

2. Recurrence Relations



Recurrence Relations

As well as being defined by explicit formulae a sequence can be defined using an **implicit formula**. (RECURRENCE RELATIONS)

This time each term is determined **from the previous term**.

Notation:

U_0 \longrightarrow Starting Value

U_n \longrightarrow Current Term

U_{n+1} \longrightarrow Next Term

U_{n-1} \longrightarrow Previous Term

So $U_{n+1} = 2U_n - 3$ means next term = 2 x this term then subtract 3

Implicit formula for terms in a sequence.

Example 1

Find the first 5 terms in the sequence defined by

$$U_{n+1} = 3U_n - 6 \quad (U_0 = 12)$$

Solution:

$$U_0 = 12$$

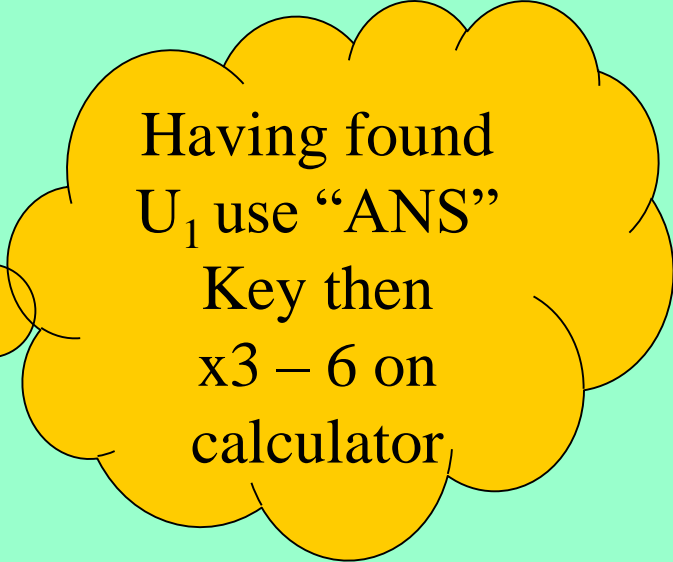
$$U_1 = 3 \times 12 - 6 = 30$$

$$U_2 = 3 \times 30 - 6 = 84$$

$$U_3 = 3 \times 84 - 6 = 246$$

$$U_4 = 3 \times 246 - 6 = 732$$

$$U_5 = 3 \times 732 - 6 = 2190$$



Having found
 U_1 use "ANS"
Key then
 $\times 3 - 6$ on
calculator

Booklet , p.3, EX 2