Module 10B: Arithmetic and geometric sequences

MTH 225
13 November 2020

The sequence 3, 15, 75, 375, 1875, ... is

Arithmetic

Geometric

Neither

To 0

The first two terms of a sequence are 1 and 10. In order for the entire sequence to be arithmetic, the third term must be

- 11
- 19
- 100
- It's impossible for this to be an arithmetic sequence

Recursive definitions for arithmetic and geometric sequences

Find recursive definitions for:

2, 5, 8, 11, 14, …

50, 43, 36, 29, …

3, 6, 12, 24, 48, …

27, 9, 3, 1, 1/3, …

Closed formulas for arithmetic and geometric sequences

Find closed formulas for:

2, 5, 8, 11, 14, ...

50, 43, 36, 29, …

3, 6, 12, 24, 48, …

27, 9, 3, 1, 1/3, ...

Finding sums of arithmetic and geometric sequences

Demo at Jamboard

Compute the sums:

$2 + 5 + 8 + 11 + 14 + \ldots + 77$

$27 + 9 + 3 + 1 + 1/3 + \ldots + 1/59049$

Feat. a couple of arithmetic tricks

Write the repeating decimal 0.669669669... as a fraction.

What we learned/what's next

- What *arithmetic* and *geometric* sequences are; how they are different; how to find the common difference or ratio
- How to find recursive and closed-formula definitions for both kinds
- How to add up the first "n" terms of each kind, easily

What's next:

- Module 11: Recurrence relations
- Module 11A: "Solutions" of recurrence relations and how to determine if a given closed formula is a solution for a recurrence relation