Sequences (H)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

Name:	
Total Marks:	

1. (a) Find the nth term of the sequence 6, 13, 20, 27, …

[2]

(b) In a sequence of four numbers, the difference between each number is 7.

The sum of the four numbers is 6.

What are the numbers in the sequence?

You must show all your working.

[3]

2. The nth term of a sequence is 2n + 1

The nth term of a different sequence is 3n - 1

Work out the **three** numbers that are

in both sequences

and

between 20 and 40

[3]

3. Which sequence is a geometric progression?

Circle your answer.

1	2	3	4		1	2	4	7
1	2	4	8		1	2	3	5

[1]

4. A sequence is defined by the term-to-term rule $u_{n+1} = u_n^2 - 8u_n + 17$.

(a) Given that $u_1 = 4$, find u_2 and u_3.

(a) .... [2]

(b) Given instead that $u_1 = 2$, find u_2, u_3 and u_{100}.

(b) .... [3]

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

$$6 \quad 10 \quad 14 \quad 18$$

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

.... [2]

The nth term of a different arithmetic sequence is 3n + 5

(b) Is 108 a term of this sequence?

Show how you get your answer.

[2]

6. Here are the first six terms of a Fibonacci sequence.

$$1 \qquad 1 \qquad 2 \qquad 3 \qquad 5 \qquad 8$$

The rule to continue a Fibonacci sequence is,

the next term in the sequence is the sum of the two previous terms.

(a) Find the 9th term of this sequence.

.... [1]

The first three terms of a different Fibonacci sequence are

a   b   a + b

(b) Show that the 6th term of this sequence is 3a + 5b

[2]

Given that the 3rd term is 7 and the 6th term is 29,
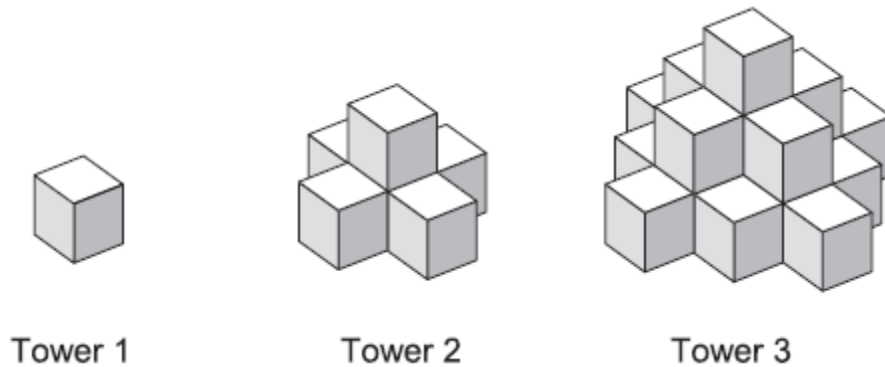
(c) find the value of a and the value of b.

a = ...

b = ...

[3]

7. Here is a picture of three towers.

Tower 1   Tower 2   Tower 3

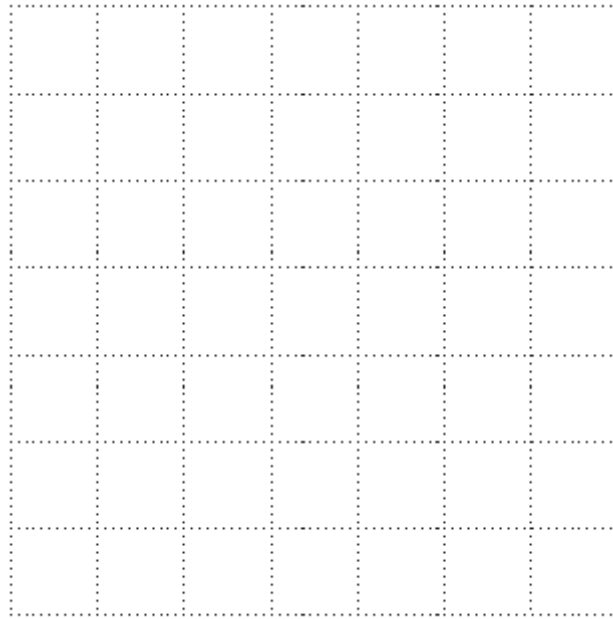Not all the cubes can be seen in the towers.

Edith uses 1 cube to build tower 1.
Edith uses 6 cubes to build tower 2. There are 5 cubes on the bottom layer.

a) Write down the total number of cubes in tower 3.

(a) .... [1]

b) Draw a plan view of the arrangement of cubes Edith will use for the bottom layer of tower 4.

[1]

c) Continue this sequence to show the number of cubes used for the bottom layer of each tower.

Tower 1	Tower 2	Tower 3	Tower 4
1	5	....	....

[2]

d) Find an expression for the number of cubes used in the bottom layer of tower **n**.

(d) .... [4]

8. This expression can be used to generate a sequence of numbers.

$$n^2 - n + 11$$

(i) Work out the first three terms of this sequence.

(i) .... , ... , ... [2]

(ii) Show that this expression does not only generate prime numbers.

[2]

9. a) The nth term of a sequence is $2^n + 2^{n-1}$

Work out the 10th term of the sequence.

[1]

b) The nth term of a different sequence is $4(2^n + 2^{n-1})$

Circle the expression that is equivalent to $4(2^n + 2^{n-1})$

$$2^{n+2} + 2^{n+1} \qquad\qquad 2^{2n} + 2^{2(n-1)}$$

$$8^n + 8^{n-1} \qquad\qquad 2^{n+2} + 2^{n-1}$$

[1]

10. a) Find the nth term of this linear sequence.

8   11   14   17

a) .... [2]

b) Here is a quadratic sequence.

2   14   36   68

The expression for the nth term of this sequence is $pn^2 + qn$.

Find the value of p and the value of q.

b) p = ...

q = ... [4]

11. Here is a sequence

40   35   30   25   20

Circle the expression for the nth term of the sequence.

$5n + 35$ $5n - 45$ $45 - 5n$ $n - 5$

[1]

12 Work out the next term of this quadratic sequence.

4   12   24   40   _____

[2]

13. Here are the first 5 terms of a quadratic sequence.

1   3   7   13   21

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

[3]

14. Here is a sequence.

2          $2\sqrt{7}$ 14 $14\sqrt{7}$

a) Work out the next term.

a) .... [1]

b) Find the nth term.

b) .... [3]

c) Find the value of the 21st term divided by the 17th term.

c) .... [2]

15. Here is a linear sequence.

5   13   21   29

Circle the expression for the nth term of the sequence.

n + 8   5n + 8   8n   8n − 3

[1]

CREDITS AND NOTES

Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.

Links:

AQA http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300

OCR http://ocr.org.uk/gcsemaths

Pearson Edexcel http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html

WJEC Eduqas http://www.eduqas.co.uk/qualifications/mathematics/gcse/

Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice set 1 and Practice set 2

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material