2.15 Linear Sequences and the nth Term: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Here are the first five terms of an arithmetic sequence.
17, 20, 23, 26, 29
Find an expression for the nth term.

(2)

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2 Here are the first five terms of an arithmetic sequence.
-3, 0, 3, 6, 9
Find an expression for the nth term.

(2)

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3 Here are the first four terms of a sequence.
11, 4, 15, 19
Write down the next two terms and describe the rule.

(2)

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4 Here are the first five terms of an arithmetic sequence.
3, 11, 19, 27, 35
Find an expression for the nth term.

(2)

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5 Here are the first four terms of a sequence.
22, 19, 16, 13
Write down the next two terms and describe the rule.

(2)

6 A pattern uses 3 dots in pattern number 1, 5 in pattern number 2 and 7 in pattern number 3, and continues in the same way.
How many dots are needed for pattern number 20?

(3)

7 Here are the first five terms of an arithmetic sequence.
4, 8, 12, 16, 20
Find an expression for the nth term.

(2)

8 The nth term of a sequence is 9n + 1.
Work out the 49th term.

(2)

9 Here are the first five terms of an arithmetic sequence.
19, 28, 37, 46, 55
Find an expression for the nth term.

(2)

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10 The nth term of a sequence is 5n + 5.
Find the first term of the sequence that is greater than 50.

(3)

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11 Here are the first four terms of a sequence.
81, 100, 121, 144
Write down the next two terms and describe the rule.

(2)

---

12 A pattern uses 5 dots in pattern number 1, 8 in pattern number 2 and 11 in pattern number 3, and continues in the same way.
How many dots are needed for pattern number 14?

(3)

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13 Here are the first four terms of a sequence.
3, 12, 48, 192
Write down the next two terms and describe the rule.

(2)

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14 Here are the first five terms of an arithmetic sequence.
13, 16, 19, 22, 25
Find an expression for the nth term.

(2)

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15 Mo says that 292 is in the sequence with nth term 8n + 5. Is Mo correct? Explain your answer.

(3)

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16 The nth term of a sequence is 7n + 5.
Is 250 a term of this sequence? Show your working.

(3)

---

17 Find the nth term of the sequence 2, 9, 16, 23, ...

(2)

---

18 Find the 15th term of the sequence with nth term 7n - 3.

(2)

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19 The nth term of a sequence is given by an + b. The first term is 9 and the 6th term is 34. Find the values of a and b, then state the 10th term.

(3)

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

(a) Sequence: 4, 8, 12, 16, ... **(1)**

(b) Sequence: 60, 52, 44, 36, ... **(1)**

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Mark scheme · 2.15 Linear Sequences and the nth Term: 1-hour Pack

Question 1

common difference 3 identified (or 3n in the expression) **M1**

3n + 14 cao **A1**

Answer: **nth term = 3n + 14**

Question 2

common difference 3 identified (or 3n in the expression) **M1**

3n - 6 cao **A1**

Answer: **nth term = 3n - 6**

Question 3

next two terms 34, 53 **B1**

rule: add the previous two terms **B1**

Answer: **34, 53 (add the previous two terms)**

Question 4

common difference 8 identified (or 8n in the expression) **M1**

8n - 5 cao **A1**

Answer: **nth term = 8n - 5**

Question 5

next two terms 10, 7 **B1**

rule: subtract 3 **B1**

Answer: **10, 7 (subtract 3)**

Question 6

identifies the common difference 2 **M1**

nth term 2n + 1 or continues the pattern correctly **M1**

41 cao **A1**

Answer: **41**

Question 7

common difference 4 identified (or 4n in the expression) **M1**

4n cao **A1**

Answer: **nth term = 4n**

Question 8

substitutes n = 49: 9 x 49 + 1 **M1**

442 cao **A1**

Answer: **442**

Question 9

common difference 9 identified (or 9n in the expression) **M1**

9n + 10 cao **A1**

Answer: **nth term = 9n + 10**

Question 10

5n + 5 = 50 or 5n + 5 > 50 used, or a trial of values **M1**

n = 10 identified, or the terms either side of 50 found **M1**

55 cao **A1**

Answer: **55**

Question 11

next two terms 169, 196 **B1**

rule: square numbers **B1**

Answer: **169, 196 (square numbers)**

Question 12

identifies the common difference 3 **M1**

nth term 3n + 2 or continues the pattern correctly **M1**

44 cao **A1**

Answer: **44**

Question 13

next two terms 768, 3072 **B1**

rule: multiply by 4 **B1**

Answer: **768, 3072 (multiply by 4)**

Question 14

common difference 3 identified (or 3n in the expression) **M1**

3n + 10 cao **A1**

Answer: **nth term = 3n + 10**

Question 15

8n + 5 = 292 written down **M1**

n = 287/8 or a clear check that the terms are 285 and 293 **M1**

No, with a correct explanation **A1**

Answer: **No, Mo is not correct**

Question 16

7n + 5 = 250 written as an equation **M1**

solves to get n = 35 **M1**

Yes, it is the 35th term **A1**

Answer: **Yes, it is the 35th term**

Question 17

identifies common difference 7 **M1**

7n - 5 cao **A1**

Answer: **7n - 5**

Question 18

substitutes n = 15 **M1**

102 cao **A1**

Answer: **102**

Question 19

forms and solves a + b = 9 and 6a + b = 34 simultaneously, e.g. 5a = 25 **M1**

a = 5, b = 4 **A1**

10th term = 54 (ft their a and b) **B1**

Answer: **a = 5, b = 4, 10th term = 54**

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Question 20

(a) start at 4, add 4 oe **B1**

(a) Answer: **start at 4, add 4 each time**

(b) start at 60, subtract 8 oe **B1**

(b) Answer: **start at 60, subtract 8 each time**

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