Sequences

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Preliminaries and Objectives

Preliminaries
- Recursion

Objectives
- Develop notation for sequences

Example 1 - Powers of 2

2	4	8	16	32	64	128	. . .	65536
1st	2nd	3rd	4th	5th	6th	7th		

Tables

Position	Number
1	2
2	4
3	8
4	16
5	32
6	64
7	128
⋮	⋮
16	65536
⋮	⋮

Example 2 - Fibonacci Numbers

$$\underline{1} \quad \underline{1} \quad \underline{2} \quad \underline{3} \quad \underline{5} \quad \underline{8} \quad \underline{13} \quad \ldots$$

$F_1 = 1$ $\{F_n\}$ = Fibonacci numbers
$F_2 = 1$
$F_3 = 2$
$F_4 = 3$
$F_5 = 5$
$F_6 = 8 \ldots$

Example 3 - Even Numbers

n	E_n
1	2
2	4
3	6
4	8
5	10
6	12
7	14

$E_n = 2n$

Example 4 - Odd Numbers

n	D_n
1	1
2	3
3	5
4	7
5	9
6	11
7	13

$D_1 = 1,$ $D_{next} = D_{prev} + 2$

Example 4 - Odd Numbers

n	D_n
1	1
2	3
3	5
4	7
5	9
6	11
7	13

$D_1 = 1,$ $D_{n+1} = D_n + 2$

Example 2 - Fibonacci Numbers

$$\underline{\quad 1 \quad} \quad \underline{\quad 1 \quad} \quad \underline{\quad 2 \quad} \quad \underline{\quad 3 \quad} \quad \underline{\quad 5 \quad} \quad \underline{\quad 8 \quad} \quad \underline{\quad 13 \quad} \quad \ldots$$

$$F_1 = 1 \qquad F_2 = 1 \qquad F_{n+2} = F_{n+1} + F_n$$

A **sequence** is an ordered list of numbers

- Explicit Formula - a_n is given by a formula involving n
- Recursive Formula - Give the value of the first term, then give a formula for the next term based on previous terms.
- The subscript indicates the location in the sequence