## WWW.M4THS.COM A LEVEL MATHS

## (19) Recurrence Relations and Periodic Sequences

**WORKING AT D/E** (1)  $u_{n+1} = 4u_n - 1$ ,  $u_1 = 3$ .

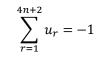
(a) Find u<sub>2</sub>, u<sub>3</sub> and u<sub>4</sub>.
(b) Explain why the sequence is not arithmetic.
(c) Find

## WORKING AT B/C

(1)  $u_n = \cos(90n^o)$  ,  $n \geq 1$ 

(a) Show that the order of the sequence is 4

(b) Explain why



(2) 
$$u_{n+1} = (u_n)^2 - 1$$
,  $u_1 = p$ ,  $p > 0$ 

(a) Find and expression for  $u_2$ ,

Given that

$$\sum_{r=1}^{2} u_r = 19$$

(b) Find the value of *p* 

 $(2) u_{n+1} = -u_n, \ u_1 = 4.$ 

(a) Find  $u_2$ ,  $u_3$  and  $u_4$ .

(b) Name what type of sequence this is.

(c) Explain why

$$\sum_{r=1}^{2000} u_r = 0$$

(3)  $u_n = (-1)^n, n \ge 1$ 

(a) Show that the sequence is periodic and state its period.

(b) Write down the value of



## WORKING AT A\*/A

(1) A sequence is defined for  $n \ge 2$  by the recurrence relation

 $u_n = u_{n-1} - 3, u_1 = k,$ 

(a) Show that the sequence is arithmetic.

Given that  $u_8 = -11$ 

(b) Find the value of k

(c) Evaluate



(2)  $u_n = \tan(180n^o) + \cos(180n^o)$ ,  $n \ge 1$ 

Explain why

(a)

(b)



 $\sum_{r=1}^{2n+1} u_r = -1$ 

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