

<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

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

for 
$$n \geqslant 1$$

### Part A Values

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

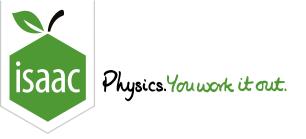
Describe the behaviour of the sequence.

- 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 two. It alternates between values of 2 and -1.
- The sequence is periodic, with a period of three. It cycles through values of 2, -1 and 1.

### Part C Sum

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

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**Arithmetic Progression 1** <u>Gameboard</u> Maths Algebra Series <u>Home</u>

### **Arithmetic Progression 1**



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

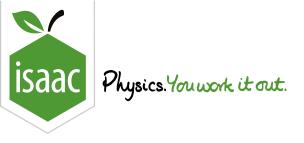
# Part A First term Find the first term, a. Common difference Part B Find the common difference, d. Sum of first 70 termsPart C

Hence, find the sum of the first 70 terms.

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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 A Values

Write down the values of  $u_1$ ,  $u_2$ , and  $u_3$ .

State the value of  $u_1$ .

The following symbols may be useful: u\_1

State the value of  $u_2$ .

The following symbols may be useful: u\_2

State the value of  $u_3$ .

The following symbols may be useful: u\_3

### 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)

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

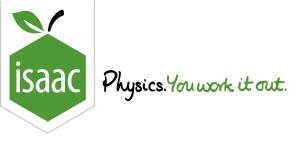
Given that 
$$\displaystyle\sum_{n=1}^{N}u_{n}=2200$$
, find the value of  $N$ .

The following symbols may be useful: N

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Algebra

Series

Arithmetic Series 1

## **Arithmetic Series 1**



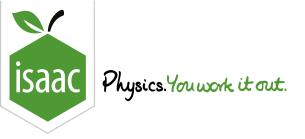
Find the sum of the arithmetic series

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

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Maths Arithmetic Series 2ii

### **Arithmetic Series 2ii**

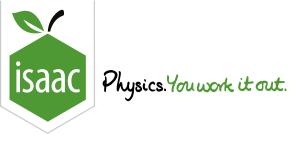


The tenth term of an arithmetic progression is equal to twice the fourth term. The twentieth term of the progression is $44$ .		
Part A Firs	t Term	
Find the	first term.	
Part B Com	nmon Difference	
Find the	common difference.	
Part C Sum	of the Series	
Find the	sum of the first $50$ terms.	

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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, 3000copies 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:

#### $20^{ m th}$ Week Part A

The number of copies that will be sold in the  $20^{
m th}$  week after publication.

#### Total copies sold in $20\ \mathrm{weeks}$ Part B

The total number of copies sold during the first 20 weeks after publication.

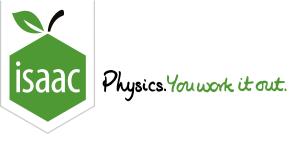
#### Total sold copies Part C

The total number of copies that will ever be sold.

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Maths

Geometric Series 2ii

### Geometric Series 2ii



Part A Geometric Progressi	ion	1
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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.)

#### **Geometric Progression 2** Part B

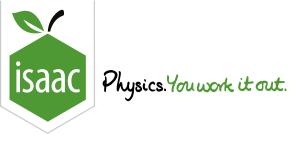
The first term of a geometric progression is 6 and the sum to infinity is 10.

Find the common ratio.

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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

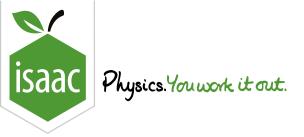
 $0.96^n < 0.008$ 

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

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Maths

Arithmetic Series 1i

### **Arithmetic Series 1i**



In an arithmetic progression the first term is 5 and the common difference is 3. The  $n^{\text{th}}$  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 
$$\sum_{n=10}^{20} u_n$$
.

### Part C Value of N

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

The following symbols may be useful:  ${\tt N}$ 

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