## recurrence evaluate terms

- 1. (*a*) A sequence is defined by  $u_{n+1} = -\frac{1}{2}u_n$  with  $u_0 = -16$ . Write down the values of  $u_1$  and  $u_2$ .
  - (*b*) A second sequence is given by 4, 5, 7, 11, ....
    It is generated by the recurrence relation v<sub>n+1</sub> = pv<sub>n</sub> + q with v<sub>1</sub> = 4.
    Find the values of p and q.
  - (c) Either the sequence in (a) or the sequence in (b) has a limit.
    - (i) Calculate this limit.
    - (ii) Why does the other sequence not have a limit?
- [SQA]2. On the first day of March, a bank loans a man £2500 at a fixed rate of interest of 1.5% per month. This interest is added on the last day of each month and is calculated on the amount due on the first day of the month. He agrees to make repayments on the first day of each subsequent month. Each repayment is £300 except for the smaller final amount which will pay off the loan.
  - (*a*) The amount that he owes at the start of each month is taken to be the amount still owing just after the monthly repayment has been made.

Let  $u_n$  and  $u_{n+1}$  represent the amounts that he owes at the start of two successive months. Write down a recurrence relation involving  $u_{n+1}$  and  $u_n$ .

(*b*) Find the date and the amount of the final payment.

[END OF QUESTIONS]

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