

Question 6

(25 marks)

The n^{th} term of a sequence is $T_n = \ln a^n$, where $a > 0$ and a is a constant.

(a) (i) Show that T_1 , T_2 , and T_3 are in arithmetic sequence.

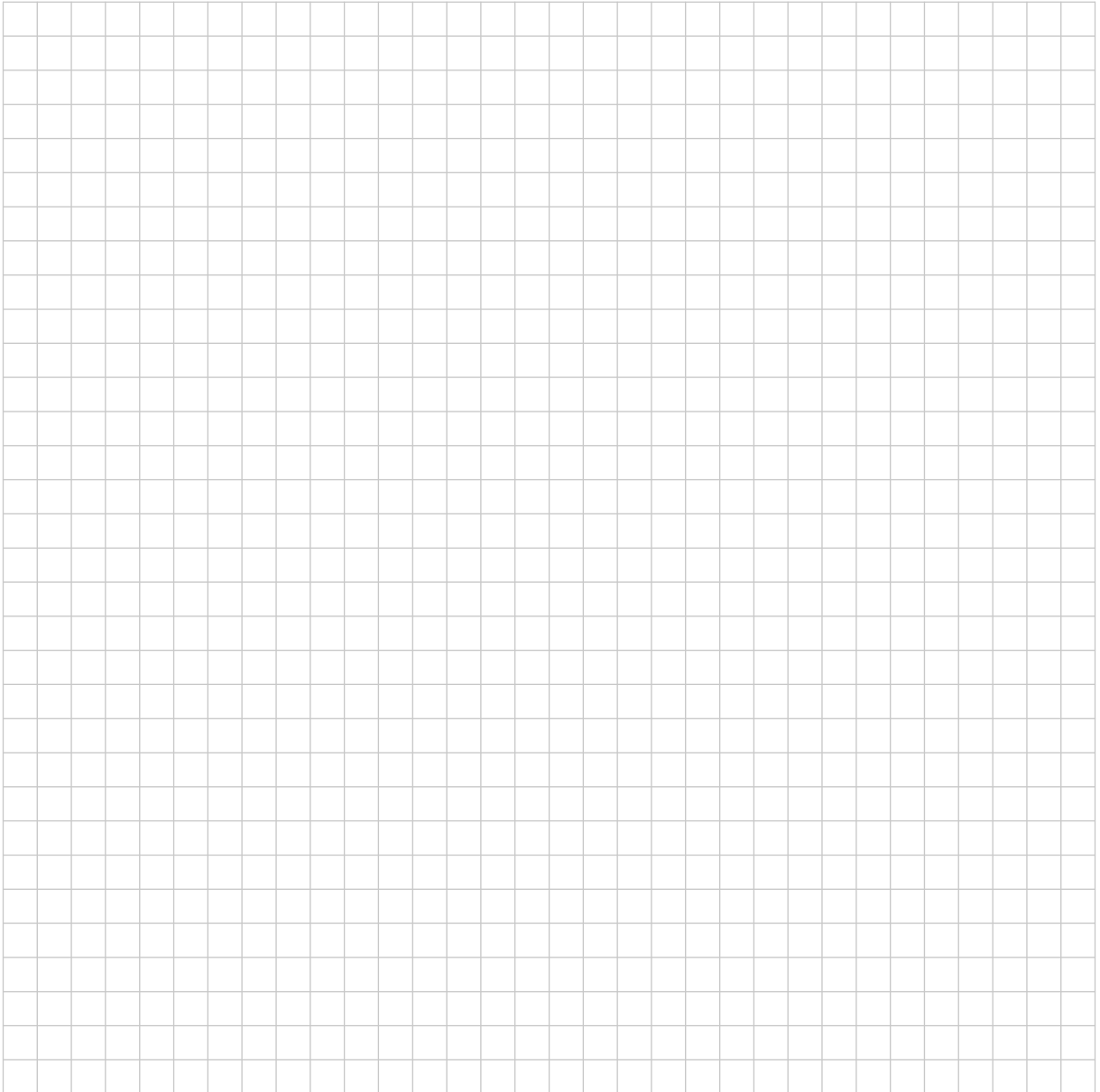
(ii) Prove that the sequence is arithmetic and find the common difference.

(b) Find the value of a for which $T_1 + T_2 + T_3 + \dots + T_{98} + T_{99} + T_{100} = 10\,100$.

(c) Verify that, for all values of a ,

$$(T_1 + T_2 + T_3 + \dots + T_{10}) + 100d = (T_{11} + T_{12} + T_{13} + \dots + T_{20}),$$

where d is the common difference of the sequence.



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