Sequences and Series Homework – Homework: Arithmetic and Geometric Sequences[*]

Kenny M. Felder

This work is produced by The Connexions Project and licensed under the
Creative Commons Attribution License [†]

Abstract

An updated version of the Homework: Arithmetic and Geometric Sequences module.

Exercise 1
Look at a calendar for this month. Look at the column that represents all the Thursdays in this month.

- **a.** What are the dates?
- **b.** What kind of sequence do these numbers represent?
- **c.** If it is arithmetic, what is d, the common difference? If geometric, what is r, the common ratio?
- **d.** If that sequence continued, what would be the 100th term?

Exercise 2
How many terms are in the arithmetic sequence 25, 28, 31, 34,...,61?

Exercise 3
Suppose that a, b, c, d... represents an arithmetic sequence. For each of the sequences below, indicate if it is **arithmetic**, **geometric**, or **neither**.

- **a.** $a + 2$, $b + 2$, $c + 2$, $d + 2$...
- **b.** $2a$, $2b$, $2c$, $2d$...
- **c.** a^2, b^2, c^2, d^2...
- **d.** 2^a, 2^b, 2^c, 2^d...

Exercise 4
Find x to make the sequence
    10, 30, $2x + 8$

- **a.** arithmetic
- **b.** geometric

Exercise 5

In class, we showed how the "recursive definition" of an arithmetic sequence $t_{n+1} = t_n + d$ leads to the "explicit definition" $t_n = t_1 + d(n-1)$. For a geometric sequence, the recursive definition is $t_{n+1} = rt_n$. What is the explicit definition?

Exercise 6

Suppose a gallon of gas cost $1.00 in January, and goes up by 3% every month throughout the year.

NOTE: "Goes up 3%" is the same as "multiplies by 1.03."

a. Find the cost of gas, rounded to the nearest cent, each month of the year. (Use your calculator for this one!)
b. Is this sequence arithmetic, geometric, or neither?
c. If it keeps going at this rate, how many months will it take to reach $10.00/gallon?
d. How about $1000.00/gallon?

Exercise 7

In an arithmetic sequence, each term is the previous term plus a constant. In a geometric sequence, each term is the previous term times a constant. Is it possible to have a sequence which is both arithmetic **and** geometric?