

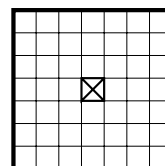
WISCONSIN MATHEMATICS, SCIENCE & ENGINEERING TALENT SEARCH

PROBLEM SET I (2026–2027)

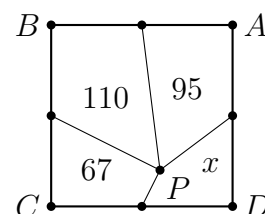
Deadline: November 9, 2026

October 2026

1. A 7×7 board of unit squares has its center square removed (marked with an X in the picture). The remaining board is cut along grid lines into 8 identical shapes. This means that any two shapes look the same, after possibly reflecting and/or rotating them. What is the maximum possible number of shapes that do not touch the outer boundary of the board (marked with a thick line) when placed in their original positions?



2. The vertices of a regular polygon are each painted with one of four colors: blue, green, purple, or orange. The groups of blue, green, and purple vertices are each the vertices of a square. The orange vertices are the vertices of a regular polygon that is not a square. How many vertices does the original polygon have?
3. Let $ABCD$ be a square, and let P be a point inside $ABCD$. Connect P with the midpoints of each of the 4 sides of the square, so the square is divided into 4 quadrilaterals. The areas of the quadrilaterals with vertices A, B, C , and D are 95, 110, 67, and x , respectively, as shown.



4. Find the least positive integer that has more 100-digit positive divisors than 1-digit positive divisors.
5. In a chess tournament 2026 players participated. Each player played one game against every other player. For each player, we define their disparity as the absolute difference between their number of wins and losses. Draws do not count toward disparity. For example, a player with 25 wins, 100 losses, and 1901 draws has a disparity $|25 - 100| = 75$. What is the greatest possible sum of all the disparities of all 2026 players?

- You are invited to submit a solution even if you solve just one problem.
- Remember that solutions require a proof or justification.
- Please carefully review the page at <https://talent.math.wisc.edu/how-to-participate/> about how to submit your solutions. Make sure to also review our policy on the use of AI: <https://talent.math.wisc.edu/ai-policy/>.
- Find old and current problems of the talent search at <http://www.math.wisc.edu/talent>.
- Find an introduction to techniques for solving problems like these at <https://go.wisc.edu/551pe6>.