Odle Mathcounts 22-23 Closing Remarks

Owen Zhang

December 2022

§1 Remarks

We hope you enjoyed this iteration of the annual Odle Mathcounts, used to select the 10 students that will compete at the Chapter competition. Regardless of how well you did, we want to congratulate you for braving through 38 difficult problems that would challenge most adults, under intense time pressure. Before we proceed, I want to emphasize once again that this exam was **extremely difficult.**

Even if you only solved a few problems, you should be proud of yourself. I had two main goals in mind while creating the test:

- Ensure that the test is a fair way of selecting the 10 individuals for chapter. This means creating a test that is difficult enough to prevent an unreasonable number of high scores and thus the necessity to resort to nonsensical tiebreak methods.
- Ensure that regardless of each individual student's goals, whether to qualify for Chapter or to just have fun, every student left the room that day feeling proud of at least one problem they solved and feeling at least slightly more enamored with math.

We know that many of you may feel discouraged due to the difficulty of the test; this means that we have much to work on in terms of the second goal above. This was my first year directing the test, and we are learning with you every step of the way.

Finally, this should not feel like the end of the road for anyone. Whether it be trying again next year to represent Odle at Chapter or moving on to more important *chapters* of your life, we wish you the best in all your future endeavors, and thank you for participating in the test; the results, statistics, and feedback alone help us more than you expect.

§2 Statistics

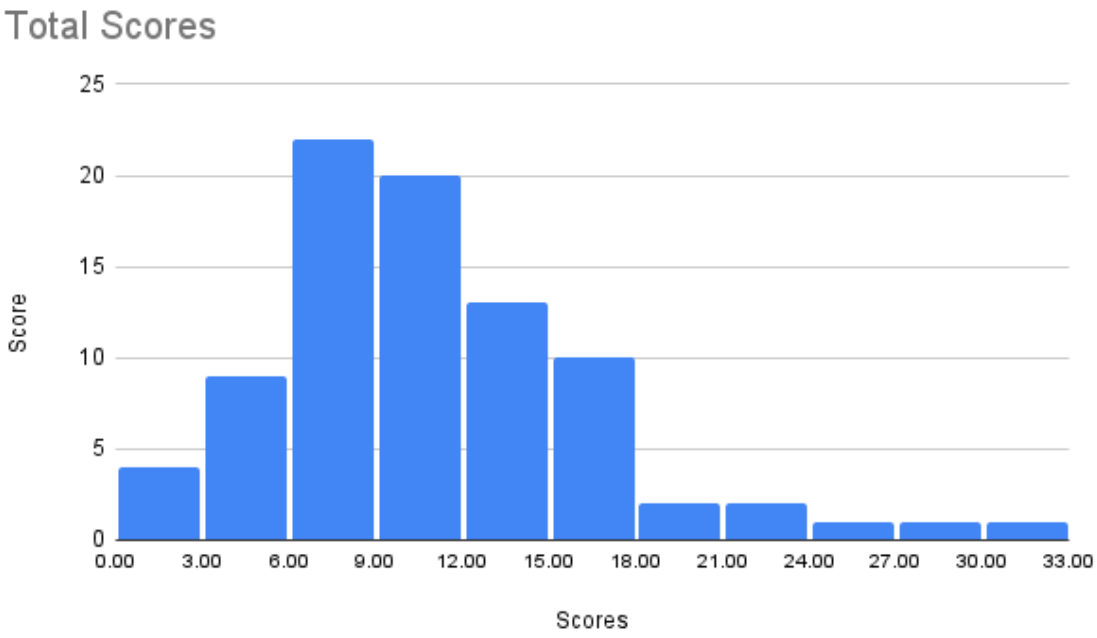
Of course, I am a huge nerd, so I could not let this test pass without analyzing some of the statistics. In particular, these statistics also let us know where we went wrong, where we were successful, and how to better engineer the event next year.

§2.1 Overall

In the following table, n is the number of participants, μ denotes the mean **total** score, and σ is the standard deviation of the scores.

n	85
μ	10.4
σ	5.70
max	32
3rd Quartile	13
Median	10
1st Quartile	6
Mode	10

Here's a histogram of the total scores (Sprint + Target):

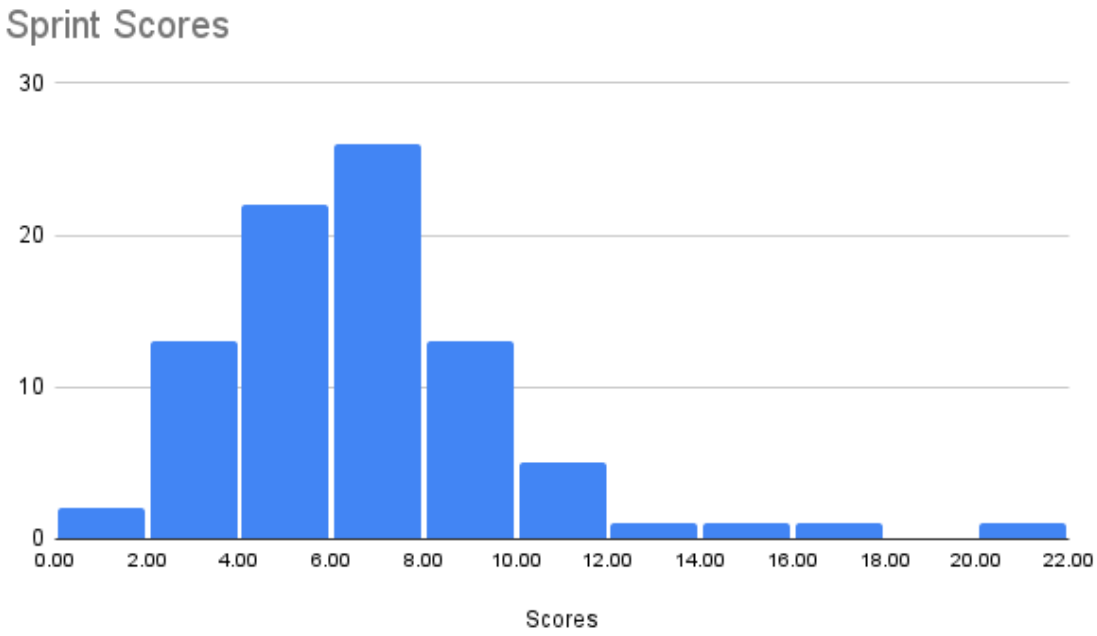


§2.2 Sprint

For just the sprint round, we have the following statistics:

n	85
μ	6.14
σ	3.20
max	20
3rd Quartile	8
Median	6
1st Quartile	4
Mode	6

Here's a histogram of the sprint scores:



In addition, we'd like to shine light on individual problem solve rates. I've ordered the problems from most solved to least solved ("actual difficulty") along with the placement on the test, its solve rate, and number of people who solved it: see the next page.

Problem Number	Solve Rate	Number of Solves
1	90.6%	77
3	82.4%	70
5	72.9%	62
11	70.6%	60
6	52.9%	45
7	51.8%	44
18	45.9%	39
4	29.4%	25
9	20.0%	17
17	15.3%	13
14	14.1%	12
2	12.9%	11
8	11.8%	10
22	10.6%	9
13	8.2%	7
23	7.1%	6
10	4.7%	4
12	4.7%	4
26	4.7%	4
15	2.4%	2
16	2.4%	2
19	0%	0
20	0%	0
21	0%	0
24	0%	0
25	0%	0
27	0%	0
28	0%	0
29	0%	0
30	0%	0

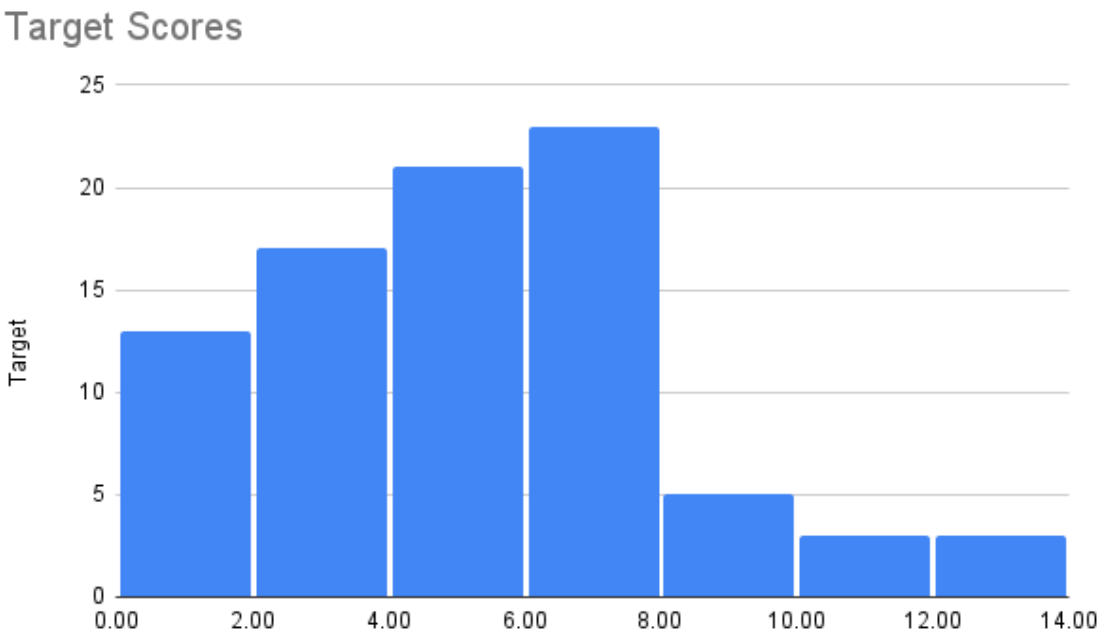
As you can see, there were **nine** problems on the Sprint alone that went unsolved – we'll be discussing all of these problems in our next lesson, and also ensuring that less of these appear on future exams. Based on the solve rates, we also had a few hiccups in the placement of problems, as Problems 11 and 18 seemed to be exceptionally easy for their placement and Problems 2, 10, and 12 seemed to be exceptionally hard for their placement. I also want to say a special shoutout to **Ian Rui** and **Jason Yao** for being the only two people to solve Problem 15, and **Ian Rui** and **Keane Qu** for being the only two people to solve Problem 16. Congrulations on such a tough problem set everyone!

§2.3 Target

For just the target round, we have the following statistics:

n	85
μ	4.26
σ	2.97
max	12
3rd Quartile	6
Median	4
1st Quartile	2
Mode	6

Here's a histogram of the target scores:



**Note that histograms are always inclusive on the lower bracket, so all scores in the 12 to 14 range are 12s, all scores in the 10 to 12 range are 10s, etc. I couldn't find a better way to represent this data.*

In addition, we'd like to shine light on individual problem solve rates. I've ordered the problems from most solved to least solved ("actual difficulty") along with the placement on the test, its solve rate, and number of people who solved it.

Problem Number	**Solve Rate**	**Number of Solves**
1	68.2%	58
2	54.1%	46
4	40.0%	34
3	27.1%	23
5	14.1%	12
7	9.4%	8
6	2.4%	2
8	0%	0

This round was clearly more balanced than the Sprint round, with a well-balanced Problem Set in terms of subject and well placed problems in terms of difficulty (it's normal on Mathcounts to see that Number 5 is easier than Number 4, or in extreme cases, Number 7 being more difficult than Number 2; they like giving you one easy problem and one harder problem to work on each set).

I really wanted someone to solve Problem 8, as its solution is simply so beautiful – check out the solution packet if you're interested. Finally, I'd also like to give a shoutout to **Helen Shan** and **Oscar Li** for being the only two people to solve Problem 6 on the Target Round.

That's all the statistics we have for you everyone! I hope you found all of this information interesting and enjoy reviewing all the problems and solutions that we've provided. Remember, you'll only get better by reviewing problems that you missed!

Sincerely,

Owen Zhang (Director)