# Hoja 0

**1)** Given any irrational number, is it always true that any finite sequence of digits can be found somewhere in its decimal representation?

**2)** Let $n$ be a positive integer and $a_1, \ldots, a_{n+1}$ be $n+1$ distinct numbers among $\{1, 2, \cdots, 2n\}$. Show that at least two of them are coprime.

**3)** For every positive integer $n$ find a closed formula for $a_n = 1 * 1! + 2 * 2! + \cdots + n * n!$

**4)** Let $A_1\, A_2\, \ldots\, A_n$ be a regular $n$-gon whose circumradius equals 1. Find the value of

$$\prod_{k=2}^{n} \overline{A_1\, A_k}$$

where $\overline{A\, B}$ denotes the length of the segment with endpoints $A, B$.

**5)** Find the value of

$$\arctan(1) + \arctan(2) + \arctan(3)$$