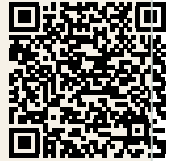


Geometric Sequences

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 $r = \frac{a_{n+1}}{a_n}$ 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 $a_1=1$ and ratio 2. Find a_6 . Worked solution: $a_6 = a_1 \cdot r^{(6-1)} = 1 \cdot 2^5 = 32$.

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) $\frac{1}{3}$
C) -3
D) -108

2. A geometric sequence has first term 5 and common ratio 2. Find a_7 . [1 marks]

- A) 160
B) 315
C) 320
D) 640

3. In a positive geometric sequence, $a_3=12$ and $a_6=96$. Find a_1 and r . [1 marks]

- A) $a_1=3, r=2$
B) $a_1=2, r=3$
C) $a_1=6, r=2$
D) $a_1=3, r=8$

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 $a_1=81$ and $r=-\frac{1}{3}$, what is a_5 ? [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 $\frac{a_{n+1}}{a_n}$ 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, $a_2=6$ and $a_5=162$. Find a_1 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 $\frac{1}{2}$. Find a_7 and S_7 , 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 $r \neq 1$ 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.