Sequences and series mixed questions (SL).

Name……

(1) The first term of an infinite geometric sequence is 6, while the third term is $\frac{2}{3}$. There are two possible sequences. Find the sum of each sequence.

(2) David goes running every week. He runs 500 metres in the first week. He considers two different training sessions, A and B.

(a) Training session A requires that each week David runs 50 metres more than the previous week and that he continues this for 12 weeks. How far would David run in the final week?

(ii) How far would he run over the 12 weeks?

(b) Training session B requires that each week David runs a distance 10% further than the previous week and that he continues this for 12 weeks. How far would David run in the final week?

(ii) How much further in total does David run over the 12 weeks with training session B?

(3) Find the sum of the infinite geometric series:

$$\frac{1}{5}, \quad -\frac{2}{15}, \quad \frac{4}{45}, \ldots$$

(4) A geometric sequence has all positive terms. The sum of the first two terms is 4 and the sum to infinity is 4.5. Find the value of

(a) The common ratio

(b) The first term.

(5) Edgar has $10,000 to invest in a bank offering 3.5% nominal annual interest, compounded monthly.

(a) How much will Edgar have in his account after 5 years?

(b) How many full years will it take for Edgar to have more than $20,000?

(6) A scientist measures the population of bacteria in a petri dish over set time intervals. Her results are shown below:

Time, t (hours)	1	2	3
Population, P	50	70	98

(a) If the growth is geometric, find an equation for the population (P) of bacteria after (t) hours.

(b) Predict how many bacteria will be in the petri dish after 12 hours.

(c) How long will it take for population of bacteria in the petri dish to be greater than 100,000?