Académie de Toulouse – sections européennes – session 2016

Subject n°40: <u>Sequences</u>

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

If you have a savings account in a bank, the bank will pay you interest.
Similarly if you need to borrow money from a bank, the bank will expect you to pay interest.
The interest is typically expressed as a percentage and can be either simple or compounded.

1. On January 1st, 2010, Simon deposited £1,500 into a bank account paying simple interest:
every year, he will receive r% of the initial amount (£1,500).
On January 1st, 2015, he had £1,725 on his account.

What is the simple interest rate per year on this account? (To be expressed as a percentage of the
initial amount).

2. For any whole number n, let u_n be the savings on Simon's bank account on January 1st,
year 2010+n.
a) Justify that (u_n) describes an arithmetic progression. Specify its first term and common
   difference.
b) For any whole number n, express u_n in terms of n.
c) What is the first year when Simon's savings are at least twice the initial amount?

3. On January 1st , 2010, Charlie deposited £1,500 into a bank account receiving 2.5%
compound interest per year.
For any whole number n, let v_n be the savings on the bank account on January 1st, year $2010+n$.
We assume that $v_n = 1,500 \times 1,025^n$.

Who (Charlie or Simon) made the best investment?