University of Colorado
Department of Mathematics
Problem of the Month
December 2017 - January 2018

This is a problem about vectors in the real plane, so let $\overrightarrow{AB}$ denote the vector from the point A to the point B.

Let $P_1, \ldots, P_{2017}$ be the vertices of some regular 2017-sided polygon in $\mathbb{R}^2$. Prove that there exists a point X in $\mathbb{R}^2$ such that

$$\sum_{k=1}^{2017} k \, \frac{\overrightarrow{XP_k}}{\|\overrightarrow{XP_k}\|^5} \;=\; 0.$$