

MATH 6: MATH BATTLE

1. Can you select 101 numbers from the set of numbers $1, 2, 3, \dots, 200$, so that none of them is a multiple of another?
2. Using ruler and compass, construct a circle which is tangent to the given line l at a given point A and also contains another given point B (outside of l).
3. If we insert parentheses in the expression

$$10 \div 9 \div 8 \div 7 \div 6 \div 5 \div 4 \div 3 \div 2 \div 1$$

so that the result is a whole number, what is the smallest value one can get?

4. In each cell of an 8×8 table we write a plus or minus sign. Initially, the upper left corner contains the minus sign, and all other signs are pluses. You can flip all signs in any one row or column of the table. By repeating this operation, can you make all signs pluses?
5. A tourist wants to take a walk in the streets of a city, starting at his hotel and ending at the opera theater (they are marked by black dots on the map). However, he wants to do it so that he never visits the same crossroads in the city. Can he visit all crossroads in the city? What would be the longest walk he can take?

Note: you must explain why the walk you have suggested is the longest possible one

