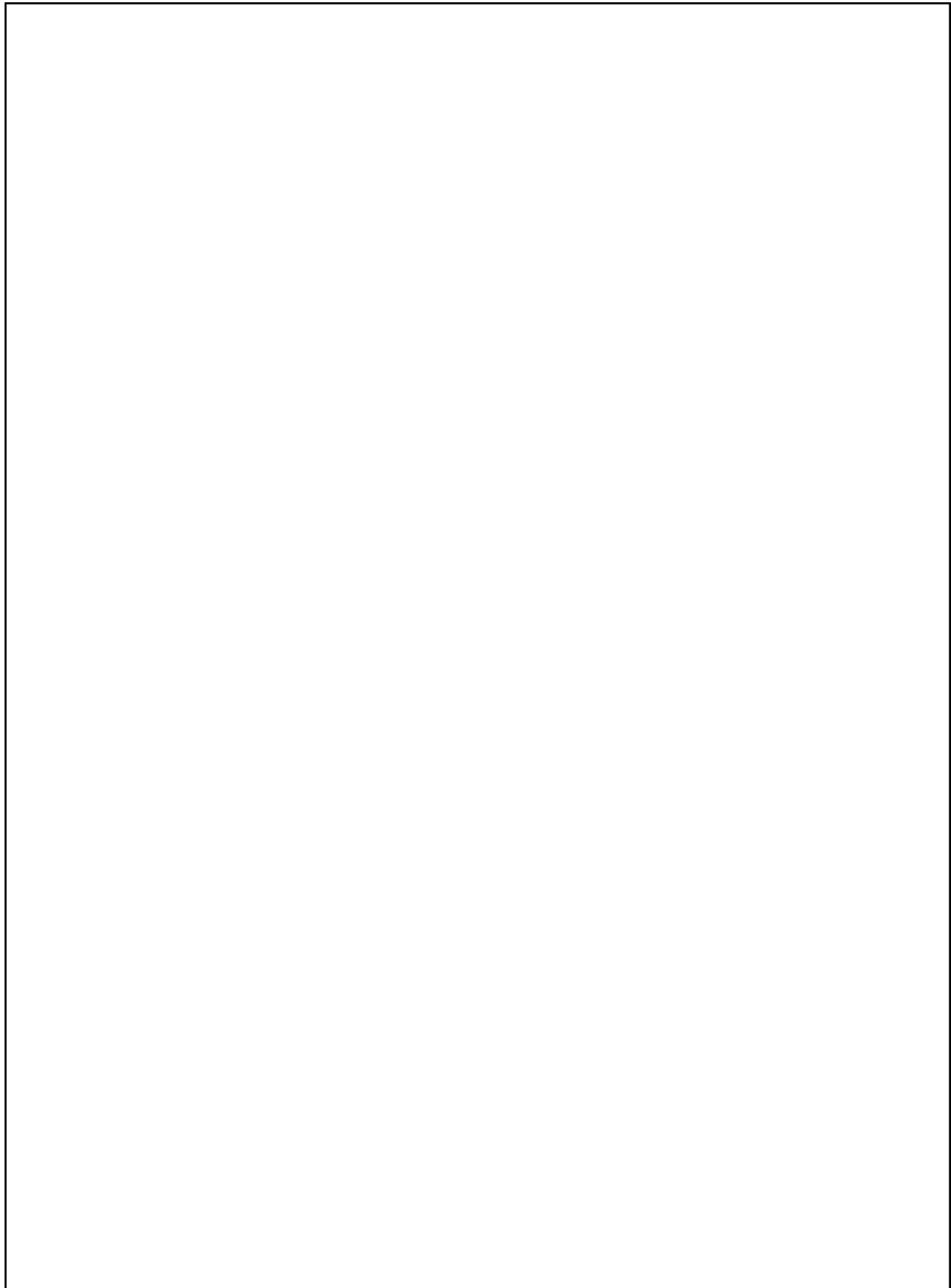
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