

Summation

Printable teaching and practice sheet

Chapter 2 | Module 8 | Student Book pages 68-84 | Suggested time: 50 minutes | 20 marks



Name: _____ Class: _____ Date: _____

Learning goals

- Explain and apply sigma notation with valid conditions and clear reasoning.
- Explain and apply summation laws with valid conditions and clear reasoning.
- Explain and apply standard sums with valid conditions and clear reasoning.

Quick reference

Sigma notation	Sigma notation records an indexed sum with an expression, lower limit, and upper limit.
Summation laws	Sums distribute over addition and constant factors can be taken outside.
Standard sums	Known formulas for $\sum k$, $\sum k^2$, and geometric sums turn patterns into closed forms.

Worked example

Evaluate $\sum_{k=1}^8 (6k + 4)$. Worked solution: Use linearity: $6\sum k + (4)\sum 1 = 6 \cdot 8 \cdot 9/2 + (4) \cdot 8 = 248$.

Graduated practice

Answer without viewing the key. Show complete working for short-response questions.

1. Which expanded expression equals Σ from $k=2$ to 5 of $(2k-1)$? [1 marks]

A) $1+3+5+7$

B) $3+5+7+9$

C) $3+5+7$

D) $2+4+6+8$

2. Evaluate Σ from $k=1$ to 6 of $(3k+2)$ using summation laws. [1 marks]

A) 63

B) 69

C) 75

D) 81

3. Evaluate Σ from $k=1$ to 5 of k^2 . [1 marks]

A) 25

B) 30

C) 55

D) 225

4. Evaluate Σ from $k=1$ to 8 of $1/[k(k+1)]$. [1 marks]

A) $1/9$

B) $7/8$

C) $8/9$

D) $9/8$

5. Evaluate Σ from $k=1$ to 4 of $k/2^k$. [1 marks]

A) $11/8$

B) $3/2$

C) $13/8$

D) $15/8$

6. If $S_n=2n^2+3n$, what is a_5 ? [1 marks]

A) 17

B) 19

C) 21

D) 65

7. True or false: the number of integer indices from lower limit p to upper limit q is $q-p+1$. [1 marks]

☐ True ☐ False

8. True or false: Σ from $k=1$ to n of the constant c equals c . [1 marks]

☐ True ☐ False

9. Evaluate Σ from $k=1$ to 6 of $(2k^2-3k+1)$ using standard sums. [3 marks]

10. Evaluate Σ from $k=1$ to 20 of $[1/k-1/(k+1)]$, showing which terms cancel. [3 marks]

11. Evaluate Σ from $k=1$ to 5 of $k \times 2^{(k-1)}$, displaying the terms before adding. [3 marks]

12. If $S_n = n(n+2)$, find a formula for a_n and then calculate a_{10} . State what happens at $n=1$. [3 marks]

Challenge and review

1. Decompose $1/[(k+2)(k+3)]$ into partial fractions, then find its sum from $k=1$ to n in closed form.
2. In round k , a competition awards EGP $50k(0.8)^{(k-1)}$. Find the total award over the first four rounds.
3. Error analysis: a student says the number of terms in a sum from $k=4$ to n is $n-4$. Explain and correct the count.

Follow-up plan

Below 14/20: revisit term counting, sigma linearity, telescoping and recovering a_n from S_n , then retry Questions 3-6 and 9-12. At 14 or above: continue to the online module challenge.