

Minnesota State High School Mathematics League

2024-25 Sample Meet 1.1, Individual Event A

15 minutes

Score	Check

1. _____ Jane, Maren, Kara, Sarah, and Tom decide to speedrun the new video game “Dueling with Galois”. Jane finished before Maren, but after Kara. Sarah finished before Tom, but after Maren. In what position did Jane finish? (Express your answer as an integer between 1 and 5 inclusive, where 1 is first and 5 is last).

2. _____ Determine the value of $\frac{\sqrt{144}}{\sqrt[3]{27}}$.

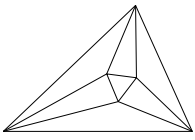
3. _____ % If A is 50% of B , and A is 30% of C , what percentage is B of C ?

4. _____ Determine the value of $\frac{2^{-7} - 2^{-13}}{8^{-4} - 8^{-5}}$.

5. _____ matches During the regular season Christina won exactly 60% of her tennis matches, winning a whole number of matches. She then won 4 of 6 matches at the championship tournament, and has now won more than 61% of her matches overall. What is the maximum number of matches she could have played during the regular season?

Name: _____

Team: _____



Minnesota State High School Mathematics League

2024-25 Sample Meet 1.1, Individual Event B

15 minutes

Score	Check

1. _____ miles The distance from Hutchinson to Monticello on a map is 16 inches. The scale on the map is 1 inch : 2.5 miles. What is the actual distance between Hutchinson and Monticello, in miles?

2. $c =$ _____^o Figure 2 shows parallel lines l_1 and l_2 and a transversal. If the measure of angle b is four times the measure of angle a , what is the degree measure of angle c ?

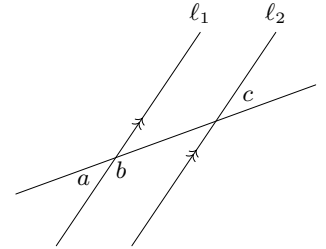


Figure 2

3. _____ A line has an x -intercept of 20 and a y -intercept of 24. If a parallel line has an x -intercept of 55, what is the y -intercept of this line?

4. $m + n =$ _____ The maximum value of the function

$$y = 2 \sin\left(\frac{\pi x}{4}\right) + 3,$$

where $0 \leq x \leq 8$ occurs at the point (m, n) . What is $m + n$?

5. $DF =$ _____ Figure 5 shows parallelogram $ABCD$ with $\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{BC}$. E is on \overline{CD} and F is on \overline{BC} , with \overline{AE} and \overline{AC} intersecting \overline{DF} at P and Q respectively. If $DE = EC = 64$, $BF = 26$, $CF = 52$, and $PQ = 27$, determine the length of \overline{DF} .

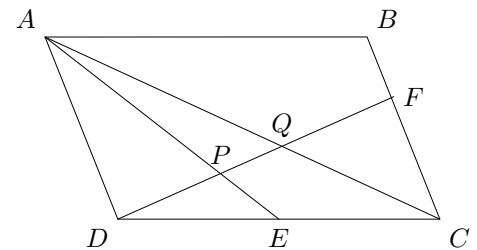
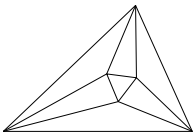


Figure 5

Name: _____

Team: _____



Minnesota State High School Mathematics League

2024-25 Sample Meet 1.1, Individual Event C

15 minutes

Score	Check

1. _____ Find the number of integers n satisfying $-3 \leq n \leq 5$.

2. _____ A number is *Beprisque* if it is the only natural number between a prime number and a perfect square. For instance 8 and 10 are Beprisque, but 12 is not. What is the largest Beprisque number less than 100?

3. $M \times N =$ _____ The least common multiple of 42 and 56 is M , and the greatest common divisor of 42 and 56 is N . Find $M \times N$.

4. _____ Find the *sum* of all values of x for which the median and unique mode of the 8 data values $\{30, 76, 2x, 45, 66, 100, 3x, 84\}$ are the same as each-other

5. _____ Fifteen dots are arranged in an equally spaced triangular pattern as shown in Figure 5. How many equilateral triangles can be formed, where each vertex is one of these dots?

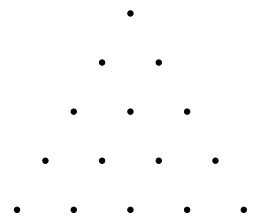
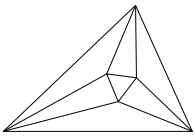


Figure 5

Name: _____

Team: _____



Minnesota State High School Mathematics League

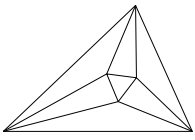
2024-25 Sample Meet 1.1, Team Event

30 minutes

Score	Check

1. _____ Find the value of $\frac{\frac{8}{9} + \frac{6}{7}}{\frac{8}{9} - \frac{6}{7}}$.
2. _____ The area of equilateral triangle T_2 is exactly 36% less than the area of equilateral triangle T_1 . If T_1 has side length 25, what is the side length of triangle T_2 ?
3. _____ Two whole numbers differ by exactly 35 and have a least common multiple of 720. What is their sum?
4. _____ In triangle XYZ , $\tan \angle Y = \frac{1}{2}$ and $\tan \angle Z = \frac{1}{3}$. If $YZ = 20$, find the area of triangle XYZ .
5. _____ Distinct integers a, b, c , and d , each between 1 and 23, inclusive, are selected, and the inequality $a \leq b - \frac{x}{c} \leq d$ is solved, giving a range of allowable values for x . Find the greatest possible length of this range of allowable values.
6. _____ A deck consists of cards numbered 1 through 2022 in order, with 1 on top. The dealer repeatedly discards the top card and moves the next card from the top to the bottom of the deck, continuing until only a single card remains. So the sequence of discarded cards is 1, 3, 5, 7, ..., 2019, 2021, 2, 6, 10, ..., and so on. What is the number on the last remaining card?

Team: _____



Minnesota State High School Mathematics League

2024-25 Sample Meet 1.1, Answers

Event A:

1.

2

(23-24 5A1, 94% correct)

2.

4

(21-22 4A1, 86% correct)

3.

60

(22-23 1A2, 59% correct)

4.

36

(21-22 3D2, 25% correct)

5.

30

(21-22 2A3, 11% correct)

Event B:

1.

40

(21-22 5B1, 89% correct)

2.

36

(23-24 1B2, 75% correct)

3.

66

(23-24 2T2, 94% correct)

4.

7

(22-23 1C3, 52% correct)

5.

120

(21-22 5B4, 4.1% correct)

Event C:

1.

9

(23-24 2A1, 80% correct)

2.

82

(21-22 5I2, 88% correct)

3.

2352

(23-24 1A2, 29% correct)

4.

60

(16-17 5D3)

5.

35

(21-22 5T3, 33% correct)

Team Event:

1.

55

(23-24 1T1, 97% correct)

2.

20

(23-24 5B2, 22% correct)

3.

125

(21-22 1T2, 83% correct)

4.

40

(22-23 5B3, 7.4% correct)

5.

484

(23-24 2A4, 3.1% correct)

6.

1996

(21-22 5T6, 6.9% correct)