4.7 Sequences (Nth Term): 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The nth term of a sequence is 6n - 4.

(a) Work out the first three terms of the sequence. **(2)**

.....

(b) Work out the 20th term of the sequence. **(1)**

.....

(Total for Question 1 is 3 marks)

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2 The sequence is 5, 9, 13, 17, ... Find the value of n for the term 29.

(Total for Question 2 is 2 marks)

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3 Pattern 1 is made with 9 matchsticks. Each new pattern needs 3 more matchsticks than the one before.

(a) Write an expression, in terms of n, for the number of matchsticks in pattern n.

(b) How many matchsticks are needed for pattern 12?

(Total for Question 3 is 4 marks)

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4 Special sequences of numbers include square numbers and triangular numbers.

(a) Write down the first five square numbers. **(1)**

.....

(b) Write down the first five triangular numbers. **(1)**

.....

(c) The nth triangular number is given by the formula n(n + 1) / 2. Use this formula to find the 12th triangular number. **(2)**

.....

(Total for Question 4 is 4 marks)

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5 Here are the first five terms of a sequence.
3, 4, 7, 11, 18

(a) Describe, in words, how each term of the sequence, after the first two, is found from the previous two terms. **(1)**

.....

(b) Find the next two terms of the sequence. **(2)**

.....

(Total for Question 5 is 3 marks)

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6 The nth term of a sequence is 7n - 2. Is 48 a term of this sequence? Give a reason for your answer.

(Total for Question 6 is 2 marks)

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7 Arjun is training for a marathon.
In week 1, he runs 8 km.
Each week after that, he runs 3 km more than the week before.

(a) Work out how far Arjun runs in week 6. **(2)**

(b) Find an expression, in terms of n, for the distance, in km, Arjun runs in week n. **(2)**

(c) Arjun wants to know the first week in which he will run at least 50 km. Find this week number. **(3)**

(Total for Question 7 is 7 marks)

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Mark scheme · 4.7 Sequences (Nth Term): 30-minute Pack

Question 1

(a) at least one correct substitution, e.g. n=1 gives 2 **M1**

(a) 2, 8, 14 all correct cao **A1**

(a) Answer: 2, 8, 14

(b) 116 cao **B1**

(b) Answer: 116

Question 2

use nth term formula 4n + 1 = 29 or show 5 + (n-1)4 = 29 oe **M1**

7 cao **A1**

Answer: 7

Question 3

common difference 3 **M1**

3n + 6 **A1**

substitutes n = 12 **M1**

42 **A1**

Answer: 3n + 6; 42

Question 4

(a) 1, 4, 9, 16, 25 all correct oe **B1**

(a) Answer: 1, 4, 9, 16, 25

(b) 1, 3, 6, 10, 15 all correct oe **B1**

(b) Answer: 1, 3, 6, 10, 15

(c) 12 x 13 / 2 oe **M1**

(c) 78 cao **A1**

(c) Answer: 78

Question 5

(a) each term (from the third term onwards) is found by adding together the two previous terms oe **B1**

(a) Answer: Each term is the sum of the two terms before it (a Fibonacci-type sequence).

(b) 11 + 18 = 29 found **M1**

(b) 29 and 47 both correct cao **A1**

(b) Answer: 29, 47

Question 6

attempt to solve 7n - 2 = 48 leading to n = 50/7 or show division step **M1**

correct conclusion that 48 is not a term because n is not an integer oe **A1**

Answer: No, 48 is not a term because 7n - 2 = 48 gives n = 50/7 which is not a whole number.

Question 7

(a) 8 + 5 x 3 oe, or lists terms up to week 6 **M1**

(a) 23 km cao **A1**

(a) Answer: 23 km

(b) common difference of 3 used correctly, e.g. 3n + c oe **M1**

(b) 3n + 5 oe cao **A1**

(b) Answer: 3n + 5

(c) 3n + 5 ≥ 50 oe (ft their expression) **M1**

(c) 3n ≥ 45 oe, leading to n ≥ 15 **M1**

(c) week 15 cao **A1**

(c) Answer: Week 15

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