

**1.** Let us denote by  $\lambda$  (where  $\lambda > 1$ ) the ratio of the sides of a parallelogram. Find, in terms of  $\lambda$ , the maximum possible measure of the acute angle formed by the diagonals. **2.** Consider the diagonals of a convex  $n$ -gon. Upon omitting any  $n - 3$  of them, prove that among the remaining diagonals there are  $n - 3$  ones that do not intersect inside the polygon. On the other hand, show that one can always omit  $n - 2$  diagonals so that the previous assertion is not true anymore. **3.** We are given the sets  $H_1, H_2, \dots, H_n$ . The set  $H_k$  ( $k = 1, 2, \dots, n$ ) consists of  $k$  pairwise disjoint intervals of the real line. Prove that among the intervals that form the sets  $H_k$  one can find  $\lfloor (n+1)/2 \rfloor$  pairwise disjoint ones, each of which belongs to a different set  $H_k$ . ( $\lfloor x \rfloor$  denotes the largest integer that is less than or equal to  $x$ .)