1 Problems

Putnam 1989/A1. How many primes among the positive integers, written as usual in base 10, are alternating 1’s and 0’s, beginning and ending with 1?

Putnam 1989/A2. Evaluate
\[ \int_0^a \int_0^b e^{\max\{b^2x^2, a^2y^2\}} \, dy \, dx \]
where \( a \) and \( b \) are positive.

Putnam 1989/A3. Prove that if
\[ 11z^{10} + 10iz^9 + 10iz - 11 = 0, \]
then \( |z| = 1 \). (Here \( z \) is a complex number and \( i^2 = -1 \).)