

### III panarmenian science olimpiad

#### mathematics

1. Positive integers, divisibility, divisibility rules
2. Prime and composite numbers. The main theorem of arithmetic's
3. Modulo operation
4. Greatest common divisor and least common multiple. Their relation
5. Equations with integer coefficients. Solution methods
6. Set, subset. Operations on sets
7. Foundations of combinatorics, permutations, partial permutations, combinations
8. Pigeonhole principle
9. Equations, inequalities, simultaneous equations,
10. Proofs of identities and inequalities
11. Relation between arithmetical mean and geometric mean, Cauchy-Schwarz inequality
12. Sequences. Arithmetic and geometric progressions
13. Method of mathematical induction, applications to prove identities, inequalities and divisibility.
14. Function. Domain and range. Properties of functions
15. Functions floor  $Y=[x]$  and fractional part (sawtooth wave)  $Y=\{x\}$
16. Trigonometric identities, their proofs.
17. Solve trigonometric equations and inequalities.
18. Puzzles
19. Planimetrics, solve problems
20. Solid geometry, solve problems
21. Vectors, operations with vectors
22. Method of coordinates