Sequences, series and recurrence solutions

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

• Sequences and series

Useful starting skills: Year 10 and relevant Year 10A algebra, functions and trigonometry; concurrent Methods supports these topics.

An arithmetic series sums terms with a constant difference; a geometric series sums terms with a constant ratio. Distinguish the nth term from the sum of the first n terms.

For $t_{n+1}=a\,t_n+b$ with $a\neq1$, a fixed point $L=b/(1-a)$ gives $t_n=L+(t_0-L)a^n$. Convergence to L occurs when$|a|<1$.

Worked example

Sum the first 10 terms of the arithmetic sequence 3, 7, 11, ...

The tenth term is 39

sum $10(3+39)/2=210$.

Answer: 210.

Try it yourself

Name: _____ Date: _____

1. Find the first 5-term sum of 2, 6, 18, ...

2. Find the infinite sum 5+2.5+1.25+... .

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. 242.

Geometric sum $2(3^5-1)/(3-1)$.

2. 10.

Ratio 1/2 has absolute value below 1; S=5/(1-1/2).

Curriculum reference: Specialist Mathematics Units 1–2 — Sequences and series

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