

<u>Home</u>

<u>Gameboard</u>

Maths

Sequences and Series 1i

# Sequences and Series 1i



A sequence of terms  $u_1,\ u_2,\ u_3,\ ...$  is defined by

$$u_1 = 2 \text{ and } u_{n+1} = 1 - u_n$$

for 
$$n \geqslant 1$$



Give the values of  $u_2,\ u_3$  and  $u_4.$ 

Give the value of  $u_2$ .

The following symbols may be useful: u\_2

Give the value of  $u_3$ .

The following symbols may be useful: u\_3

Give the value of  $u_4$ .

The following symbols may be useful: u\_4

Part B Behaviour
------------------

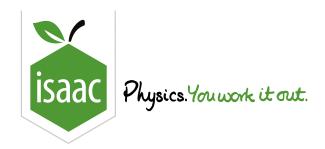
Describe the behaviour of the sequence.

- It is a geometric sequence, with first term 2 and constant ratio  $-\frac{1}{2}$ .
- The sequence is periodic, with a period of four. The first two values that repeat are 2 and -1.
- The sequence is periodic, with a period of three. It cycles through values of 2, -1 and 1.
- The sequence is periodic, with a period of two. It alternates between values of 2 and -1.

#### Part C Sum

Find 
$$\sum_{n=1}^{100} u_n$$
.

Adapted with permission from UCLES A-level Maths papers, 2003-2017.



Home Gameboard Maths Algebra Series Arithmetic Progression 1

In an arithmetic progression, the fifth term is 32 and the tenth term is 57.

# **Arithmetic Progression 1**

Pre-Uni Maths for Sciences C2.2



Part A First term
Find the first term, $a$ .
Part B Common difference
Find the common difference, $d$ .
Part C Sum of first 70 terms
Hence, find the sum of the first $70$ terms.

Created for isaacphysics.org by Julia Riley.

Gameboard:

**STEM SMART Single Maths 25 - Sequences & Series** 



<u>Home</u> <u>Gameboard</u>

Maths

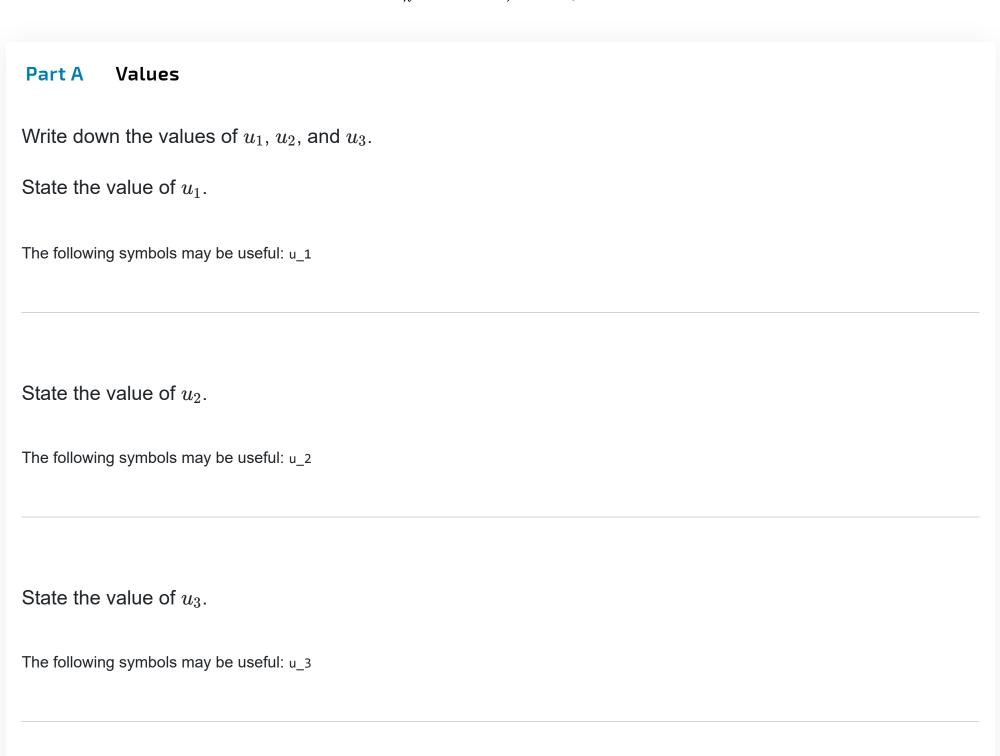
Arithmetic Series 5i

## **Arithmetic Series 5i**

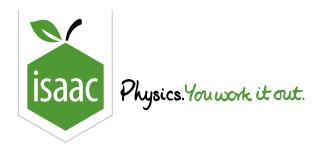


A sequence of terms  $u_1, u_2, u_3, ...$  is defined by

$$u_n=2n+5, \ {
m for} \ n\geqslant 1.$$



Part B Type of Sequence
What type of sequence is made by the terms of $u_n$ ?
A periodic sequence
A Fibonacci sequence
An arithmetic sequence (arithmetic progression)
A geometric sequence (geometric progression)
Part C Value of $N$
Given that $\displaystyle\sum_{n=1}^{N}u_{n}=2200$ , find the value of $N$ .
The following symbols may be useful: N
Adapted with permission from UCLES A-level Maths papers, 2003-2017.
Gameboard:
STEM SMART Single Maths 25 - Sequences & Series
All materials on this site are licensed under the <b>Creative Commons license</b> , unless stated otherwise.



Home Gameboard Maths Algebra Series Arithmetic Series 1

## **Arithmetic Series 1**

#### Pre-Uni Maths for Sciences C2.1



Find the sum of the arithmetic series

$$10.0 + 10.1 + 10.2 + \cdots + 12.0$$

Created for isaacphysics.org by Julia Riley.

Gameboard:

**STEM SMART Single Maths 25 - Sequences & Series** 



Home Gameboard Maths Arithmetic Series 2ii

## **Arithmetic Series 2ii**



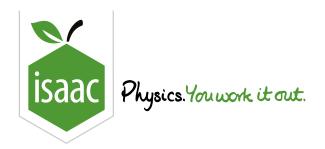
The tenth term of an arithmetic progression is equal to twice the fourth term. The twentieth term of the progression is 44.

Part A First Term
Find the first term.
Part B Common Difference
Find the common difference.
Part C Sum of the Series
Find the sum of the first $50$ terms.

Used with permission from UCLES A-level Maths papers, 2003-2017.

Gameboard:

**STEM SMART Single Maths 25 - Sequences & Series** 



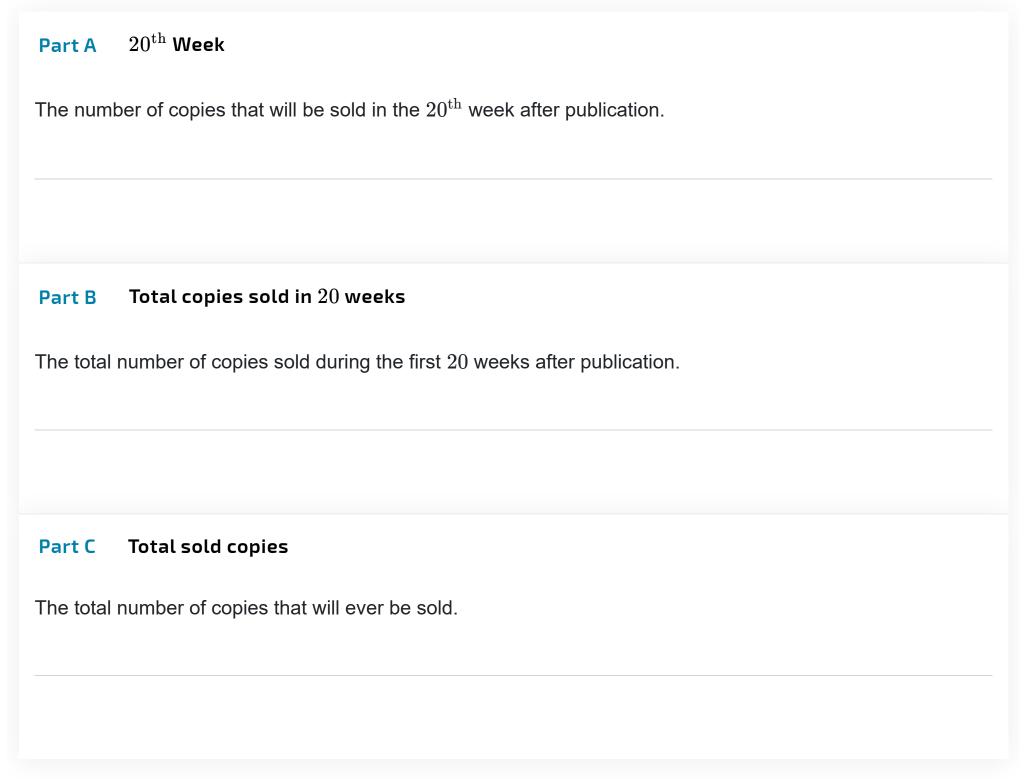
<u>Gameboard</u> <u>Home</u>

Maths Geometric Series 1ii

## Geometric Series 1ii



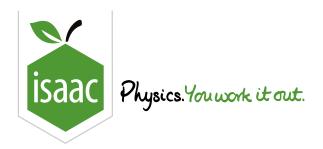
Records are kept of the number of copies of a certain book that are sold each week. In the first week after publication, 3000 copies were sold, and in the second week 2400 copies were sold. The publisher forecasts future sales by assuming that the number of copies sold each week will form a geometric progression with first two terms 3000 and 2400. Calculate (to the nearest number of whole books) the publisher's forecasts for:



Used with permission from UCLES A-level Maths papers, 2003-2017.

Gameboard:

STEM SMART Single Maths 25 - Sequences & Series



<u>Home</u> <u>Gameboard</u> Maths Geometric Series 2ii

## Geometric Series 2ii

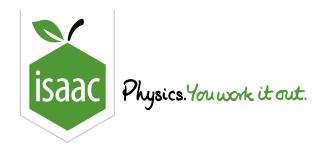


Part A Geometric Progression 1
In a geometric progression, the sum to infinity is four times the first term.
Find the common ratio.
Given that the third term is 9, find the first term.
Find the sum of the first twenty terms. (To three significant figures.)
Part B Geometric Progression 2
The first term of a geometric progression is $6$ and the sum to infinity is $10$ .
Find the common ratio.

Used with permission from UCLES A-level Maths papers, 2003-2017.

Gameboard:

**STEM SMART Single Maths 25 - Sequences & Series** 



<u>Home</u>

Gameboard Maths Geometric Series 4ii

#### Geometric Series 4ii



In a geometric progression, the first term is 5 and the second term is 4.8.

#### **Sum to Infinity** Part A

Find the sum to infinity.

#### Value of nPart B

The sum of the first n terms is greater than 124. By showing that

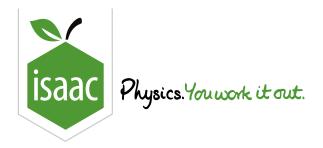
$$0.96^n < 0.008$$

and using logarithms, calculate the smallest possible value of n.

Used with permission from UCLES A-level Maths papers, 2003-2017.

#### Gameboard:

**STEM SMART Single Maths 25 - Sequences & Series** 



<u>Home</u>

<u>Gameboard</u>

Maths

Arithmetic Series 1i

## **Arithmetic Series 1i**



In an arithmetic progression the first term is 5 and the common difference is 3. The  $n^{\rm th}$  term of the progression is denoted by  $u_n$ .

#### Part A Value of $u_{20}$

Find the value of  $u_{20}$ .

The following symbols may be useful: u\_20

#### Part B Sum

Find the value of  $\sum_{n=10}^{20} u_n$ .

#### ${\bf Part \, C} \qquad {\bf Value \, of \, } N$

Find the value of N such that  $\sum_{n=N}^{2N}u_n=2750.$ 

The following symbols may be useful: N