# SEQUENCES & SERIES (Q 5, PAPER 1)

LESSON NO. 1: WORKING WITH SEQUENCES

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 SOLUTION 5 (a) (i)  $T_n = 1 - n \Rightarrow T_5 = 1 - (5) = -4$ Put a bracket around *n* on each side and substitute in the little number (subscript). 5 (a) (ii)  $T_{10} = 1 - (10) = -9$  $\Rightarrow T_5 - T_{10} = -9 - (-4) = -9 + 4 = -5$ 

## 2000

- 5 (a) The *n*th term of a sequence is given by  $T_n = n^2 + 1$ .
  - (i) Write down the first three terms of the sequence.

(ii) Show that 
$$T_1 + T_2 + T_3 = T_4$$
.

# SOLUTION

5 (a) (i)  $T_n = n^2 + 1$   $\Rightarrow T_1 = (1)^2 + 1 = 1 + 1 = 2$   $\Rightarrow T_2 = (2)^2 + 1 = 4 + 1 = 5$  $\Rightarrow T_3 = (3)^2 + 1 = 9 + 1 = 10$ 

## Arithmetic sequence: 2, 5, 10

## 5 (a) (ii)

 $T_n = n^2 + 1$   $\Rightarrow T_4 = (4)^2 + 1 = 16 + 1 = 17$  $T_1 + T_2 + T_3 = 2 + 5 + 10 = 17$ 

$$\therefore T_1 + T_2 + T_3 = T_4$$

#### 1999

5 (a) The *n*th term of a sequence is given by  $\frac{1}{2}$ 

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

(i) Find  $T_2$ , the second term.

(ii) Show that 
$$T_2 + T_3 > 1$$
.

# SOLUTION

5 (a) (i)  $T_n = \frac{n}{n+1}$   $\Rightarrow T_2 = \frac{(2)}{(2)+1} = \frac{2}{3}$ 5 (a) (ii)  $T_n = \frac{n}{n+1}$   $\Rightarrow T_3 = \frac{(3)}{(3)+1} = \frac{3}{4}$  $\therefore T_2 + T_3 = \frac{2}{3} + \frac{3}{4} = \frac{17}{12} = 1\frac{5}{12} > 1$