

Recursive Procedures

Recursive Sequences

$t_n =$
Eg. 3, 5, 7, 9... can be written as:

Another way to write an explicit formula is using a Recursion Formula.

ist
diff
/

2
2
2

+b
1

Pull

$$t_1 = 3, t_n = t_{n-1} + 2$$

Previous term.

$$t_{n-2}$$
$$t_{n+2}$$

Recursive Sequences

Determine the first 4 terms in each sequence

a) $t_1 = 4, t_n = t_{n-1} + 3$

4, 7, 10, 13, ...

$$t_3 = t_1 + t_2$$
$$t_3 = 2$$

b) $t_1 = 1, t_2 = 1, t_n = t_{n-2} + t_{n-1}$

1, 1, 2, 3, 5, 8, 13, ...

Recursive Sequences

Determine a recursive formula for each sequence.

a) -3, 6, -12, 24...

$$t_1 = -3$$

$$\begin{array}{c|c} n & t_n \\ \hline 1 & -3 \end{array}$$

$$2 \quad -3(-2) = t_1 \times (-2)$$

$$3 \quad 6(-2) = t_2 \times (-2)$$

$$4 \quad -12(-2) = t_3 \times (-2)$$

$$t_n = t_{n-1}(-2)$$

$$t_n = -2t_{n-1}$$

$$t_1 = -3$$

b)

c)

b) 5, 7, 9, 11...

$$t_1 = 5$$
$$t_n = t_{n-1} + 2$$

c) 3, 5, 8, 12...

n	t_n
1	3
2	$3 + 2 = t_1 + 2$
3	$5 + 3 = t_2 + 3$
4	$8 + 4 = t_3 + 4$

$\therefore t_1 = 3$
 $t_n = t_{n-1} + n$

Problem #1

Determine the 100th term of the sequence:

$$t_1 = 10, t_n = t_{n-1} + 2$$

n	t_n	Δ
1	10	1
2	12	2
3	14	2

$$t_n = 2n + 8$$
$$t_{100} = 208$$

Problem #2

Determine the 100th term of the sequence:

$$t_1 = 1, t_2 = 1, \quad t_n = \frac{2t_{n-1}}{t_{n-2}}$$

$$\underbrace{1, 1, 2, 4, 4, 2, 1, 1, 2, 4, 4}_{6 \times 16 = 96}$$

Homework:

pg 370 # (1 - 3)ace, 6,
(8, 9)ace, 10