## Sequences \& Series (Q 5, Paper 1)

## Lesson No. 2: Working with Series

## 2002

5 (b) The sum of the first $n$ terms of an arithmetic series is given by $S_{n}=\frac{3 n}{2}(n+3)$.
(i) Calculate the first term of the series.
(ii) By calculating $S_{9}$ and $S_{10}$, find $T_{10}$ (the tenth term of the series).

Solution
5 (b) (i)
$S_{n}=\frac{3 n}{2}(n+3)$
$\Rightarrow S_{1}=\frac{3(1)}{2}((1)+3)$
$\Rightarrow S_{1}=\frac{3}{2}(4)=6$

5 (b) (ii)
$S_{n}=\frac{3 n}{2}(n+3)$
$\therefore S_{10}=\frac{3(10)}{2}((10)+3)$
$\Rightarrow S_{10}=\frac{30}{2}(13)=195$
$S_{1}=T_{1}$ for all sequences and series.
$\therefore S_{9}=\frac{3(9)}{2}((9)+3)$
$\therefore S_{9}=\frac{27}{2}(12)=162$

## 1997

5 (c) In an arithmetic series

$$
S_{n}=n^{2}+n,
$$

where $S_{n}$ is the sum to the first $n$ terms.
Write down
(i) $S_{10}$, the sum to 10 terms
(ii) $S_{11}$, the sum to 11 terms
(iii) $T_{11}$, the 11th. term.

Solution
5 (c) (i)
$S_{n}=n^{2}+n$
$\Rightarrow S_{10}=(10)^{2}+(10)$
$\Rightarrow S_{10}=100+10$
$\Rightarrow S_{10}=110$
5 (c) (ii)
$S_{n}=n^{2}+n$
$\Rightarrow S_{11}=(11)^{2}+(11)$
$\Rightarrow S_{11}=121+11$
$\Rightarrow S_{11}=132$
5 (c) (iii)

$$
S_{n}-S_{n-1}=T_{n} \ldots \ldots .
$$

$T_{11}=S_{11}-S_{10}$
$\Rightarrow T_{11}=132-110=22$

