

Section 3.3. Recursive Definitions

Note. In this section we introduce recursive definitions which are similar to the idea of mathematical induction.

Note. To define a function on the nonnegative integers we can:

1. Define the function at 0, and
2. Give a rule for finding its value at integer n in terms of the values of the functions at smaller integers.

This is a *recursive* or *inductive definition*.

Note. You likely saw the determinant of a matrix defined recursively in Linear Algebra; see my online notes at:

<http://faculty.etsu.edu/gardnerr/2010/c4s2.pdf>

Example. Page 205 Example 5. The Fibonacci numbers are defined recursively as $f_0 = 0$, $f_1 = 1$, and $f_n = f_{n-1} + f_{n-2}$ for nonnegative integer $n \geq 2$.

Note. We can also define sets recursively. Consider Page 210 Number 20.