Series

Questions

Arithmetic Sequences & Series

Geometric Sequences & Series

Sums to Infinity

Sigma Notation

Arithmetic Sequences & Series

Q1) For each sequence i) write down the first 4 terms ii) write down a & d.

a) $u_n = 5n + 2$ b) $u_n = 9 - 2n$ c) $u_n = n - 10$

Q2) A sequence is generated by the following rule, $x_n = 4n - 2$. Determine the 15th and 20th terms of this sequence.

Q3) A sequence is generated by the following rule, $x_n = 3n + 5$. Determine the 5th and 8th terms of this sequence.

Q4) Calculate the number of terms in the following arithmetic sequence

$x, 3x, 5x, \ldots, 35x$

Q5) The first term of an arithmetic sequence is 14. The fourth term is 32.
Find the common difference.

Q6) Find the sum of the following series.

a) $3 + 7 + 11 + 14 + ..$ 20 terms b) $5 + 1 - 3 - 7 ..$ 14 terms

Q7) How many terms of the given series $64 + 62 + 60 + ..$ are needed to make a sum to zero?
That is, $64 + 62 + 60 + .. = 0$

Q8) Find the sum of the first 50 even numbers.

Geometric Sequences & Series

Q1) Continue the following geometric sequences for three more terms.

a) $5, 15, 45, ..$ b) $1, p, p^2, ..$

Q2) Determine the 8th and 12th terms of the following geometric sequence

$3, 6, 12, 24, 48, ..$

Q3) Find the 6th and 8th term of the following geometric sequences.

a) 2, 6, 18, 54, .. b) 1, -2, 4, -8, ..

Q4) The sixth term of a geometric sequence is 32 and the 3rd term is 4.

Find the first term and the common ratio.

Q5) Find the sum of the following series.

a) $1 + 2 + 4 + 8 + ..$ 8 terms

b) $729 - 243 + 81 - \cdots - \frac{1}{3}$

Q6) A geometric series has first term 5 and common ratio $\frac{2}{3}$. Find the value of S_8.

Q7) The first term of a geometric series is a and the common ratio is $\sqrt{3}$.

Show that $S_{10} = 121a(\sqrt{3} + 1)$.

Sums to Infinity

Q1) a) A geometric series has first term 10 and sum to infinity 30. Find the common ratio.

b) A geometric series has first term -5 and sum to infinity -3. Find the common ratio.

Q2) A geometric series has sum to infinity 60 and common ratio $\frac{2}{3}$.

Find the first term.

Q3) For a geometric series $a + ar + ar^2 + \cdots$, $S_3 = 9$ and $S_\infty = 8$.

Find the value of a and r.

Sigma Notation

Q1) Find the sum of the series by writing out all of the terms.

a) $\sum_{r=1}^{5}(3r+1)$

b) $\sum_{r=1}^{6} 3r^2$

Q2) Express the series using sigma notation and evaluate the sum.

a) $2+4+6+8$

b) $2+6+18+54+162$

Q3) Evaluate $\sum_{r=9}^{30}\left(5r-\frac{1}{2}\right)$