Hoja 4

1) Prove that a convex 13-gon (that is, a polygon with 13 sides) cannot be cut into finitely many parallelograms.

2) Suppose $A \subset \{1, 2, 3, \ldots, 2n\}$ is any set with $n + 1$ elements.

a) Show that there are always two numbers in A which are coprime.

b) Show that there are always two numbers in A such that one divides the other.

3) Let r be an arbitrary positive rational number. Prove that it can be represented as a sum of fractions of the form $\frac{1}{k}$, where all denominators are different.

4) Determine whether or not there exists n such that n is divisible by exactly 200 different prime numbers and $2^n + 1$ is divisible by n.