SEQUENCES & SERIES (Q 4 & 5, PAPER 1)

LESSON NO. 3: GEOMETRIC SEQUENCES

2006

4 (b) The sum to infinity of a geometric series is $\frac{9}{2}$. The second term of the series is -2. Find the vaue of r, the common ratio of the series.

4 (c) The sequence $u_1, u_2, u_3, \ldots,$ defined by $u_1 = 3$ and $u_{n+1} = 2u_n + 3,$ is as follows:
3, 9, 21, 45, 93, ...

(i) Find u_6, and verify that it is equal to the sum of the first six terms of a geometric series with first term 3 and common ratio 2.

(ii) Given that, for all k, u_k is the sum of the first k terms of a geometric series with first term 3 and common ratio 2, find $\sum_{k=1}^{n} u_k$.

2004

5 (b) (i) In a geometric series, the second term is 8 and the fifth term is 27. Find the first term and the common ratio.

2002

4 (a) Find in terms of n, the sum of the first n terms of the geometric series $3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \ldots$

2001

5 (a) The second term, u_2, of a geometric sequence is 21. The third term, u_3, is -63. Find

(i) the common ratio

(ii) the first term.

2005

4 (a) Write the recurring decimal 0·636363.... as an infinite geometric series and hence as a fraction.

2003

4 (a) Express the recurring decimal 0.252525... in the form $\frac{p}{q}$ where $p, q \in \mathbf{N}$ and $q \neq 0$.

Answers

2006 4 (b) $r = -\frac{1}{3}$

2006 4 (c) (i) $u_6 = 189$ (ii) $\sum_{k=1}^{n} u_k = 6(2^n - 1) - 3n$

2004 5 (b) (i) $a = \frac{16}{3}$, $r = \frac{3}{2}$

2002 4 (a) $6\left[1 - (\frac{1}{2})^n\right]$

2001 5 (a) (i) $r = -3$ (ii) $a = -7$

2005 4 (a) $\frac{7}{11}$

2003 4 (a) $\frac{25}{99}$