

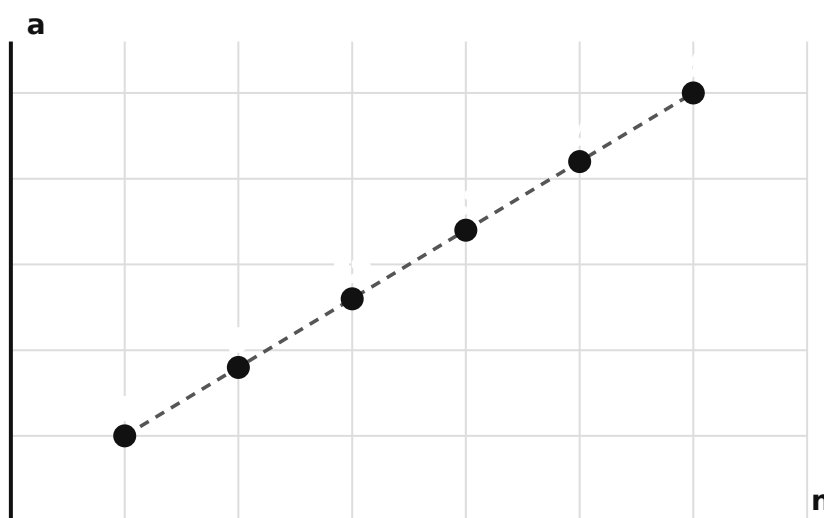
Algebra 2 · Sequences and Series · Test Answer Key

Common Core A-SSE.B.4, F-BF.A.2, F-IF.A.3 · mathovore.fr

Full solutions with a scoring guide for each question. Award partial credit when the method is right but an arithmetic slip appears, and do not deduct twice for the same carried-over error.

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

Question 1: Sequence from a graph (2 points)



The rule $a_n = 4n + 1$ passes through every plotted point.

a. The points rise 4 each step: $a_n = 5 + 4(n - 1) = 4n + 1$.

b. $a_{30} = 4(30) + 1 = 121$.

Scoring: 1 point for the formula (accept $a_n = 5 + 4(n - 1)$); 1 point for 121.

Question 2: Alternating sequence (2 points)

a. Ratio $\frac{-12}{6} = -2$: $a_n = 6(-2)^{n-1}$.

b. $a_9 = 6(-2)^8 = 6 \cdot 256 = 1536$.

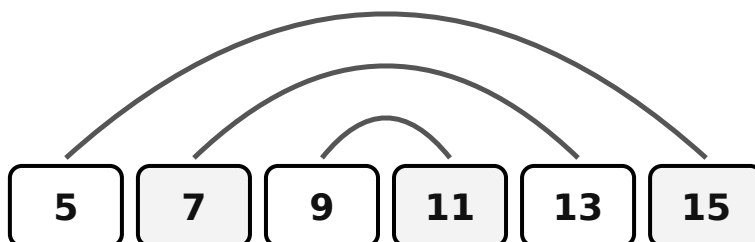
Scoring: 1 point for the formula with the correct ratio; 1 point for 1536 (the sign is positive because the exponent 8 is even).

Question 3: Recursive to explicit (2 points)

- a. 9, 5, 1, -3.
b. $a_n = 9 - 4(n-1) = 13 - 4n$, so $a_{25} = 13 - 100 = -87$.

Scoring: 1 point for four correct terms; 1 point for a correct explicit formula and $a_{25} = -87$.

Question 4: Sigma evaluation (2 points)



3 pairs, each adding to 20

Three pairs of 20 give 60.

- a. $5+7+9+11+13+15$.
b. $5+7+9+11+13+15=60$. (Check: $\frac{6(5+15)}{2}=60$.)

Scoring: 1 point for the six terms; 1 point for the sum 60.

Question 5: Lecture hall (2 points)

- a. $a_{20} = 12 + 19(3) = 69$ seats.
b. $S_{20} = \frac{20(12+69)}{2} = 10 \cdot 81 = 810$ seats.

Scoring: 1 point for 69; 1 point for 810 (award it if the method is right and only the arithmetic from part a carries an error).

Question 6: Series with negative ratio (2 points)

Geometric with $a_1 = 3$, $r = -2$, $n = 8$: $S_8 = \frac{3(1-(-2)^8)}{1-(-2)} = \frac{3(1-256)}{3} = -255$.

Scoring: 1 point for identifying $a_1 = 3$, $r = -2$, $n = 8$ and substituting; 1 point for -255 .

Question 7: Missing terms (2 points)

- a. $r^2 = \frac{96}{24} = 4$, so $r = 2$ (positive terms). $a_1 = \frac{24}{2^3} = 3$.
b. $a_8 = 3 \cdot 2^7 = 384$.

Scoring: 1 point for $r=2$ and $a_1=3$; 1 point for 384.

Question 8: Growing deposits (3 points)

- a. $a_{24} = 100 + 23(15) = \text{\$445}$.
b. $S_{24} = \frac{24(100+445)}{2} = 12 \cdot 545 = \text{\$6,540}$.

Scoring: 1 point for \$445; 1 point for a correct series formula with the right values; 1 point for \$6,540.

Question 9: Loan amount (3 points)

- a. $\sum_{k=1}^{24} 400(1.005)^{-k}$.
b. Geometric with $a_1 = \frac{400}{1.005}$, $r = \frac{1}{1.005}$: $P = 400 \cdot \frac{1 - 1.005^{-24}}{0.005} \approx \$9,025.15$, so **\\$9,025.15**.
c. $400 \cdot 24 = 9600$ paid, and $9600 - 9025.15 \approx \$574.85$. **\\$574.85** of interest.

Scoring: 1 point for the sigma expression; 1 point for the amount borrowed; 1 point for the interest.

Total
20 points