LESSON MAKER PRO

Sequence Power Moves

Find terms and sums in arithmetic and geometric patterns.

HIGH SCHOOL · MA.912.AR.10

MA.912.AR.10 "Solve problems involving sequences and series."

NAME _____ DATE _____

TERMS AND TOTALS

An arithmetic sequence changes by a constant difference, so $a_n = a_1 + (n - 1)d$. A geometric sequence changes by a constant ratio, so $a_n = a_1 * r^{(n - 1)}$. For a sum, use $S_n = n/2(a_1 + a_n)$ for arithmetic terms or $S_n = a_1(r^n - 1)/(r - 1)$ for geometric terms when r != 1.

WORKED EXAMPLE

Find S_{12} for the arithmetic sequence 7, 11, 15, ...

1. Identify $a_1 = 7$, d = 4, and n = 12.
2. Find the last term: $a_{12} = 7 + (12 - 1)4 = 51$.
3. Use $S_{12} = 12/2(7 + 51)$.
4. Calculate $S_{12} = 348$.

Answer: 348

PRACTICE 6 problems

1 An arithmetic sequence has $a_1 = 9$ and d = 5. Find a_8.

ANSWER _____

2 A geometric sequence has $a_1 = 3$ and r = 3. Find a_5.

ANSWER _____

3 Find S_3 for the geometric sequence 8, 24, 72, ...

ANSWER _____

4 An arithmetic sequence has $a_1 = 13$ and d = 3. Find S_5.

ANSWER _____

5 Which term of the arithmetic sequence 14, 19, 24, ... equals 89?

ANSWER _____

6 A geometric sequence has $a_1 = 10$ and r = 5. Find S_3.

ANSWER _____

APPLY IT Show your work

1 A student's video receives 18 views on its first day. The number of views received each day doubles for the next four days. How many views does the video receive in all during its first five days?

WORK SPACE

ANSWER _____

2 A student saves for a concert by depositing $9 in the first week. Each week, the student deposits $3 more than in the previous week. How much does the student save during the first 8 weeks?

WORK SPACE

ANSWER _____

CHALLENGE One step up

An arithmetic sequence has $a_5 = 20$ and $a_{14} = 47$. Find S_{20}.

WORK SPACE AND ANSWER

ANSWER KEY # Sequence Power Moves

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	An arithmetic sequence has $a_1 = 9$ and $d = 5$. Find a_8.	**44**
2	A geometric sequence has $a_1 = 3$ and $r = 3$. Find a_5.	**243**
3	Find S_3 for the geometric sequence 8, 24, 72, ...	**104**
4	An arithmetic sequence has $a_1 = 13$ and $d = 3$. Find S_5.	**95**
5	Which term of the arithmetic sequence 14, 19, 24, ... equals 89?	**16th term**
6	A geometric sequence has $a_1 = 10$ and $r = 5$. Find S_3.	**310**

PART 2 · APPLY IT

1. **558 views** Add the daily views: 18 + 36 + 72 + 144 + 288 = 558.
2. **$156** The eighth deposit is $30. Pair the first and last deposits to make 4 pairs of $39, for a total of $156.

CHALLENGE

730

Accept equivalent arithmetic or geometric formulas and valid work. For the term-position problem, accept 16 as long as the student clearly identifies it as the 16th term.