

Edexcel GCSE Mathematics (Linear) – 1MA0

SEQUENCES

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil



Instructions

Use black ink or ball-point pen.

Fill in the boxes at the top of this page with your name, centre number and candidate number.

Answer all questions.

Answer the questions in the spaces provided – there may be more space than you need.

Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.

Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.

Keep an eye on the time.

Try to answer every question.

Check your answers if you have time at the end.

1. Here are the first 5 terms of an arithmetic sequence.

$$\begin{array}{cccccc} & 5 & 10 & 15 & & \\ & \searrow & & \searrow & & \\ 6, & 11, & 16, & 21, & 26 & \\ & \nearrow & & \nearrow & & \\ & +5 & & +5 & & \end{array}$$

Find an expression, in terms of n , for the n th term of the sequence.

$$\dots Sn + 1 \dots$$

(Total 2 marks)

2. Here are the first five terms of a number sequence.

$$\begin{array}{cccccc} 3 & 8 & 13 & 18 & 23 & \\ & \nearrow & & \nearrow & & \\ & +5 & & +5 & & \end{array}$$

- (a) Write down the next **two** terms of the sequence.

$$\dots 28, 33 \dots$$

(2)

- (b) Explain how you found your answer.

$$\dots \text{The sequence goes up by 5 each time} \dots$$

(1)

- (c) Explain why 387 is **not** a term of the sequence.

$$\dots \text{Because every term ends in either 3 or} \dots$$

$$\dots 8 \text{ and } 387 \text{ ends in a } 7. \dots$$

(1)

(Total 4 marks)

3. Here are the first five terms of a number sequence.

$$\begin{array}{cccccc} 126 & 122 & 118 & 114 & 110 & \\ & \searrow & & \searrow & & \\ & -4 & & -4 & & \end{array}$$

- (a) Write down the next two terms of the number sequence.

$$\dots 106, 102 \dots$$

(1)

- (b) Explain how you found your answer.

$$\dots \text{I took away } 4 \text{ from the previous term} \dots$$

(1)

The 20th term of the number sequence is 50

(c) Write down the 21st term of the number sequence.

$$50 - 4 \qquad \dots 46 \dots$$

(1)

(Total 3 marks)

4. Here are the first five terms of a number sequence.

$$3 \xrightarrow{+4} 7 \xrightarrow{+4} 11 \quad 15 \quad 19$$

(a) Work out the 8th term of the number sequence.

$$\begin{aligned} 9 + 4 &= 13 \\ 13 + 4 &= 17 \\ 17 + 4 &= 21 \end{aligned} \qquad \dots 21 \dots$$

(1)

(b) Write down an expression, in terms of n , for the n th term of the number sequence.

$$\begin{aligned} &4n \\ \text{Compare to } &4 \times \text{table} \quad \dots 4n - 1 \dots \end{aligned}$$

$$\begin{array}{ccc} -1 & 4 & 8 & 16 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 3 & 7 & 11 & \end{array}$$

(2)

(Total 3 marks)

5. The first five terms of an arithmetic sequence are

$$2 \quad 9 \quad 16 \quad 23 \quad 30$$

$$\xrightarrow{+7} \quad \xrightarrow{+7} \quad \xrightarrow{+7}$$

Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{ccc} -5 & 7 & 14 & 21 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 2 & 9 & 16 & \end{array} \qquad \dots 7n - 5 \dots$$

(Total 2 marks)

6. The first five terms of an arithmetic sequence are

$$2 \quad 7 \quad 12 \quad 17 \quad 22$$

$$\xrightarrow{+5} \quad \xrightarrow{+5}$$

Write down, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{ccc} -3 & 5 & 10 & 15 & 20 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 2 & 7 & 12 & 17 & 22 \end{array} \qquad \dots 5n - 3 \dots$$

(Total 2 marks)

7. Here are the first five terms of an arithmetic sequence.

$$-1 \quad 3 \quad 7 \quad 11 \quad 15$$

$\xrightarrow{+4}$ $\xrightarrow{+4}$

(a) Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{cccc}
 -5 & 4 & 8 & 12 \\
 \swarrow & & & \\
 -1 & 3 & 7 &
 \end{array}
 \qquad \dots 4n - 5 \dots$$

(2)

In another arithmetic sequence the n th term is $8n - 16$

John says that there is a number that is in both sequences.

(b) Explain why John is wrong.

All terms in the first sequence are odd
 whereas the new sequence is all even numbers

(2)

(Total 4 marks)

8. The first four terms of an arithmetic sequence are

$$21 \quad 17 \quad 13 \quad 9$$

$\xrightarrow{-4}$ $\xrightarrow{-4}$

Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{cccc}
 +25 & -4 & -8 & -12 \\
 \swarrow & & & \\
 21 & 17 & &
 \end{array}
 \qquad \dots -4n + 25 \dots$$

(Total 2 marks)

9. The n th term of a sequence is $2n^2$

(i) Find the 4th term of the sequence.

$$2 \times 4^2 = 2 \times 16 \qquad \dots 32 \dots$$

(ii) Is the number 400 a term of the sequence?

$$\begin{array}{l}
 400 \div 2 = 200 \\
 \sqrt{200} = 14.14
 \end{array}
 \qquad \dots \text{NO} \dots$$

Give reasons for your answer.

Because $\frac{1}{2}$ of 400 is 200

and if $n^2 = 200$ then n is not a whole number.

(Total 3 marks)

10. Here are the first 5 terms of an arithmetic sequence.

$$3 \quad 9 \quad 15 \quad 21 \quad 27$$

$\xrightarrow{+6}$ $\xrightarrow{+6}$

(a) Find an expression, in terms of n , for the n th term of this sequence.

$$\begin{array}{cccc}
 & 6 & 12 & 18 \\
 -3 \downarrow & & & \\
 & 3 & 9 & 15
 \end{array}
 \qquad
 \dots\dots\dots 6n - 3$$

(2)

Ben says that 150 is in the sequence.

(b) Is Ben right?

You must explain your answer.

$$6n - 3 = 150$$

$$6n = 153$$

153 won't be divisible by 6 so 150 is not in the sequence

(1)

(Total 3 marks)

11. Here are the first 5 terms of an arithmetic sequence.

$$2 \quad 9 \quad 16 \quad 23 \quad 30$$

$\xrightarrow{+7}$ $\xrightarrow{+7}$

(a) Write down the 12th term of this sequence.

$$\begin{array}{l}
 30 + 7 = 37 \qquad 72 \\
 37 + 7 = 44 \qquad 79 \\
 \qquad 51 \\
 \qquad 58 \\
 \qquad 65
 \end{array}
 \qquad
 \dots\dots\dots 79$$

(1)

(b) Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{cccc}
 & 7 & 14 & 21 & 28 \\
 -5 \downarrow & & & & \\
 & 2 & 9 & 16 & 23
 \end{array}
 \qquad
 \dots\dots\dots 7n - 5$$

(2)

(Total 3 marks)

12. The first four terms of an arithmetic sequence are

$$21 \quad 17 \quad 13 \quad 9$$

$\xrightarrow{-4}$ $\xrightarrow{-4}$

Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{r}
 +25 \downarrow \\
 -4 \quad -8 \quad -12 \\
 21 \quad 17
 \end{array}$$

$$\underline{\underline{-4n + 25}}$$

(Total 2 marks)

13. Here are the first 5 terms of an arithmetic sequence.

$$6, 11, 16, 21, 26$$

$\xrightarrow{+5}$ $\xrightarrow{+5}$

Find an expression, in terms of n , for the n th term of the sequence.

$$\begin{array}{r}
 +1 \downarrow \\
 5 \quad 10 \quad 15 \\
 6 \quad 11 \quad 16
 \end{array}$$

$$\underline{\underline{5n + 1}}$$

(Total 2 marks)

14. The first five terms of an arithmetic sequence are

$$2 \quad 9 \quad 16 \quad 23 \quad 30$$

$\xrightarrow{+7}$ $\xrightarrow{+7}$

Find, in terms of n , an expression for the n th term of this sequence.

$$\begin{array}{r}
 -5 \downarrow \\
 7 \quad 14 \quad 21 \\
 2 \quad 9 \quad 16
 \end{array}$$

$$\underline{\underline{7n - 5}}$$

(Total 2 marks)

15. Here are the first five terms of a number sequence.

3 8 13 18 23 ,
 $\xrightarrow{+5}$ $\xrightarrow{+5}$

(a) Write down the next **two** terms of the sequence.

28, 33

(2)

(b) Explain how you found your answer.

It goes up by 5 each time

(1)

(c) Explain why 387 is **not** a term of the sequence.

All terms in the sequence end in
3 or 8. 387 ends in 7

(1)

(Total 4 marks)

16. Here are the first five terms of a number sequence.

3 7 11 15 19

(a) Write down an expression, in terms of n , for the n th term of this sequence.

$\xrightarrow{+4}$ $\xrightarrow{+4}$
 $\begin{matrix} 4 & 8 & 12 \\ -1 & 3 & 7 & 11 \end{matrix}$

$4n - 1$

(2)

Adeel says that 319 is a term in the number sequence.

(b) Is Adeel correct?

You must justify your answer.

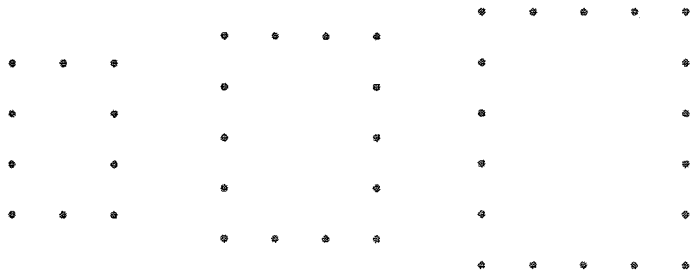
$319 - 1 = 318$

318 isn't divisible by 4 so it won't
in the sequence

(2)

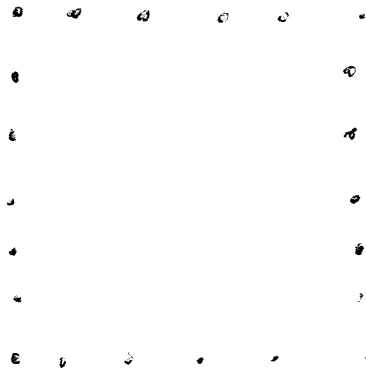
(Total 4 marks)

17. Here are some patterns made up of dots.



Pattern number 1 Pattern number 2 Pattern number 3

(a) In the space below, draw Pattern number 4.



(1)

(b) Complete the table.

Pattern number	1	2	3	4	5	6	7	8	9	10
Number of dots	10	14	18	22	26	30	34	38	42	46

(1)

(c) How many dots are used in Pattern number 10?

46
.....

(1)

(Total 3 marks)