

Subject 4
SEQUENCES

Please don't write on the exam paper and don't forget to give back the examination paper at the end of the test.

The populations of Alicante and Bilbao are respectively 340,000 and 350,000 inhabitants in 2013. The projections for the future are a yearly increase of 2% and 1.5% respectively.

We denote A_n and B_n the populations of Alicante and Bilbao in the year $(2013 + n)$. Thus :

$$A_0 = 340,000 \text{ and } B_0 = 350,000.$$

1°) Prove that both sequences are geometric and precise their common ratios.

2°) Express A_n and B_n in terms of n .

3°) Find out in which year Alicante's population will have caught up with Bilbao's one.

4°) Find out in which years each the population of each town shall have doubled, at their own rates.

5°) Give a few comments about the kind of ecological and economical problems (water, garbage, energy, etc ...) the two cities would have to deal with in the future if the rates remain the same during those years.