Geometric Sequences

Printable teaching and practice sheet

Chapter 2 | Module 7 | Student Book pages 57-67 | Suggested time: 50 minutes | 20 marks

Name: _____ Class: _____ Date: _____

_____ _____ _____

Learning goals

- Explain and apply common ratio with valid conditions and clear reasoning.
- Explain and apply general term with valid conditions and clear reasoning.
- Explain and apply finding parameters with valid conditions and clear reasoning.

Quick reference

Common ratio	A geometric sequence has constant ratio r=a_{n+1}/a_n for nonzero terms.
General term	A geometric sequence has a_n=a_1 r^(n-1).
Finding parameters	Two suitable term conditions can determine a_1 and r, sometimes with more than one real possibility.

Worked example

A geometric sequence has a1=1 and ratio 2. Find a6. Worked solution: a6=a1·r^(6-1)=1·2^5=32.

Graduated practice

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

1. For the geometric sequence 162, 54, 18, 6, ... what is the common ratio? [1 marks]

A) 3 B) 1/3

C) -3 D) -108

2. A geometric sequence has first term 5 and common ratio 2. Find a7. [1 marks]

A) 160 B) 315

C) 320 D) 640

3. In a positive geometric sequence, a3=12 and a6=96. Find a1 and r. [1 marks]

A) a1=3, r=2 B) a1=2, r=3

C) a1=6, r=2 D) a1=3, r=8

4. A geometric sequence has first term 3 and common ratio 2. Find the sum of its first 6 terms. [1 marks]

A) 96 B) 126

C) 189 D) 192

5. If a1=81 and r=-1/3, what is a5? [1 marks]

A) -3 B) -1

C) 1 D) 3

6. A culture starts with 250 bacteria and grows by 20% each hour. How many are present after three complete increases? [1 marks]

A) 310 B) 400

C) 432 D) 450

7. True or false: in a geometric sequence of nonzero terms, the ratio a_(n+1)/a_n is constant. [1 marks]

□ True □ False

8. True or false: if the common ratio is negative, every term of the sequence is negative. [1 marks]

□ True □ False

9. In a positive geometric sequence, a2=6 and a5=162. Find a1 and r, showing your method. [3 marks]

10. Find the sum of the first 7 terms of 2, 6, 18, ... Write the formula and substitution. [3 marks]

11. A geometric sequence has first term 64 and ratio 1/2. Find a7 and S7, and explain the effect of |r|<1. [3 marks]

12. A model population is 800 and decreases by 10% each year. Find the population after four years of decrease and state the change factor. [3 marks]

Challenge and review

1. Derive the finite geometric-sum formula for r≠1 by writing S_n and rS_n, then subtracting.

2. A device worth EGP 20,000 loses 12% of its value each year. Write a model after n years and find its value after 5 years to the nearest pound.

3. Error analysis: a student says 3, 6, 12, 24 is arithmetic because the increases grow regularly. Explain the correct classification.

Follow-up plan

Below 14/20: revisit ratio versus difference and the formulas for a_n and S_n, then retry Questions 3-6 and 9-12. At 14 or above: continue to the online module challenge.