

- 2 A geometric series has first term 3 and common ratio  $-2$ .
- Find the fifth term of the series. (2)
  - Find the sum of the first ten terms of the series. (2)
  - Show that the sum of the first eight positive terms of the series is 65 535. (4)
- 4 Evaluate  $\sum_{r=3}^{12} 2^r$ . (4)
- 6 Ginny opens a savings account and decides to pay £200 into the account at the start of each month. At the end of each month, interest of 0.5% is paid into the account.
- Find, to the nearest penny, the interest paid into the account at the end of the third month. (4)
  - Show that the total interest paid into the account over the first 12 months is £79.45 to the nearest penny. (5)
- 7 Find the first four terms in the expansion of  $(1 - 3x)^8$  in ascending powers of  $x$ , simplifying each coefficient. (4)
- 8 a Prove that the sum,  $S_n$ , of the first  $n$  terms of a geometric series with first term  $a$  and common ratio  $r$  is given by
- $$S_n = \frac{a(1-r^n)}{1-r}. \quad (4)$$
- b Find the exact sum of the first 16 terms of the geometric series with fourth term 3 and fifth term 6. (5)
- 9 a Write down the first three terms in the binomial expansion of  $(1 + ax)^n$ , where  $n$  is a positive integer, in ascending powers of  $x$ . (2)
- Given that the coefficient of  $x^2$  is three times the coefficient of  $x$ ,
- show that  $n = \frac{6+a}{a}$ . (4)
- Given also that  $a = \frac{2}{3}$ ,
- find the coefficient of  $x^3$  in the expansion. (3)
- 11 The first term of a geometric series is 162 and the sum to infinity of the series is 486.
- Find the common ratio of the series. (3)
  - Find the sixth term of the series. (2)
  - Find, to 3 decimal places, the sum of the first ten terms of the series. (4)
- 15 The terms of a sequence are defined by the recurrence relation
- $$u_r = 2u_{r-1}, \quad r > 1, \quad u_1 = 6.$$
- Write down the first four terms of the sequence. (1)
  - Evaluate  $\sum_{r=1}^{10} u_r$ . (3)

- 17** The common ratio of a geometric series is 1.5 and the third term of the series is 18.
- a** Find the first term of the series. (2)
  - b** Find the sum of the first six terms of the series. (2)
  - c** Find the smallest value of  $k$  such that the  $k$ th term of the series is greater than 8000. (4)