



KS3.M-A15 Linear Sequences and the n th Term

AQA KS3.M-A15 · Calculators not allowed · about 75 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 For each sequence give the next two terms.

(a) Sequence: 4, 9, 14, 19, ... (1)

(b) Sequence: 20, 17, 14, 11, ... (1)

(c) Sequence: 7, 11, 15, 19, ... (1)

2 State the term-to-term rule for each sequence.

(a) Sequence: 3, 6, 9, 12, ... (1)

(b) Sequence: 50, 45, 40, 35, ... (1)

3 A sequence has rule: start at 2 and add 6 each time. Write down the first four terms.

(2)

4 For each sequence, find an expression for the n th term in the form $an + b$.

(a) Sequence: 5, 8, 11, 14, ... (1)

(b) Sequence: 12, 9, 6, 3, ... (1)

(c) Sequence: 7, 11, 15, 19, ... (2)

5 Given the n th term $6n - 4$, work out the 5th term and the 0th term.

(a) Find the 5th term. (2)

(b) Find the 0th term. (2)

6 A sequence begins 2, 5, 8, 11, ... and the n th term is $3n - 1$.

(a) Show that the 4th term from the n th term formula is 11. (1)

(b) Write down the 10th term. (2)

7 Find n when the n th term equals 41 for the sequence with n th term $5n - 4$.

(3)

- 8** The n th term of a sequence is $8n + 2$. Is 50 a term of this sequence? If it is, find n ; if it is not, explain why.

(4)

- 9** A gardener plants bulbs in a straight line. On the first day she plants 7 bulbs and each day after she plants 4 more than the previous day. Let the n th day have n th term $4n + 3$. On which day will she first have planted at least 35 bulbs in that single day?

(3)

- 10** Stretch: The n th term of a sequence is given by $an + b$. The first term is 11 and the 5th term is 31. Find the values of a and b , then state the 8th term.

(4)

Mark scheme · KS3.M-A15 Linear Sequences and the nth Term

Question 1

- (a) **B1** next two terms 24 and 29 cao
- (a) Answer: **24, 29**
- (b) **B1** next two terms 8 and 5 cao
- (b) Answer: **8, 5**
- (c) **B1** next two terms 23 and 27 cao
- (c) Answer: **23, 27**

Question 2

- (a) **B1** add 3 each time cao
- (a) Answer: **Add 3 each time**
- (b) **B1** subtract 5 each time cao
- (b) Answer: **Subtract 5 each time**

Question 3

- **M1** list showing repeated addition by 6
- **A1** 2, 8, 14, 20 cao
- Answer: **2, 8, 14, 20**

Question 4

- (a) **B1** $3n + 2$ cao
- (a) Answer: **$3n + 2$**
- (b) **B1** $-3n + 15$ cao
- (b) Answer: **$-3n + 15$**
- (c) **M1** common difference 4 identified, so $a = 4$
- (c) **A1** $4n + 3$ cao
- (c) Answer: **$4n + 3$**

Question 5

- (a) **M1** substitute $n = 5$ into $6n - 4$
- (a) **A1** 26 cao
- (a) Answer: **26**
- (b) **M1** substitute $n = 0$ into $6n - 4$
- (b) **A1** -4 cao
- (b) Answer: **-4**

Question 6

- (a) **B1** substitution $n = 4$ gives 11 cao
- (a) Answer: **11**
- (b) **M1** substitute $n = 10$ into $3n - 1$
- (b) **A1** 29 cao
- (b) Answer: **29**

Question 7

- **M1** set up equation $5n - 4 = 41$ or $5n = 45$
- **M1** divide both sides by 5 or perform correct arithmetic to get $n = 9$
- **A1** $n = 9$ cao
- Answer: **$n = 9$**

Question 8

- **M1** set up equation $8n + 2 = 50$ and rearrange to $8n = 48$
- **M1** divide both sides by 8 to find $n = 6$
- **A1** $n = 6$ cao
- **B1** explicit statement that 50 is a term since $n = 6$ is a positive integer (or equivalent justification)
- **Answer: $n = 6$**

Question 9

- **M1** set up inequality $4n + 3 \geq 35$ and rearrange to $4n \geq 32$
- **M1** divide by 4 to get $n \geq 8$
- **A1** first day is $n = 8$ cao
- **Answer: 8**

Question 10

- **M1** use first term: $a(1) + b = 11$ or $a + b = 11$
- **M1** use fifth term: $a(5) + b = 31$ or $5a + b = 31$ and subtract to find $4a = 20$
- **A1** $a = 5$ cao
- **A1** $b = 6$ and 8th term $= 5(8) + 6 = 46$ cao
- **Answer: $a = 5$, $b = 6$; 8th term = 46**