UKZN Matric Helpline Online Session: Arithmetic and Geometric Progressions

1. The sum of the first n terms of an arithmetic progression is given by

$$S_n = 5n^2 - 11n.$$

a. Determine the sum of the first ten terms.

b. Hence, determine the 10^{th} term.

c. Determine the arithmetic progression.

d. If the arithmetic progression consists of 20 terms, determine the sum of the last 10 terms.

e. If the arithmetic progression consists of 21 terms, determine the middle term.

2. Consider the series: $5 + 13 + 21 + ... + (8n - 3)$.

a. Show that the sum to n terms is $4n^2 + n$.

b. If the last four terms of the series are excluded, determine a formula for the sum of the remaining terms.

c. If the sum of the last four terms is 772, determine the number of terms in the series.

3. The first three terms of an arithmetic sequence are $2k - 7, k + 8$ and $2k - 1$ where k is a constant from the set of Real numbers.

3.1 Determine the 15^{th} term of the sequence.

3.2 Calculate the sum of the first thirty even numbers that are in the sequence.

4. A convergent geometric series consisting of only positive numbers has first term p, constant ratio r and n^{th} term T_n such that $\sum_{n=3}^{\infty} T_n = \frac{1}{4}$.

4.1 If $T_1 + T_2 = 2$ then write down an expression for p in terms of r.

4.2 Determine the value(s) of r.