1 Problems

**Putnam 2006/B1.** Show that the curve $x^3 + 3xy + y^3 = 1$ contains only one set of three distinct points $A$, $B$, and $C$, which are vertices of an equilateral triangle, and find its area.

**Putnam 2006/B2.** Prove that for every set $X = \{x_1, \ldots, x_n\}$ of real numbers, there exists a non-empty subset $S$ of $X$ and an integer $m$ such that

$$\left| m + \sum_{s \in S} s \right| \leq \frac{1}{n+1}.$$ 

**Putnam 2006/B3.** Let $S$ be a finite set of points in the plane. A linear partition of $S$ is an unordered pair \{A, B\} of subsets of $S$ such that $A \cup B = S$, $A \cap B = \emptyset$, and $A$ and $B$ lie on opposite sides of some straight line disjoint from $S$ (A or B may be empty). Let $L_S$ be the number of linear partitions of $S$. For each positive integer $n$, find the maximum of $L_S$ over all sets $S$ of $n$ points.