Subject n°29: <u>Sequences</u>

Please do not write on this document, and do not forget to hand it back at the end of the test.

The president of a sport association notices that each year, the association keeps 75 % of its members and that there are 800 new members.

We suppose that the evolution of the number of members remains the same every year. Let's study this evolution. We note u_n the number of members after n years. We know that at the beginning of the association, there were 1,600 members, that is $u_0 = 1,600$.

1°) Calculate u_1 , u_2 and u_3 .

2°) Express u_{n+1} in terms of u_n .

3°) We define $v_n = 3,200 - u_n$. Calculate v_0 .

4°) Prove that the sequence (v_n) is geometric.

5°) Deduce the expression of v_n in terms of n.

6°) Deduce that $u_n = 3,200 - 1,600 \times (0,75)^n$.

7°) Study the limit of the sequence (u_n) .

8°) What can we deduce concerning the number of members of this sport association ?