



## Leith Academy Higher Home Learning



### RECURRENCE RELATIONS

### CALCULATOR

- 1) A sequence is generated by the recurrence relation  $u_{n+1} = 4u_n - 1$ ,  $u_0 = \frac{1}{2}$ . Calculate  $u_1$ ,  $u_2$  and  $u_3$ .
- 2) The sequence 3, 8, 18 ... is generated by the recurrence relation  $u_{n+1} = au_n + b$ . Work out the values of  $a$  and  $b$ .
- 3) A sequence is generated by the recurrence relation  $u_{n+1} = \frac{2}{5}u_n + 6$ . Calculate the limit of this sequence as  $n \rightarrow \infty$ .
- 4) The number of bacteria around a sink is increasing daily by 40% and every day 250 bacteria are cleaned away. Write down a recurrence relation to illustrate this.
- 5) The brake fluid in a car is leaking and every week 30% of the brake fluid is lost. To compensate the owner of the car tops up the brake fluid each week by 750ml.
  - a) Write a recurrence relation to illustrate this.
  - b) If the brake fluid falls below 1 litre then the car is deemed unsafe. Will the car remain safe in the long term? Give a reason for your answer.