

### SEQUENCES

*Please do not write on the exam paper, and do not forget to give back the examination paper at the end of the test*

1. The production of a piano factory (called Treble Clef Ltd) follows an arithmetic sequence  $u$ , such as for every whole number  $n$ ,  $u_n$  is the number of pianos manufactured during year  $2,000+n$ .  
In 2000, the factory produced 750 pianos, so  $u_0=750$ .  
In 2005, the factory produced 1,200 pianos.
  - a) Give  $u_5$  and justify that the common difference of this sequence is 90.
  - b) For any  $n$ , express  $u_n$  in terms of  $n$ .
  - c) In which year will the factory produce for the first time more than three times as many pianos as it initially did?
  
2. Another piano factory, Bass Clef Ltd, which was created in 2000, produced 350 pianos the first year.  
Since then, each year, the production of this company increases by 10%.  
For any whole number  $n$ , let  $v_n$  be the number of pianos produced during year  $2,000+n$ .
  - a) Compute  $v_0$ ,  $v_1$  and  $v_2$ .
  - b) What type of progression is  $(v_n)$ ?
  - c) For any counting number  $n$ , express  $v_n$  in terms of  $n$ .
  
3. Find out in which year Bass Clef Ltd will have produced at least as many pianos as Treble Clef Ltd.