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Erdős, Paul; Purdy, G.

Some combinatorial problems in the plane. (In English)

J. Comb. Theory, Ser. A 25, 205-210 (1978). [0097-3165]

The author prove (among other things) the following remarkable theorem: Let S be a finite set of n points in the plane, not all on one line, and let t_i denote the number of lines which contain exactly i points of S for $i=2,3, \dots, n-1$. If $n \geq 25$, then $\max\{t_2, t_3\} \geq n - 1$. Also, for all n , if $t_2 < n - 1$, then $t_3 \geq (n^2 - 12n - 16)/24$. Finally, $\max\{t_2, t_3, \dots, t_{n-1}\} = \max\{t_2, t_3\}$. The paper includes results in a similar vein together with various conjectures and their current status.

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Classification:

05B25 Finite geometries (combinatorics)

51M05 Euclidean geometries (general) and generalizations

00A07 Problem books

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finite set of points in the plane; lines