Mathelaureate

IBDP Mathematics - SL Test: Sequence and Series (GDC)

Time : 40 Marks : 40

1. [Maximum mark: 6]

   The first three terms of an arithmetic sequence are $36, 40, 44, \ldots$.

   (a) (i) Write down the value of d .

   (ii) Find u_8 .

   (b) (i) Show that $S_n = 2n^2 + 34n$.

   (ii) Hence, write down the value of S_{14} .

2. [Maximum mark: 6]

   The first term of a geometric sequence is 200 and the sum of the first four terms is 324.8.

   (a)Find the common ratio. [4marks]

   (b)Find the tenth term. [2marks]

3. [Maximum mark: 5]

   In an arithmetic sequence $u1 = 7$, $u20 = 64$ and $u_n = 3709$.

   (a)Find the value of the common difference.

   (b)Find the value of n .

4. [Maximum mark: 14]

(a) Consider an infinite geometric sequence with $u1 = 40 \; and \; r = \frac{1}{2}$

(I) Find $u4$.

(ii) Find the sum of the infinite sequence. [4marks]

Consider an arithmetic sequence with n terms, with first term (−36) and eighth term (−8) .

(b) (i) Find the common difference.

(ii) Show that $S\,n = 2n^2 - 38n$. [5marks]

(c) The sum of the infinite geometric sequence is equal to twice the sum of the arithmetic sequence. Find n. [5marks]

5. [Maximum mark: 9]

Ryan is cartoonist. His comic strip has just been bought by a newspaper, so he sends them the 28 comic strips he has drawn so far. Each week after the first he mails 3 more comic strips to the newspaper.

[a] Find the total number of comic strips sent after 1 , 2, 3, and 4 weeks.

[2marks]

[b] Show that the total number of comic stripes sent after n weeks forms an arithmetic sequence.

[1 mark]

[c] Find the number of comic strips sent after 15 weeks.

[3marks]

[d] When does Ryan send his 120^{th} comic strip?

[3marks]