(13) Arithmetic Sequences

WORKING AT D/E

(1) The nth term of an arithmetic sequence is

$$u_n = 2n + 5$$

(a) Find the first 3 terms in the sequence.

(b) Show that the term 91 is in the sequence.

(c) Given that $u_a = 47$, find the value of a.

(2) (a) A sequence is generated by the formula
$$u_n = 24 - 3n$$
(i) How many terms in the sequence are > 0 ?
(ii) Find u_{20}

(b) A sequence is generated by the formula
$$u_n = 12 + 8n$$
(i) Find the value of a, the first term.
(ii) Write down d, the common difference.
(iii) Write down the first term that exceeds 100.

(3) Find the nth term of the sequence -10, -14, -18, -22….. in the form $u_n = pn + q$

WORKING AT B/C

(1) In an arithmetic sequence the 4th term is 18 and the 12th term is 34.

(a) Find the nth term of the sequence in the form $u_n = pn + q$, where p and q are constants.

(b) Another arithmetic sequence has nth term $u_n = 40 - 3n$. Show that there is a term in **both** sequences, stating the term.

(2) (a) Find out how many terms there are in each of the sequences below:

(i) $4, 7, 10 \ldots .238, 241$ (ii) $5, 3, 1 \ldots . -121$

(b) An arithmetic sequence is $40, 36, 32 \ldots .. -236$. How many negative terms are there in the sequence?

(3) The first 3 terms of an arithmetic sequence are $2p - 1, \ p - 2$ and $4p + 9$.

(a) Show that $-p - 1 = 3p + 11$

(b) Hence, find the value of p

(c) Find the nth term of the formula.

(d) Write down the number of negative terms in the sequence.

WORKING AT A*/A

(1) An arithmetic sequence u_n has first term $p^2 + 1$ and second term $3p + 10$, where p is a positive constant. Given that the common difference, d, in the sequence is 5.
(a) Find the value of p
(b) Find the third term.
(c) Find the largest term less than 100.
Given instead p was a negative constant,
(d) Find an expression form the nth term of the sequence in the form $u_r = ar + b$
(e) Write down the only terms that appear in u_n that don't appear in u_r.

(2) A sequence has first 3 terms $p^2, 4p$ and $2p + 10$ where p is a constant.

Prove that the sequence is not arithmetic.