Here are some problems involving Euclidean Geometry...

- Prove that in an arbitrary triangle, the sum of the lengths of the altitudes is less than the triangle’s perimeter.

- Consider a pyramid whose base is an $n$-gon, where $n$ is odd. Think of the edges as vectors whose direction we will choose. Can we choose so that the sum of the vectors is 0?

- Let $ABCD$ be a convex quadrilateral, and let $M, N$ be the midpoints of $AD, BC$ respectively. Prove that $MN = \frac{AB+CD}{2}$ if and only if $AB$ is parallel to $CD$.

- Consider $n$ red and $n$ blue points in the plane, no 3 of them collinear. Prove that we can connect each red point to a blue one with a segment and have no 2 segments intersect.

- **Putnam 2001 A4**
  Triangle $ABC$ has an area 1. Points $E, F, G$ lie, respectively, on sides $BC, CA, AB$ such that $AE$ bisects $BF$ at point $R$, $BF$ bisects $CG$ at point $S$, and $CG$ bisects $AE$ at point $T$. Find the area of the triangle $RST$.

- **Putnam 2008 B1**
  What is the maximum number of rational points that can lie on a circle in $\mathbb{R}^2$ whose center is not a rational point? (A rational point is a point both of whose coordinates are rational numbers.)