Module 10B: Arithmetic and geometric sequences

MTH 225 13 November 2020

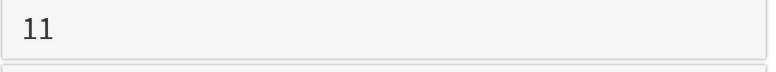
The sequence 3, 15, 75, 375, 1875, ... is

Arithmetic

Geometric

Neither

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



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:

$$2 + 5 + 8 + 11 + 14 + ... + 77$$

 $27 + 9 + 3 + 1 + 1/3 + ... + 1/59049$

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