

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.

