GRADE 7 MATHEMATICS

Sequences & nth Term

Name: Date:

INQUIRY

A bamboo plant near Xuanwu Lake grows 3 cm per day. On day 1 it was 12 cm tall. Can you predict its height on day 100 without counting every day?

Discuss with your partner. Write your initial ideas below:

Key Vocabulary

Term	Definition
Arithmetic sequence	A sequence where the same amount is added each time.
Common difference (d)	The amount added between consecutive terms.
nth term	Formula for any term: T = dn + c.

Part A — Finding the nth Term

1. Find the nth term rule for: 4, 7, 10, 13, 16, ... Show all working. [3 marks]

2. Find the nth term rule for: 20, 17, 14, 11, 8, ... Then find the 30th term. [3 marks]

3. Find the nth term rule for: 1, 5, 9, 13, 17, ... Is 101 a term in this sequence? Show algebraically. [4 marks]

Part B — Generating Sequences

4. T = 6n - 5. Write the first 5 terms. [2 marks]

Show your working:

5. T = -3n + 40. (a) Write the first 5 terms. (b) Which term is the first negative value? [3 marks]

Show your working:

6. Bamboo plant: T = 3n + 9. (a) Height on day 1? (b) Day 50? (c) On which day does it reach 1 metre? [3 marks]

Show your working:

Part C — Cultural Sequences

7. Korean pagoda levels: the width of each level (from bottom) is 12 m, 10 m, 8 m, 6 m, ... (a) Find the common difference. (b) Write the nth term rule. (c) How wide is the 7th level? (d) Does this sequence make physical sense for all values of n? Explain. [4 marks]

8. The Nanjing Metro opened with 1 line. It added lines following a pattern: 2005: 1 line, 2010: 2 lines, 2014: 4 lines, 2017: 7 lines, 2021: 11 lines. Is this arithmetic? Find the differences between terms. What kind of pattern is it? Can you predict 2025? [4 marks]