

BACCALAURÉAT GÉNÉRAL ET TECHNOLOGIQUE
ÉPREUVE SPÉCIFIQUE DES SECTIONS EUROPÉENNES
MATHEMATIQUES – ANGLAIS

Corrigé 19 - Student accommodation: what you need to know

Thème : Sequences

1. $340 + 340 \times \frac{1.5}{100} = 345.1$ or $340 \times (1 + \frac{1.5}{100}) = 340 \times 1.015 = 345.1$

With the first contract, the student will have to pay about £345 for the second month.

$350 + 4 = 354$

With the second contract, the student will have to pay £354 for the second month.

2. a. After n months the rent is u_n .

$$u_n = u_{n-1} + u_{n-1} \times \frac{1.5}{100} = u_{n-1} (1 + \frac{1.5}{100}) = 1.015 u_{n-1}$$

$u_n = 1.015 u_{n-1}$ which is equivalent to $u_{n+1} = 1.015 u_n$.

- b. It's a geometric sequence.

c. $u_n = u_1 \times q^{n-1} = 340 \times 1.015^{n-1}$

d. $u_{36} = 340 \times 1.015^{35} \approx 572.519 \approx 573$

The last month the rent will be £573 rounded to the nearest pound.

3. a. $v_n = v_{n-1} + 4 \Leftrightarrow v_{n+1} = v_n + 4$.

Therefore (v_n) is an arithmetic sequence. The common difference is 4.

b. $v_n = v_1 + (n - 1)r$ $v_{36} = 350 + 35 \times 4 = 490$ The last month, the rent will be £490.

4. a. It's a difficult question to answer:

Initially the first contract seems to be more attractive: for the first month, the rent with the first contract is less than the one with the second contract.

But for the last month, it's the other way around.

- b. We have to calculate the sum of the rents with contracts 1 and 2.

Contract 1: $S_1 = u_1 + u_2 + \dots + u_{36}$

$$= u_1 \times \frac{1 - q^{36}}{1 - q} \quad (= 340 \times \frac{1 - 1.015^{36}}{1 - 1.015} \approx 16,074)$$

Contract 2: $S_2 = v_1 + v_2 + \dots + v_{36}$

$$= \frac{(v_1 + v_{36}) \times 36}{2} \quad (= \frac{(350 + 490) \times 36}{2} = 15,120)$$