

SEQUENCES & SERIES (Q 5, PAPER 1)

2007

- 5 (a) The n th term of a sequence is given by $T_n = 1 - n$.
- (i) Find T_5 , the fifth term.
- (ii) Find $T_5 - T_{10}$ where T_{10} is the tenth term.
- (b) The first term of an arithmetic series is 3 and the common difference is 4.
- (i) Find, in terms of n , an expression for T_n , the n th term.
- (ii) How many terms of the series are less than 200?
- (iii) Find the sum of these terms.
- (c) The first two terms of a geometric series are $\frac{1}{3} + \frac{1}{9} + \dots$
- (i) Find r , the common ratio.
- (ii) Find an expression for S_n , the sum of the first n terms.
- Write your answer in the form $\frac{1}{k} \left(1 - \frac{1}{3^n} \right)$ where $k \in \mathbf{N}$.
- (iii) The sum of the first n terms of the geometric series $\frac{p}{3} + \frac{p}{9} + \dots$ is $1 - \frac{1}{3^n}$.
- Find the value of p .

ANSWERS

- 5 (a) (i) -4 (ii) 5
- (b) (i) $T_n = 4n - 1$ (ii) 50 (iii) 5050
- (c) (i) $\frac{1}{3}$ (ii) $\frac{1}{2} \left(1 - \frac{1}{3^n} \right)$ (iii) $p = 2$