



pen Tournament

Score Data and Item Difficulty

Saturday, March 26, 2022

Overall statistics

Contest	Invitational cutoff	Mean	Median	Mode	Min	Max	25%ile	75%ile	Standard deviation
MS America	7	6.40	5.5	6	0	17	3	8	4.60
MS Asia	7	5.83	5	5	0	19	1	5	6.82
HS America	8	6.56	5	2	1	14	1	11	5.08
HS Asia	6	2.50	2	–	0	6	0.5	4.5	2.65

Note: To protect privacy and anonymity of the competitors, data for the Europe/Africa contests is not being released due to exceedingly small sample size.

Invitational Qualifiers

For their excellent performance at the Open Online Tournament, the following students (listed in alphabetical order of last name, not ranking) have advanced to the Invitational Competition, to be held on Saturday, April 2, 2022:

Middle School, America: Rohan Garg, Andrew Kalashnikov, Caden Lewis-Shickman, William Liu, Pranav Mallina, Aryan Raj, Shaheem Samsudeen, Ryan Shin, Kenneth Sun, Kevin Sun, Feodor Yevtushenko

Middle School, Asia: Ray Zhao

High School, America: Samuel Choi, Niyathi Kukkapalli, Sargam Mondal, Gil Yarsky

High School, Europe: Robert Dragomirescu

High School, Asia: Adithya Kishor

Congratulations to all!

Middle School Division (America)

Item difficulty

Problem	Correct %	Incorrect %	Blank %
1	73.33	23.33	3.33
2	50.00	50.00	0.00
3	80.00	13.33	6.67
4	16.67	60.00	23.33
5	70.00	30.00	0.00
6	66.67	26.67	6.67
7	10.00	70.00	20.00
8	23.33	76.67	0.00
9	26.67	50.00	23.33
10	80.00	13.33	6.67
11	26.67	40.00	33.33
12	10.00	66.67	23.33
13	6.67	50.00	43.33
14	30.00	30.00	40.00
15	13.33	40.00	46.67
16	16.67	43.33	40.00
17	3.33	36.67	60.00
18	13.33	43.33	43.33
19	20.00	30.00	50.00
20	3.33	33.33	63.33

Score-rank correspondence

Score	Rank	Percentile
17	1	100
16	2	97
13	3	93
12	6	83
10	7	80
8	8	77
7	10	70
6	12	63
5	16	50
4	20	37
3	23	27
2	25	20
1	27	13
0	29	7

Note: the *rank* of a score is defined as 1 plus the number of participants with a *strictly* higher score. For example, if the rank of a score of 12 is 4, exactly 3 participants scored 13 or better.

Middle School Division (Asia)

Item difficulty

Problem	Correct %	Incorrect %	Blank %
1	66.67	33.33	0.00
2	83.33	16.67	0.00
3	16.67	50.00	33.33
4	33.33	33.33	33.33
5	33.33	66.67	0.00
6	50.00	33.33	16.67
7	16.67	50.00	33.33
8	16.67	66.67	16.67
9	16.67	50.00	33.33
10	16.67	50.00	33.33
11	33.33	33.33	33.33
12	50.00	33.33	16.67
13	33.33	66.67	0.00
14	33.33	33.33	33.33
15	16.67	33.33	50.00
16	16.67	66.67	16.67
17	0.00	66.67	33.33
18	16.67	66.67	16.67
19	16.67	33.33	50.00
20	16.67	66.67	16.67

Score-rank correspondence

Score	Rank	Percentile
19	1	100
5	2	83
1	5	33
0	6	17

Note: the *rank* of a score is defined as 1 plus the number of participants with a *strictly* higher score. For example, if the rank of a score of 12 is 4, exactly 3 participants scored 13 or better.

High School Division (America)

Item difficulty

Problem	Correct %	Incorrect %	Blank %
1	55.56	33.33	11.11
2	66.67	33.33	0.00
3	55.56	33.33	11.11
4*	100.00	0.00	0.00
5	22.22	55.55	22.22
6	22.22	66.67	11.11
7	11.11	55.56	33.33
8	55.56	33.33	11.11
9	44.44	22.22	33.33
10	22.22	55.55	22.22
11	33.33	33.33	33.33
12	33.33	22.22	44.44
13	0.00	55.56	44.44
14	44.44	22.22	33.33
15	22.22	33.33	44.44
16	33.33	11.11	55.56
17	11.11	33.33	55.56
18	0.00	33.33	66.67
19	0.00	44.44	55.56
20	22.22	11.11	66.67

*: voided due to an ambiguity in the question.

Score-rank correspondence

Score	Rank	Percentile
14	1	100
13	2	89
11	3	78
8	4	67
5	5	56
3	6	44
2	7	33
1	9	11

Note: the *rank* of a score is defined as 1 plus the number of participants with a *strictly* higher score. For example, if the rank of a score of 12 is 4, exactly 3 participants scored 13 or better.

High School Division (Asia)

Item difficulty

Problem	Correct %	Incorrect %	Blank %
1	50.00	25.00	25.00
2	25.00	75.00	0.00
3	50.00	25.00	25.00
4	25.00	75.00	0.00
5	0.00	50.00	50.00
6	25.00	50.00	25.00
7	25.00	50.00	25.00
8	0.00	50.00	50.00
9	0.00	0.00	100.00
10	0.00	25.00	75.00
11	25.00	25.00	50.00
12	25.00	50.00	25.00
13	0.00	0.00	100.00
14	0.00	50.00	50.00
15	0.00	0.00	100.00
16	0.00	25.00	75.00
17	0.00	25.00	75.00
18	0.00	25.00	75.00
19	0.00	0.00	100.00
20	0.00	25.00	75.00

Score-rank correspondence

Score	Rank	Percentile
6	1	100
3	2	75
1	3	50
0	4	25

Note: the *rank* of a score is defined as 1 plus the number of participants with a *strictly* higher score. For example, if the rank of a score of 12 is 4, exactly 3 participants scored 13 or better.