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A LEVEL MATHS

(14) Arithmetic Series

WORKING AT D/E

(1) Find the sum of the first 80 terms in each arithmetic sequence using the formula book:
(a) First term (a) 4, common different (d) 6
(b) -3, 1, 5, 9, 13……..
(c) $u_n = 3n - 4$
(d) $u_n = 8 - n$

(2) An arithmetic series has first term 6, second term 11 and last term 611.
Use the formula book to show that the sum of all the terms in the sequence is 37637.

(3) An arithmetic series has first term -2 and second term -5. The sum of the first n terms is -5430.
(a) Using the formula book, show that
$$3n^2 + n - 10860 = 0$$
(b) Hence find the value of n

WORKING AT B/C

(1) Show that the sum of the first 40 even numbers is 1640

(2) The first term of an arithmetic series is 9 and the last is 384. Given that the sum of the terms in the series is 14541

(a) Find the number of terms in the sequence

(b) Show that the 12th term in the sequence is $\frac{4782}{73}$

(3) The first 3 terms of an arithmetic series are $2p$, $p^2 - 11$ and $p + 5$ where p is a constant. Given that the sum of the first 3 terms is -6

(a) Find the value of p

(b) Find the 14th term of the series

(c) Find the sum of the first 60 terms in the series.

WORKING AT A*/A

(1) The 8th term of aa arithmetic series is 28 and the 14th terms is 64.
(a) Find the sum of the first 100 terms in the series.
(b) Given that the sum of the first r terms doesn't exceed 3000, find the value of r.
(c) Given that the sum of the first k terms in the sequence is negative, find the greatest possible value of k.

(2) Prove that the sum of the first n terms in an arithmetic series can be given as $\frac{n}{2}(a + l)$ where a is the first term and l is the last term.

(3) Show that the difference between the sum of the first 100 even numbers and the first 100 odd numbers is 100.