PROBLEM CORNER

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Problem 1

S. S. Pillai proved in [1] the following theorem. When $m \leq 16$, in every set of m consecutive integers, there is at least one integer which is relatively prime to all the others in the set. He realized that the smallest number m for which there is a sequence of m consecutive integers without a number relatively prime to all others is $m = 17$. Find the smallest natural number n such that in the sequence $n, n+1, \ldots, n+16$ there is no number relatively prime to the others.

[1] S.S. Pillai, *On m consecutive integers-I.*, Proceedings of the Indian Academy of Sciences Vol 11/1, pp 6-12 (1940).
https://www.ias.ac.in/article/fulltext/seca/011/01/0006-0012

Problem 2

Draw all the diagonals of a regular polygon. How many interior intersections are there on a given diagonal? For example, the figure shows a regular 18-gon and all its diagonals. The diagonal connecting the opposite vertices has 27 interior intersection points.

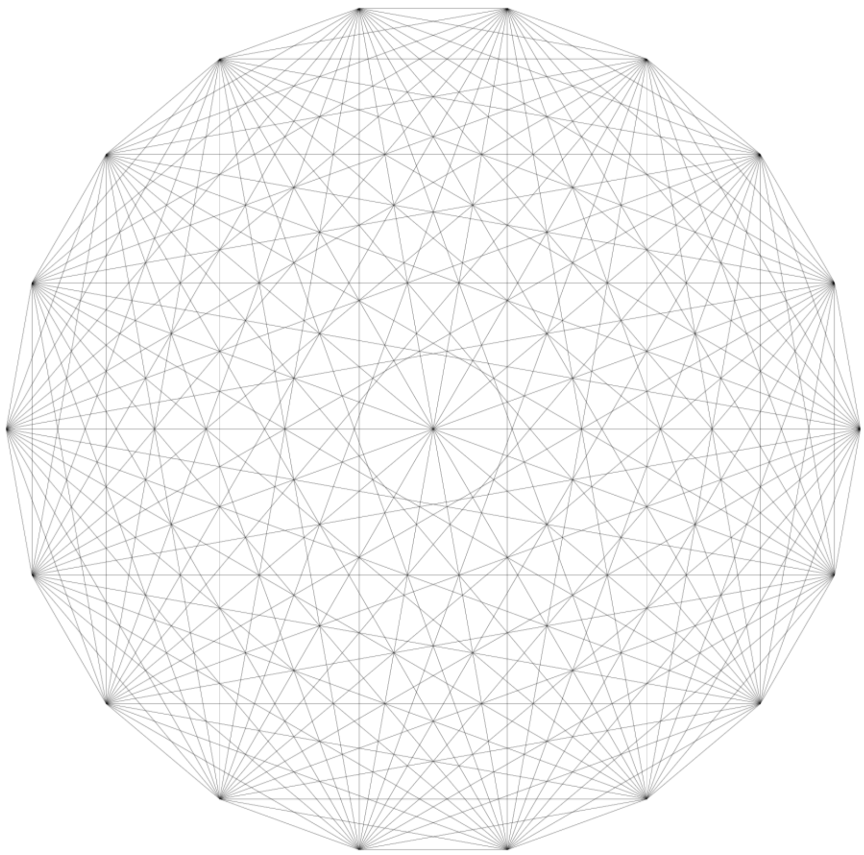

Figure. The regular 18-gon with its diagonals. There are 27 interior intersection points on the longest diagonal: 8 two-line intersections, 12 three-line intersections, 6 five-line intersections, and 1 nine-line intersection