

Name:
Group A
Result:

1.

[8 points]

Calculate the following sums:

a) $2 + 7 + 12 + \dots + 87 =$

b) $\sum_{k=1}^8 2 \cdot 3^{k-1}$

c) $\sum_{k=1}^{15} \frac{k+1}{3}$

d) $\sum_{k=1}^{\infty} 6 \cdot \left(\frac{1}{3}\right)^k$

2.

[2 points]

In an arithmetic sequence the third term is equal to 11 and the tenth term is equal to -17 . Find the first term and the common difference.

3.

[4 points]

$a + 2$, $4a - 1$ and $5a + 2$ are the first three of an arithmetic sequence (in the given order).

(a) Find a .

(b) Find the sum of the first 20 terms of this sequence.

4.

[4 points]

$10x + 1$, $4x + 1$ and $3x$ are the first three of an infinite geometric sequence (in the given order).

(a) Find the possible values of x .

(b) Find the sum to infinity of both sequences (if such sums exist).

5.[2 *points*]

Show that if a sequence u_n is arithmetic, then the sequence $v_n = a^{u_n}$, where a is a constant, is geometric.

6.[3 *points*]

The sum of an arithmetic sequence is given by the formula $S_n = 2n^2 - 5n$. Find the number of terms of this sequence which are smaller than 100.

7.[2 *points*]

Consider an infinite geometric series:

$$2 + \frac{3x - 1}{2} + \frac{(3x - 1)^2}{8} + \dots$$

- (a) Find the set of possible values of x for which the series converges.
- (b) Find the sum when $x = \frac{1}{2}$.