

The Department of Mathematics at NDSU is happy to announce the start of the annual North Dakota Mathematics Talent Search. The Talent Search poses sets of challenging mathematical problems throughout the year which will be posted on our website at

https://www.ndsu.edu/math/outreach/nd_talent_search/

Interested students are strongly encouraged to send in solutions even if they only solve one problem in a set; **finding a good solution to a problem is always an achievement**. The problems do not require advanced mathematical knowledge – just creativity and a feeling or taste for problem solving.

The students who submit a significant number of mathematically sound solutions for each of the three rounds will be rewarded with various prizes.

Please upload and submit your solutions by January 31, 2026, using the form on the website. Alternatively, solutions may be sent by regular mail to:

Talent Search
c/o Maria Alfonseca
Mathematics NDSU Dept.# 2750
PO BOX 6050
Fargo, ND 58108-6050

Please do not forget to include your name, postal address, school, and e-mail address.

Here is the **second set** of problems:

1. A boy has as many sisters as brothers, but each sister has only half as many sisters as brothers. How many brothers and sisters are there in the family?
2. What is the greatest possible number of points of intersection for nine distinct lines on a plane?
3. Find all the pairs of natural numbers x and y such that both $x^2 + 3y$ and $y^2 + 3x$ are squares of whole numbers.
4. (a) Find triangles Δ_1 and Δ_2 such that $\text{Area}(\Delta_1) < \text{Area}(\Delta_2)$, but any side of Δ_1 is longer than any side of Δ_2 .
(b) Let P_1, P_2 be convex polygons such that P_1 is inside P_2 . Is it true that $\text{Perimeter}(P_1) \leq \text{Perimeter}(P_2)$?
5. In how many ways can the letters $AAABBCCDEF$ be rearranged so that every pair of A 's has at least two other letters between them? For example, $ABCA$ is allowed, but ABA and AA are not.