2. *[Maximum mark: 6]*

Consider the arithmetic sequence $3, 9, 15, \ldots, 1353$.

(a) Write down the common difference. *[1 mark]*

(b) Find the number of terms in the sequence. *[3 marks]*

(c) Find the sum of the sequence. *[2 marks]*

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2. *[Maximum mark: 6]*

An arithmetic sequence, $u_1, u_2, u_3 \ldots$, has $d = 11$ and $u_{27} = 263$.

(a) Find u_1. *[2 marks]*

(b) (i) Given that $u_n = 516$, find the value of n.

(ii) For this value of n, find S_n. *[4 marks]*

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3. *[Maximum mark: 5]*

In an arithmetic sequence $u_1 = 7$, $u_{20} = 64$ and $u_n = 3709$.

(a) Find the value of the common difference. *[3 marks]*

(b) Find the value of n. *[2 marks]*

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Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. In particular, solutions found from a graphic display calculator should be supported by suitable working, e.g. if graphs are used to find a solution, you should sketch these as part of your answer. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

SECTION A

*Answer **all** questions in the boxes provided. Working may be continued below the lines if necessary.*

1. *[Maximum mark: 6]*

The first three terms of an arithmetic sequence are 36, 40, 44, ….

(a) (i) Write down the value of d.

(ii) Find u_8. *[3 marks]*

(b) (i) Show that $S_n = 2n^2 + 34n$.

(ii) Hence, write down the value of S_{14}. *[3 marks]*

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3. *[Maximum mark: 6]*

The first term of a geometric sequence is 200 and the sum of the first four terms is 324.8.

(a) Find the common ratio. *[4 marks]*

(b) Find the tenth term. *[2 marks]*

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*Do **NOT** write solutions on this page.*

9. *[Maximum mark: 14]*

The first two terms of a geometric sequence u_n are $u_1 = 4$ and $u_2 = 4.2$.

(a) (i) Find the common ratio.

(ii) Hence or otherwise, find u_5. *[5]*

Another sequence v_n is defined by $v_n = an^k$, where $a, k \in \mathbb{R}$, and $n \in \mathbb{Z}^+$, such that $v_1 = 0.05$ and $v_2 = 0.25$.

(b) (i) Find the value of a.

(ii) Find the value of k. *[5]*

(c) Find the smallest value of n for which $v_n > u_n$. *[4]*