

4. In a forest, the population of a species of mouse is falling by 2.7% each year.

To increase the population scientists plan to release 30 mice into the forest at the end of March each year.

- (a)  $u_n$  is the estimated population of mice at the start of April,  $n$  years after the population was first estimated.

It is known that  $u_n$  and  $u_{n+1}$  satisfy the recurrence relation  $u_{n+1} = au_n + b$ .

State the values of  $a$  and  $b$ .

1

The scientists continue to release this species of mouse each year.

- (b) (i) Explain why the estimated population of mice will stabilise in the long term.

1

- (ii) Calculate the long term population to the nearest hundred.

2