SEQUENCES & SERIES (Q 5, PAPER 1)

1999

5 (a) The *n*th term of a sequence is given by

$$T_n = \frac{n}{n+1}$$

- (i) Find T_2 , the second term.
- (ii) Show that $T_2 + T_3 > 1$.
- (b) The first two terms of a geometric series are $2 + \frac{2}{3} + ...$
 - (i) Find *r*, the common ratio.
 - (ii) Write down the third and fourth terms of the series.
 - (iii) Show that S_6 , the sum to 6 terms, is $3 \frac{1}{3^5}$.
- (c) The *n*th term of a series is given by $T_n = 4n + 1$.
 - (i) Write down, in terms of *n*, an expression for T_{n-1} , the (n-1)st. term.
 - (ii) Show that the series is arithmetic.
 - (iii) Find S_{20} , the sum of the first 20 terms of the series.

Answers 5 (a) (i) $\frac{2}{3}$ (b) (i) $r = \frac{1}{3}$ (ii) $\frac{2}{9}, \frac{2}{27}$ (c) (i) $T_{n-1} = 4n - 3$ (iii) 860