

- 1 Find the n th term and 10th term in the following arithmetic progression:
23, 20, 17, 14
- 2 The first term of an arithmetic sequence is 7.5 and the fourth term is 9. Find the common difference.
- 3 Given the common difference in an arithmetic sequence is 12 and the 8th term is 89, find the first term.
- 4 The first three terms in an arithmetic sequence are -8 , $2k^2$, $18k$. Find the two possible values for k .
- 5 Find the sum of the first 22 terms of the arithmetic sequence 5, 12, 19, 26.
- 6 Find the sum of the arithmetic sequence 12, 15, 18, ... , 249.
- 7 Find the sum of the arithmetic sequence $(2x + 3)$, $(4x + 3)$, $(6x + 3)$, ... , $(40x + 3)$.
- 8 Prove that the sum of the first n even numbers is n^2
- 9 Calculate the sum of all the multiples of 7 from 7 to 84.
 - a For the series $3p + 6p + 9p + \dots + 300$
 - b Calculate the number of terms in the series
 - c Show the sum of the entire series is $150 + \frac{15000}{p}$
 - d Find the 80th term of the sequence $(5p + 4)$, $(7p + 5)$, $(9p + 6)$, ...
- 10 In a geometric series the first term is 2 and the common ratio is 3. What is the 15th term?
- 11 In a geometric sequence the common ratio is 0.5 and the first term is 8. Find the 20th term.
- 12 In a geometric sequence, the 2nd term is 3 and the 4th term is 27. If the common ratio is positive, find the 12th term.
- 13 The first three terms of a geometric sequence are 5, x , $x+10$. If $x > 0$ find the value of x and the 10th term.
- 14 The first term of a geometric sequence is 8 and the third term is 2. Find the two possible values of the 8th term.
- 15 The first three terms of a geometric sequence are $8 - x$, $2x$, x^2 . Find the value of x .
- 16 Sum the following geometric series to the 10th term
 $3 + 6 + 12 + 24 + \dots$



- 17** Sum the following series:
 $236 - 128 + 64 - 32 + \dots + 1$
- 18** The first three terms in a geometric sequence are $k - 12$, k , $2k + 7$. If $k > 0$, find the value of k . Then find the sum to the 10th term.
- 19** A geometric series has first term a and common ratio r . The second term of the series is $\frac{4}{3}$ and the sum to infinity of the series is 6.
- a** Show that $18r^2 - 18r + 4 = 0$.
 - b** Find the two possible values of r .
 - c** Find the corresponding values of a .
- Given that r takes the smaller of the two values,
- d** find the smallest value of n for which S_n exceeds 5.99.
- 20** A company made a profit of £12 000 in its first year of trading, Year 1.
A model for future trading predicts that the yearly profit will increase by 12% each year, so that the yearly profits will form a geometric sequence.
According to the model,
- a** show that the profit for Year 4 will be £16 859
 - b** find the first year when the yearly profit will exceed £40 000
 - c** find the total profit for the first 25 years of trading, giving your answer to the nearest £1000
- 21** The sequence u_1, u_2, u_3, \dots is defined by

$$u_{n+1} = k - \frac{15}{u_n} \quad \text{and} \quad u_1 = 5$$

where k is an integer.

$$\text{Given that } -u_1 + 5u_2 + 2u_3 = 0$$

- a** show that $7k^2 - 41k + 30 = 0$
- b** Find the value of k giving a reason
- c** Find the value of u_3