

Algebra 2 - Arithmetic and Geometric Sequences and Series - Test Answer Key

Common Core F-BF.A.2, A-SSE.B.4, F-IF.A.3 · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on arithmetic and geometric sequences and series (F-BF.A.2). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

Algebra 2 · Common Core State Standards: **F-BF.A.2, A-SSE.B.4, F-IF.A.3**

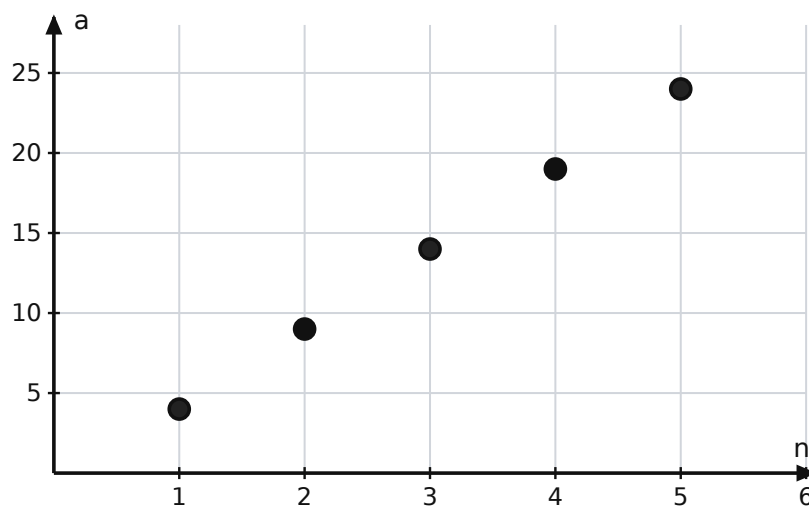
Question 1 - List the terms [2 pts]

$$2(1)-3=-1, 2(4)-3=5, 2(9)-3=15, 2(16)-3=29.$$

-1, 5, 15, 29

Scoring: 1 point for two correct terms, 1 point for all four.

Question 2 - Arithmetic formula [3 pts]



Common difference 5.

$$a_1 = 4 \text{ and } d = 5: a_n = 4 + 5(n-1) = 5n - 1.$$

$$a_{30} = 5(30) - 1 = 149.$$

$$a_n = 5n - 1; a_{30} = 149$$

Scoring: 1 point for d, 1 point for the formula, 1 point for a_30.

Question 3 - Geometric formula [2 pts]

$$r = 3; a_n = 5 \cdot 3^{n-1}. a_6 = 5 \cdot 243 = 1215.$$

$$a_6 = 1215$$

Scoring: 1 point for the formula, 1 point for a_6.

Question 4 - Arithmetic series [3 pts]

$$a_1 = 3, a_{25} = 99.$$

$$S_{25} = \frac{25(3+99)}{2} = 25 \cdot 51 = 1275.$$

1,275

Scoring: 1 point for the first and last terms, 1 point for the formula, 1 point for the sum.

Question 5 - Geometric series [3 pts]

$$a_1 = 2, r = 3, n = 6.$$

$$S_6 = 2 \cdot \frac{1-3^6}{1-3} = 2 \cdot \frac{-728}{-2} = 728.$$

728

Scoring: 1 point for identifying a_1 and r, 1 point for the formula, 1 point for the sum.

Question 6 - Recursive formula [2 pts]

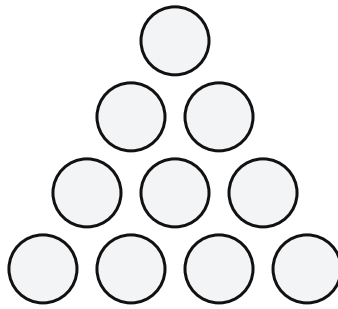
Each term is half the previous one: $a_1 = 48, a_n = \frac{1}{2}a_{n-1}.$

Next terms: 3 and 1.5.

3 and 1.5

Scoring: 1 point for the recursive formula, 1 point for the next terms.

Question 7 - Stadium seating [2 pts]



$$4 + 3 + \dots + 1 = 10 \text{ logs}$$

A stack of logs with 4 in the bottom row.

$$a_{12} = 8 + 11(3) = 41. \quad S_{12} = \frac{12(8+41)}{2} = 294.$$

294 seats

Scoring: 1 point for a_{12} , 1 point for the sum.

Question 8 - Identify the type [2 pts]

Ratios: $9 \div 3 = 3$, $27 \div 9 = 3$. Geometric with $r = 3$.

$$a_n = 3^n \text{ and } a_7 = 2187.$$

Geometric; $a_n = 3^n$; $a_7 = 2,187$

Scoring: 1 point for the type, 1 point for the formula and a_7 .

Question 9 - Find the error [1 pt]

The sum formula with averaging only works for arithmetic sequences. This one is geometric with $r = 2$: $S_5 = 1 \cdot \frac{1-2^5}{1-2} = 31$.

The sequence is geometric; the sum is 31

Scoring: 1 point for the explanation and the correct sum.

Total

20 points

