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A LEVEL MATHS

(16) Geometric Series

WORKING AT D/E

(1) Using the formula book, find the sum of the first 40 terms in each geometric series:

(a) $a = 3$ and $r = 1.2$

(b) 2, 1.6, 1.28, 1.024……

(2) The sum of the first 5 terms of geometric series with common ratio 1.5 is 26.375. Use the formula book to find the first term a.

(3) 8, 6.4, 5.12……2.62144 is a geometric series.
(a) Find the number of terms in the series.
(b) Find the sum of the terms in the geometric series

WORKING AT B/C

(1) A geometric series has 4th term 8.64 and 7th term 14.92992.
(a) Find the first term a
(b) Find the common ratio r
(c) Hence, find the sum of the first 7 terms to 3 significant figures.

(2) A geometric series has first term 2 and common ratio 1.8. Given that the sum of the first n terms of the series exceeds 25,
(a) Using the formula book, show that $1.8^n > 11$
(b) Hence, find the smallest possible value of n

(3) The first 3 terms of a geometric series are

$k,\ k+4$ and $3k+4$….

where k is a positive constant.

(a) Show that $k^2 - 2k - 8 = 0$

(b) Hence, find the value of k

(c) Find the sum of the first 10 terms of the series.

WORKING AT A*/A

(1) A series u_n is given by $u_n = (a \times 2^{n-1}) + 4n$ where a is a positive constant.

Given that $S_{20} = 1678560$, find the value of a

(2) Prove that the sum of the first n terms of a geometric series with first term a and ratio r is

$$S_n = \frac{a(1-r^n)}{1-r}$$

(3) Prove that the sum of a geometric series with first term 4 and ratio 0.4 cannot exceed 7.