12.2 Patterns, sequences and series

12.2 Sigma notation

1. Consider the following sigma notation and answer the following questions.

$$\sum_{k=7}^{19}(3k+2)$$

(a) What is the starting value of k?
(b) Give the first three terms in the expansion of the series.
(c) What is the general term?

2. Consider the following sigma notation and answer the following questions.

$$\sum_{k=4}^{12}(k+15)$$

(a) What is the starting value of k?
(b) Give the first three terms in the expansion of the series.
(c) What is the general term?

3. Consider the following sigma notation and answer the following questions.

$$\sum_{k=7}^{17}(-2k+14)$$

(a) What is the starting value of k?
(b) Give the first three terms in the expansion of the series.
(c) What is the general term?

4. Expand the series indicated by the sigma notation.

(a) $\sum_{k=1}^{6}(6k-1)$

(b) $\sum_{k=5}^{9}(-5k+3)$

(c) $\sum_{k=4}^{6}(k-5)$

5. Write the following series in sigma notation.

(a) 1 + 4 + 9 + 16 + 25
(b) 5t + 6t + 7t + 8t + 9t + 10t
(d) 5 + 5 + 5 + 5 + 5 + 5

MEMO

Sigma notation [4.1.6.5; 4.1.6.6]

1. $\sum_{k=7}^{19}(3k+2)$

(a) What is the starting value of k?
k = 7
(b) First three terms:
23 ; 26 ; 29
(c) General term:
3k + 2

2. $\sum_{k=4}^{12}(k+15)$

(a) What is the starting value of k?
k = 4
(b) First three terms:
19 ; 20 ; 21
(c) General term:
k + 15

3. $\sum_{k=7}^{17}(-2k+14)$

(a) What is the starting value of k?
k = 7
(b) First three terms:
0 ; -2 ; -4
(c) General term:
-2k + 14

4. Expand the sigma notation.

(a) $\sum_{k=1}^{6}(6k-1)$

$= (6(1)-1)+(6(2)-1)+(6(3)-1)+(6(4)-1)+(6(5)-1+(6(6)-1)$

$= 5+11+17+23+29+35$

(b) $\sum_{k=5}^{9}(-5k+3)$

$= (-5(5)+3)+(-5(6)+3)+(-5(7)+3)+(-5(8)+3)+(-5(9)+3)$

$= -22-27-32-37-42$

(c) $\sum_{k=4}^{6}(k-5)$

$= (4-5)+(5-5)+(6-5)$

$= -1+0+1$

5. Sigma notation.

(a) $1 + 4 + 9 + 16 + 25 = \sum_{k=1}^{5} k^2$

(b) $5t + 6t + 7t + 8t + 9t + 10t = \sum_{k=5}^{10} tk$

(c) $5 + 5 + 5 + 5 + 5 + 5 = \sum_{k=1}^{6} 5$