

INKMATHS FLASHCARDS

Sequences and series

5 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in precise wording, the standard results the formulae booklet does not print, a check-yourself question per topic, and the slips that lose marks. The same cards run on the website with spaced-repetition scheduling, at inkphysics.co.uk/maths/flashcards.

STANDARD RESULT

nth term:

arithmetic $u_n = ?$, geometric $u_n = ?$

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RECALL

State the validity condition for the general binomial expansion.

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RECALL

State how to pick out one coefficient from a binomial expansion.

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DEFINITION

Define: Periodic sequence.

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SPOT THE ERROR

Say what is wrong with this claim:

The series $2 + 3 + 4.5 + 6.75 + \dots$ has sum to infinity $2/(1 - 1.5) = -4$.

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RECALL

With n negative or fractional the expansion holds only for $|x| < 1$. Take out a to the n from $(a + bx)^n$ first, and the condition becomes $|bx/a| < 1$. Quoting $|x| < 1$ for $(2 + 3x)^{-1}$ is out by a factor of three.

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STANDARD RESULT

$$a + (n - 1)d, ar^{n-1}$$

SEQUENCES AND SERIES

DEFINITION

A sequence that repeats itself after a fixed number of terms, so u_{n+k} equals u_n for every n . Its order is the smallest k that does this, since every multiple of that k repeats as well.

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RECALL

Do not expand the lot. The general term of $(a + bx)^n$ is nCr times a to the $(n - r)$ times $(bx)^r$, so set r to the power of x you want and evaluate one term. Raise the whole of bx to the r , since forgetting to raise b is where the mark goes.

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SPOT THE ERROR

Here $r = 1.5$, so the terms grow and the series diverges. The sum to infinity formula only applies when $|r|$ is below 1. A series of positive terms returning a negative total is the tell, so check r before you use the formula, not after.

SEQUENCES AND SERIES