"Full Coverage": Sequences

This worksheet is designed to cover one question of each type seen in past papers, for each GCSE Higher Tier topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise → Past Papers/Worksheets* (or *Library → Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Determine a term of a formula given the position-to-term formula.

[Edexcel GCSE(9-1) Mock Set 2 Spring 2017 1F Q24b, 1H Q7b]
Here are the first 7 terms of a quadratic sequence.

3   6   11   18   27   38   51

The n th term of the sequence is $n^2 + 2$.
(b) Find the 50th term of the sequence.

....

Question 2

Categorisation: Determine an algebraic expression for a term of a sequence given a term-to-term rule.

[Edexcel New SAMs Paper 3F Q20b, Paper 3H Q3b]
Here are the first six terms of a Fibonacci sequence.

1   1   2   3   5   8

The rule to continue a Fibonacci sequence is,

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

The first three terms of a different Fibonacci sequence are

a b $a + b$

Find the 6th term of this sequence, in terms of a and b. Simplify your answer.

....

Question 3

Categorisation: Understand notation for term-to-term rules, i.e. if u_n is the nth term of a sequence, then u_{n+1} is the $(n + 1)$th term.

[Edexcel GCSE(9-1) Mock Set 3 Autumn 2017 3H Q17]

At the start of year , the quantity of a radioactive metal is P_n At the start of the following year, the quantity of the same metal is given by

$$P_{n+1} = 0.87P_n$$

At the start of 2016 there were 30 grams of the metal.

What will be the quantity of the metal at the start of 2019?

Give your answer to the nearest gram.

.... grams

Question 4

Categorisation: Determine a formula for some aspect of a pictorial sequence.

[Edexcel IGCSE Jan2017-2F Q6e]

Here is a sequence of shapes drawn on a square grid.
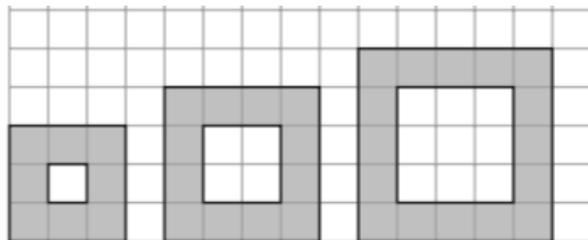
Shape number 1   Shape number 2   Shape number 3

The width of Shape number 1 is 3 squares.

The width of Shape number 2 is 4 squares.

The width of Shape number n is W squares.

Write down a formula for W in terms of .

$W = $ ....

Question 5

Categorisation: Determine the nth term formula of an arithmetic/linear sequence.

[Edexcel GCSE Nov2006-3I Q10b, Nov2006-5H Q2a]
Here are the first five terms of a number sequence.

3   7   11   15   19

Write down an expression, in terms of n, for the n th term of the number sequence.

....

Question 6

Categorisation: As above, but involving negative terms.

[Edexcel GCSE Nov2007-3I Q12bi, Nov2007-5H Q6bi Edited]
Here are the first five terms of a number sequence.

−4   −1 2 5 8

Find, in terms of n, an expression for the n th term of this number sequence.

....

Question 7

Categorisation: Determine an expression for the $(n + 1)$th term of a sequence given then formula for the nth term.

[Edexcel IGCSE May2015-3H Q3b]
The first four terms of an arithmetic sequence are

5   9   13   17

The n th term formula of this sequence is $4n + 1$
Write down an expression, in terms of , for the $(n + 1)$ th term.

....

Question 8

Categorisation: Determine when the nth term of two sequences is the same.

[Edexcel GCSE(9-1) Mock Set 3 Autumn 2017 1F Q27]
Here are the first five terms of an arithmetic sequence.

2   7   12   17   22

The n th term of a different arithmetic sequence is $4n + 15$

The last term of each sequence is the same number.
There are the same number of terms in each sequence.

Find the number of terms in each sequence.

....

Question 9

Categorisation: Determine if a number occurs in a sequence.

[Edexcel GCSE Nov2006-5H Q2b Edited]

Here are the first five terms of a number sequence.

3   7   11   15   19

Adeel says that 319 is a term in the number sequence.
Is Adeel correct?

Question 10

Categorisation: As above, but for a descending sequence.

[Edexcel GCSE(9-1) Mock Set 3 Autumn 2017 2F Q8b Edited]

Here are the first five numbers in a sequence.

47   41   35   29   23

Sarah says,

" −100 is **not** a number in this sequence."
Is Sarah correct?

Question 11

Categorisation: As with Question 8, but the terms do not need to appear in the same position.

[Edexcel GCSE Nov2007-3I Q12bii, Nov2007-5H Q6bii Edited]

Here are the first four terms of a number sequence.

2   7   12   17

Here are the first five terms of another number sequence.

−4   −1   2   5   8

Find two numbers that are in both number sequences.

....

Question 12

Categorisation: Find the nth term formula for a quadratic sequence.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 - 2H Q12a]
Here are the first four terms of a quadratic sequence.

3   8   15   24

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

....

Question 13

Categorisation: As above, but where the coefficient of the n term is negative.

[Edexcel Specimen Papers Set 1, Paper 2H Q17]
Here are the first 5 terms of a quadratic sequence.

1   3   7   13   21

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

....

Question 14

Categorisation: As above, but where the coefficient of n^2 is not 1.

[AQA IGCSE FM Practice paper set 3 P2 Q20]
The first five terms of a sequence are shown.

-1 2   9   20   35

Work out an expression for the n th term of the sequence.

n th term = ...

Question 15

Categorisation: Determine the nth term of a quadratic sequence in a pictorial context.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 - 1H Q18]

The diagram shows the first 10 sides of a spiral pattern.
It also gives the lengths, in cm, of the first 5 sides.
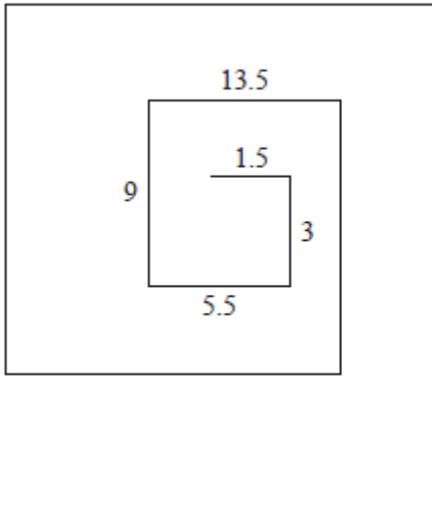
The lengths, in cm, of the sides of the spiral form a sequence.
Find an expression in terms of n for the length, in cm, of the n th side.

....

Answers

Question 1

2502

Question 2

$3a + 5b$

Question 3

20 grams

Question 4

$W = n + 2$

Question 5

$4n - 1$

Question 6

$3n - 7$

Question 7

$4n + 5$

Question 8

18

Question 9

$4n - 1 = 319$
$n = 80 \therefore$ Yes

Question 10

$53 - 6n = -100$
$6n = 153$ but 153 does not divide by 6.
Therefore yes, not in sequence.

Question 11

Two of 2, 17, 32, 47, 62

Question 12

$n^2 + 2n$

Question 13

$n^2 - n + 1$

Question 14

n th term = $2n^2 - 3n$

Question 15

$\frac{1}{2}n^2 + 1$