

American Regions Math League Power Contest

Dear Coach:

Welcome to **Round 2** of the **2016 – 2017 ARML Power Contest**. The topic for this contest is a variation of the idea of factorials, which leads to a nifty way to sum certain series. Because the fall contest was a little too easy for some of the bigger, more experienced teams, there is quite a bit of meat in this spring contest to help separate the teams at the top. There are plenty of entry problems for the smaller teams as well, of course.

As always, at the ARML competition in June we will be awarding plaques to the top teams, through the generous sponsorship of the Society of Actuaries. But we know that your students are in it for the fun and challenge of solving interesting problems, so let's get to it!

This page should be the first in a five-page document consisting of the items below:

1. This letter.
2. Rules and Directions page.
3. Grading sheet.
4. Answer sheet.
5. Comment sheet.

The contest itself is in a separate file on the contest website. All materials are available online for download from your school's registration page in the online system, at www.armlpower.com/update.php

In advance of administering the contest please make enough copies of the contest questions for your students, as well as a supply of answer sheets for them to use (about 20). The contest should be given between **February 25 through March 12**. Some teams have already contacted me regarding being slightly early or slightly late; if you need to make special arrangements please let me know as soon as possible.

At the conclusion of the contest, staple together the team solutions. **Please validate the grading sheet with your signature.** Return the grading sheet, comment sheet, and student solutions to me as quickly as possible. This wound will take extra time to grade, so the faster I have the papers the sooner I can get to work on them.

The solutions to Round 2 will be posted to the ARML power web site at the conclusion of the contest window. Graded papers will be returned via regular mail when grading is complete.

Warmest regards,
Micah Fogel

ARML Power Contest
c/o Micah Fogel
1500 Sullivan Road
Aurora, IL 60506-1000

e-mail: fogel@imsa.edu
phone: +1-630-907-5086

web: <http://www.armlpower.com>

2016 – 2017 ARML Power Contest

Round 2

Rules and Directions

To be read to the students prior to the start of the contest:

This is the first round of the 2016 – 2017 ARML Power Contest and should take place between Saturday, February 25 and Sunday, March 12.

You will have **45 minutes** to complete this set of problems. During this time you are encouraged to work together, communicating and sharing ideas. It is important that everyone understands the problem before splitting up into smaller groups.

Language translators may be used on this contest, but no other electronic devices are allowed. This includes, but is not limited to, calculators, computers, tablets, and smartphones.

The topic of the second contest this year is falling factorials, difference operations, and series summation. The techniques follow a different approach to studying series than you may have seen before, and leads to some results much more easily than the normal approach.

Please pay careful attention to the directions in each contest question, as that may save you quite a bit of writing! Especially note the warning at the top of the front page of the contest. Taking short cuts will not be rewarded! Remember that this is a contest of mathematical writing, and many problems require mathematical justification or proof. Be clear and concise. Many of the problems rely on each other, though most can be solved independently, assuming the result of an earlier problem. You may refer to an earlier problem in your work—even if you didn't solve that problem—but you may not refer to a later problem.

Use dark pencil or ink and **please be legible**. Write on **only one side** of an answer sheet. You may submit several answers on the same answer sheet, but be sure to submit only one solution for each problem!

At the conclusion of the contest, submit your solutions **in order** to your coach. You are encouraged to include any comments or concerns about the problem on the comment sheet. The contest has a total of 40 points possible. You will be given a copy of the scoring sheet; the point value of each problem is also listed in the left margin on the contest sheets.

Contests will be mailed in, and scores will be posted as soon as possible. The solutions will also be posted. The ARML Power Contest website is: www.armlpower.com

Good luck!!

Enjoy!!

(Proctors: please hand out all contest materials and begin the 45-minute contest period.)

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Round 2
Grading Sheet

Team Name: _____

(The number appearing in braces is the point total for that problem.)

1. ____ [4]

10. ____ [1]

2. ____ [4]

11. ____ [2]

3. ____ [2]

12. ____ [2]

4. ____ [2]

13. ____ [2]

5. ____ [2]

14. ____ [2]

6. ____ [2]

15. ____ [1]

7. ____ [1]

16. ____ [2]

8. ____ [6]

17. ____ [3]

9. ____ [2]

Total Score: _____ (out of 40)

We have complied by the rules of this contest

(coach's signature)

(date)

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Round 2
Answer Sheet

Page ____ of ____ . Problems(s) _____

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Round 2
Comment Sheet