

Sequences and Series: math test, Grade 11 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Two sequences

/ 4 pts

(a) For $11, 16, 21, 26, \dots$ write an explicit formula and find a_{25} . (b) For $243, 81, 27, \dots$ write an explicit formula and find a_6 .

2 Recursive rule

/ 3 pts

A sequence has $a_1 = 4$ and $a_{n+1} = a_n - 3$. (a) List the first four terms. (b) Write an explicit formula. (c) Find a_{30} .

3 Arithmetic series

/ 4 pts

Consider $9 + 13 + 17 + \dots$ (a) Find the sum of the first 30 terms. (b) What is the least number of terms whose sum exceeds 1,000?

4 Finite geometric series

/ 4 pts

No calculator. (a) Find $7 + 14 + 28 + \dots$ for 9 terms. (b) Evaluate $\sum_{k=1}^6 4\left(\frac{1}{2}\right)^{k-1}$.

5 Infinite series

/ 3 pts

(a) Find $18 + 6 + 2 + \dots$ (2 pts). (b) Explain why $3 + 6 + 12 + \dots$ has no sum.

6 The pendulum

/ 2 pts

A pendulum's first swing covers 40 cm (about 15.7 in). Each following swing is 90% as long as the one before. Find the total distance covered before it stops.



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