

Question 4**(12 marks)**

(a) Given the sequence 256, 128, 64, 32, ...

(i) Write a recursive rule for the sequence.

(2 marks)

(ii) Deduce a rule for the n^{th} term of this sequence. Hence, calculate the 15th term, leaving your answer as a fraction. (3 marks)

(b) Use the recursive definitions given to state the first **three** terms of each of the following sequences.

(i) $T_{n+1} = T_n + 7, T_1 = 11$

(2 marks)

(ii) $T_{n+1} = 1.5T_n, T_2 = 7.5$

(2 marks)

(c) Consider the sequence 12, 7, 2, -3 , ...

By deducing a rule for the n^{th} term, or otherwise, determine which term of the sequence is -168 . (3 marks)