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A LEVEL MATHS

(15) Geometric Sequences

WORKING AT D/E

(1) Find the 5th and 12th term in each of the following geometric sequences:

(a) (i) 3, 5.4, 9.72…… (ii) 5^{n-1}

(b) Explain why 1.9, 6.08, 19.456, 60.3136…… is not a geometric sequence.

(2) The 5th term of a geometric sequence is 0.0512. Given that the first term is 2, Show that the common ratio $r = \pm 0.4$.

(3) Given that a geometric series with first term 2 has 7th term $\frac{2}{15625}$, find the possible values of the common ratio r.

WORKING AT B/C

(1) The 5th term of a geometric sequence is 3.1104 and the 7th term of the sequence is 4.478976
(a) Find the common ratio r, given that $r > 0$
(b) Find the first term a
(c) Find the 12th term of the sequence
(d) Find the first term in the sequence that exceeds 200.

(2) A geometric series has first three terms $p + 1$, $4p$ and $12p$ where p is a constant.
(a) Write down the value of p
(b) Hence find the first 3 terms.
(c) Write down nth term for the formula in the form $c \times d^{n-1}$
(d) Find how many terms in the sequence are less than 500.

(3) A sequence has first term 10, second term 5 and so on such that it forms a geometric progression. Find the term in the sequence that is closest to 0.01

WORKING AT A*/A

(1) The first 3 terms of a geometric sequence are k, $2k - 11$ and $\frac{3k+1}{k}$ where k is a constant. Given that there is only one positive term in the sequence, find the value of k.

(2) A geometric sequence has first term a and common ratio r. Given that the 4th term in the sequence is 100,
(a) Explain why both a and r must be positive or both be negative.
Given that a and r are positive,
(b) Show that:

$$\log(r) = \frac{2 - \log(a)}{3}$$

(c) Given that $0 < r < 1$, find the possible set of values of a.

(3) Prove that the sequence $a, a + 1, a + 2 \ldots\ldots$ where a is a constant, is not geometric.