Inequalities, apart from being rarely absent from mathematical contests at all levels, are a topic with numerous fans on internet. They are attractive because, on many occasions, offer opportunity to exhibit a lot of ingenuity in choosing from several proof-ideas at solver’s disposal.

In the first 100 pages of the book under review the authors present the theorems on which classical inequalities rely on. Here the reader finds the statements and proofs for inequalities between means, the weighted power mean and rearrangement inequalities, as well as those associated with the name of Cauchy-Schwarz, Aczél, Jensen, Hölder, Minkowski, Schur, Chebyshev, Bernoulli, Karamata, Popoviciu. Each of them is illustrated with several detailed examples of non-trivial applications. To fully profit from the exposition, the reader should have a previous experience in problem-solving and be definitely familiar with other chapters of mathematics (for instance, on Page 2 it is given a solution involving polar coordinates; although the definition given here for convex functions is algebraic, the very first example of it invokes the analytic characterization, which by the way is never explicitly given in this text).

In the second part of the book, the 116 problems mentioned in title are stated and solved. Multiple solutions are indicated for several of them. The statements are appealing, difficult, and in a number of cases they are in a pleasant contrast with the simplicity of solution. Most of them are very recent, appearing after 2014 either in discussion groups on internet or in competitions or journals with problems for high-school students.

The reading leaves an unpleasant feeling of rush for timeliness, it seems that on many occasions a second look at material would have been necessary. For instance, not always the notation and hypothesis are clearly stated (the domain of definition of a convex function should be an interval; the first solution given for Advanced problem 6 is only valid for positive numbers; the statement of Advanced problem 28 makes no sense for $a = 3$; the inequalities in the Advanced problems 36 and 41 refer to positive variables, while in their solutions it is indicated that equality holds when $d = 0$). There are at least four incomplete solutions: in Examples 59 and 60 it is not checked that Minkowski’s inequality is applied to non-negative numbers; in the solution of Introductory problem 48, the sum is not cyclic; assuming, as in the solution to Advanced problem 39, both conditions $a + b + c + d = 4$ and $abcd = 1$, eliminates all possibilities but $a = b = c = d = 1$. Irritating language faults are too often present (“greater then”, “let ...are”, “it is suffices” and the unavoidable variant “it’s suffices”), not to mention typos, of which “Cauchy-Schwartz” is a classical of sloppiness and at least one alters the mathematical meaning (cf. Advanced problem 18).

In conclusion, the book is useful to high-school students preparing for mathematical contests and which have a solid prior knowledge of both English and algebraic inequalities.

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