Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. 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.*

1. *[Maximum mark: 6]*

In an arithmetic sequence, $u_1 = 2$ and $u_3 = 8$.

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

(b) Find u_{20}. *[2 marks]*

(c) Find S_{20}. *[2 marks]*

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

9. *[Maximum mark: 16]*

The first three terms of a infinite geometric sequence are $m-1$, 6, $m+4$, where $m \in \mathbb{Z}$.

(a) (i) Write down an expression for the common ratio, r.

(ii) Hence, show that m satisfies the equation $m^2+3m-40=0$. *[4]*

(b) (i) Find the two possible values of m.

(ii) Find the possible values of r. *[6]*

(c) The sequence has a finite sum.

(i) State which value of r leads to this sum **and** justify your answer.

(ii) Calculate the sum of the sequence. *[6]*

2. *[Maximum mark: 7]*

In an arithmetic sequence, the third term is 10 and the fifth term is 16.

(a) Find the common difference. *[2]*

(b) Find the first term. *[2]*

(c) Find the sum of the first 20 terms of the sequence. *[3]*

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7. *[Maximum mark: 8]*

The sums of the terms of a sequence follow the pattern

$S_1 = 1 + k$, $S_2 = 5 + 3k$, $S_3 = 12 + 7k$, $S_4 = 22 + 15k$, …, where $k \in \mathbb{Z}$.

(a) Given that $u_1 = 1 + k$, find u_2, u_3 and u_4. *[4]*

(b) Find a general expression for u_n. *[4]*

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2. *[Maximum mark: 6]*

In an arithmetic sequence, the first term is 2 and the second term is 5.

(a) Find the common difference. *[2]*

(b) Find the eighth term. *[2]*

(c) Find the sum of the first eight terms of the sequence. *[2]*

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3. [Maximum mark: 6]

In an arithmetic sequence $u_{10} = 8$, $u_{11} = 6.5$.

(a) Write down the value of the common difference. [1]

(b) Find the first term. [3]

(c) Find the sum of the first 50 terms of the sequence. [2]

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