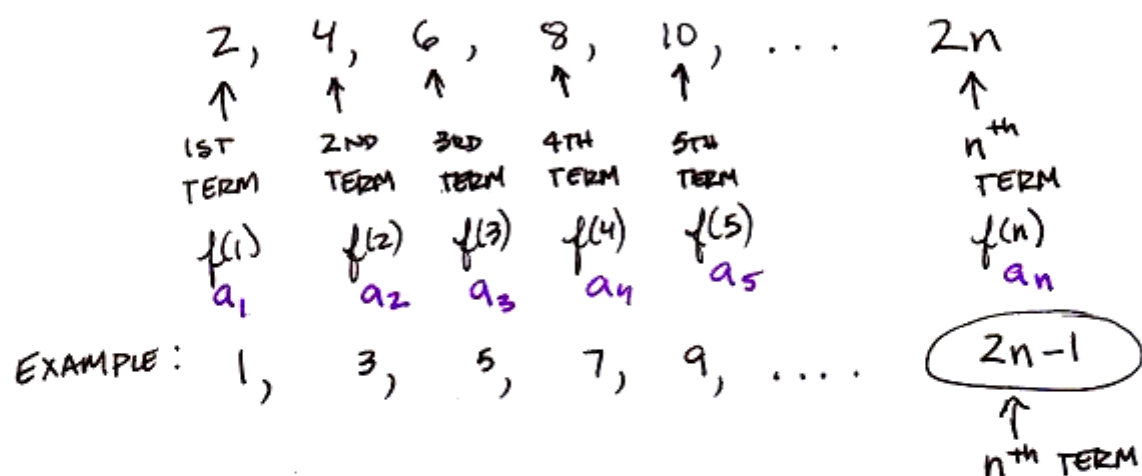


SEC 9.1 SEQUENCES & SUMMATION NOTATION

1. SEQUENCE: A FUNCTION f WHOSE DOMAIN IS THE SET OF NATURAL NUMBERS. THE VALUES ARE $f(1), f(2), f(3) \dots$. THESE ARE CALLED TERMS.

EXAMPLE: SEQUENCE OF NUMBERS



2. RECURSIVE FUNCTION: A FUNCTION WHERE "NEXT" TERM IS DEPENDENT ON THE "PREVIOUS" TERM.

EXAMPLE: FIBONACCI SEQUENCE

$1, 1, 2, 3, 5, 8, 13, 21, 34, \dots$

#11 (TEXTBOOK)

$a_n = 2(a_{n-1} - 2)$ AND $a_1 = 3$

\uparrow \uparrow

NOW PREVIOUS TERM

n	a_n
1	3
2	2
3	0
4	-4
5	-12

$$a_1 = 3$$

$$a_2 = 2(a_{2-1} - 2) = 2$$

$$2(a_1 - 2)$$

$$2(3 - 2)$$

$$2 \cdot 1$$

$$2$$

$$a_3 = 2(a_{3-1} - 2)$$

$$0 = 2(a_2 - 2)$$

$$2(2 - 2)$$

$$2 \cdot 0$$

$$0$$

$$a_4 = 2(a_{4-1} - 2)$$

$$2(a_3 - 2)$$

$$2(0 - 2)$$

$$2(-2)$$

$$-4$$

$$a_5 = 2(a_{5-1} - 2)$$

$$2(a_4 - 2)$$

$$2(-4 - 2)$$

$$2(-6)$$

$$-12$$

EXAMPLE

$$a_1 = 1; \quad a_2 = 2$$

$$a_n = a_{n-1} + a_{n-2}$$

$$a_3 = a_{3-1} + a_{3-2}$$

$$a_3 = a_2 + a_1$$

$$2 + 1$$

$$a_3 = 3$$

$$a_4 = a_{4-1} + a_{4-2}$$

$$a_3 + a_2$$

$$3 + 2$$

$$5$$

n	a _n
1	1
2	2
3	3
4	5
5	8
6	13
7	21

3. SIGMA NOTATION :

 Σ

PARTIAL SUM OF
TERMS IN A SEQUENCE

GREEK CAPITAL
LETTER

n ← END

 Σ
K=1

↑
START

$$a_k = a_1 + a_2 + a_3 + a_4 + a_5 + \dots + a_n$$

EXAMPLE:

$$\sum_{j=1}^5 j^2$$

$$= 1^2 + 2^2 + 3^2 + 4^2 + 5^2$$

$$= 1 + 4 + 9 + 16 + 25 = 55$$

"SUM OF THE FIRST 5 TERMS OF THE FUNCTION j^2 "

EXAMPLE: $\sum_{i=3}^8 2i+3 = \overset{9}{(2 \cdot 3+3)} + \overset{11}{(2 \cdot 4+3)} + \overset{13}{(2 \cdot 5+3)} + \overset{15}{(2 \cdot 6+3)} + \overset{17}{(2 \cdot 7+3)} + \overset{19}{(2 \cdot 8+3)} = 84$

EXAMPLE: $\sum_{t=4}^7 2^{t-1} = 2^{4-1} + 2^{5-1} + 2^{6-1} + 2^{7-1}$
 $2^3 + 2^4 + 2^5 + 2^6$
 $8 + 16 + 32 + 64 = 120$

25

1, 4, 7, 10 ...

$3n - 2$

FIND THE n^{th} TERM

n	$f(n)$
1	1
2	4
3	7
4	10
...	
n	$3n-2$