2.15 Linear Sequences and the nth Term: Test Pack

Calculators not allowed · about 60 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)**

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2 Stretch: The nth 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)

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3 Mo says that 72 is in the sequence with nth term 8n + 1. Is Mo correct? Explain your answer.

(3)

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4 The nth term of a sequence is 6n + 5.
Is 143 a term of this sequence? Show your working.

(3)

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

(2)

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6 A pattern uses 9 tiles in pattern number 1, 15 in pattern number 2 and 21 in pattern number 3, and continues in the same way.
Which pattern number uses 207 tiles?

(3)

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7 Here are the first four terms of a sequence.
49, 64, 81, 100
Write down the next two terms and describe the rule.

(2)

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

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

.....

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

.....

9 A sequence begins 2, 5, 8, 11, ... and the nth term is 3n - 1.

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

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

.....

10 The nth term of a sequence is 4n - 4.
Find the first term of the sequence that is greater than 150.

(3)

11 The nth 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)

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12 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 nth day have nth term 4n + 3. On which day will she first have planted at least 35 bulbs in that single day?

(3)

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13 For each sequence give the next two terms.

(a) Sequence: 8, 11, 14, 17, ... **(1)**

.....

(b) Sequence: 30, 26, 22, 18, ... **(1)**

.....

(c) Sequence: 9, 13, 17, 21, ... **(1)**

.....

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14 State whether the sequence 5, 8, 11, 14, ... is increasing or decreasing, and give its common difference.

(1)

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15 A sequence has rule: start at 5 and add 7 each time. Write down the first four terms.

(1)

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16 For each sequence, find an expression for the nth term in the form an + b.

(a) Sequence: 6, 10, 14, 18, ... **(1)**

(b) Sequence: 15, 11, 7, 3, ... **(1)**

(c) Sequence: 9, 13, 17, 21, ... **(1)**

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Mark scheme · 2.15 Linear Sequences and the nth Term: Test Pack

Question 1

(a) next two terms 24 and 29 cao **B1**

(a) Answer: **24, 29**

(b) next two terms 8 and 5 cao **B1**

(b) Answer: **8, 5**

(c) next two terms 23 and 27 cao **B1**

(c) Answer: **23, 27**

Question 2

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 **M1**

a = 5 cao **A1**

b = 6 and 8th term = 5(8) + 6 = 46 cao **A1**

Answer: **a = 5, b = 6; 8th term = 46**

Question 3

8n + 1 = 72 written down **M1**

n = 71/8 or a clear check that the terms are 65 and 73 **M1**

No, with a correct explanation **A1**

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

Question 4

6n + 5 = 143 written as an equation **M1**

solves to get n = 23 **M1**

Yes, it is the 23rd term **A1**

Answer: **Yes, it is the 23rd term**

Question 5

list showing repeated addition by 6 **M1**

2, 8, 14, 20 cao **A1**

Answer: **2, 8, 14, 20**

Question 6

nth term 6n + 3 **M1**

6n + 3 = 207 **M1**

pattern number 34 cao **A1**

Answer: **pattern number 34**

Question 7

next two terms 121, 144 **B1**

rule: square numbers **B1**

Answer: **121, 144 (square numbers)**

Question 8

(a) substitute n = 5 into 6n - 4 **M1**

(a) 26 cao **A1**

(a) Answer: **26**

(b) substitute n = 0 into 6n - 4 **M1**

(b) -4 cao **A1**

(b) Answer: **-4**

Question 9

(a) substitution n = 4 gives 11 cao **B1**

(a) Answer: **11**

(b) substitute n = 10 into 3n - 1 **M1**

(b) 29 cao **A1**

(b) Answer: **29**

Question 10

4n - 4 = 150 or 4n - 4 > 150 used, or a trial of values **M1**

n = 39 identified, or the terms either side of 150 found **M1**

152 cao **A1**

Answer: **152**

Question 11

set up equation 8n + 2 = 50 and rearrange to 8n = 48 **M1**

divide both sides by 8 to find n = 6 **M1**

n = 6 cao **A1**

explicit statement that 50 is a term since n = 6 is a positive integer (or equivalent justification) **B1**

Answer: **n = 6**

Question 12

set up inequality 4n + 3 ≥ 35 and rearrange to 4n ≥ 32 **M1**

divide by 4 to get n ≥ 8 **M1**

first day is n = 8 cao **A1**

Answer: **8**

Question 13

(a) 20, 23 cao **B1**

(a) Answer: **20, 23**

(b) 14, 10 cao **B1**

(b) Answer: **14, 10**

(c) 25, 29 cao **B1**

(c) Answer: **25, 29**

Question 14

increasing, common difference 3 **B1**

Answer: **Increasing, common difference 3**

Question 15

5, 12, 19, 26 cao **B1**

Answer: **5, 12, 19, 26**

Question 16

(a) 4n + 2 cao **B1**

(a) Answer: **4n + 2**

(b) 19 - 4n oe (-4n + 19) **B1**

(b) Answer: **19 - 4n**

(c) 4n + 5 cao **B1**

(c) Answer: **4n + 5**

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