**1** The first two terms of a quadratic sequence are 10 and 17

Here is some information about the sequence.

| | 1st term | 2nd term | 3rd term | 4th term |
|---|---|---|---|---|
| Sequence | 10 | 17 | 30 | 49 |
| First difference | | +7 | +13 | 19 |
| Second difference | | | +6 | +6 |

Work out an expression for the $n$th term of the sequence.

**[4 marks]**

$n^{th}$ term : $an^2 + bn + c$

$a = \frac{6}{2} = 3$ (1)

$an^2 = 3n^2 = 3(1)^2, 3(2)^2, 3(3)^2, 3(4)^2$

$= 3, 12, 27, 48$

sequence = 10, 17, 30, 49

difference = 7, 5, 3, 1

$b = -2$ (1)

$-2(x1) + c = 7$

$c = 9$ (1)

$a = 3, b = -2, c = 9$, $3n^2 - 2n + 9$

Answer $3n^2 - 2n + 9$ (1)

**2** Here are the first four terms of a quadratic sequence.

3 20 47 84

Work out an expression for the *n*th term of the sequence.

**[4 marks]**

nth term = $an^2 + bn + c$

3 20 47 84

1st diff : 17 27 37

2nd diff : 10 10

a : $a = \frac{10}{2} = 5$ (1) $\therefore 5n^2$

b : $3 \times 5 + b = 17$

$b = 2$ (1) $\therefore 2n$

c : $5 \times 1^2 + 2 \times 1 + c = 3$

$c = -4$ (1)

nth term : $5n^2 + 2n - 4$ (1)

Answer $5n^2 + 2n - 4$