

## 1.3 Geometric sequences and series

# Checklist

## What you should know

By the end of this subtopic you should be able to:

- use  $r = \frac{u_n}{u_{n-1}}$  to find the common ratio and show that a sequence is geometric
- identify  $u_1$  and  $r$  and use them to write the general term of a geometric sequence in the form  $u_n = u_1 r^{n-1}$
- apply  $\frac{u_n}{u_{n-1}} = \frac{u_{n-1}}{u_{n-2}}$  to questions that give three consecutive terms of a geometric sequence
- solve questions that give specific terms of a geometric sequence by using  $u_n = u_1 r^{n-1}$  to write equations for these terms
- find sums of geometric series using  $S_n = \frac{u_1(r^n - 1)}{r - 1}$  or  $S_n = \frac{u_1(1 - r^n)}{1 - r}$  for  $r \neq 1$
- recognise that  $u_1 = S_1$ ,  $u_2 = S_2 - S_1$  and  $u_n = S_n - S_{n-1}$  and apply to questions where sums are given
- recognise that any application question where a quantity grows or decays by a constant percentage rate can be solved by using a geometric sequence model
- use  $u_n = u_0 r^n$  to model growth and decay in application questions, where  $u_0$  is the initial amount and  $r$  is  $1 \pm$  rate.

