

Algebra 2 - Arithmetic and Geometric Sequences and Series - Worksheet

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

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice arithmetic and geometric sequences and series (Common Core F-BF.A.2, A-SSE.B.4 and F-IF.A.3). The first problems check listing terms and recognizing arithmetic and geometric patterns, the middle problems add explicit and recursive formulas and the sum formulas, and the last six are word problems and multi-step tasks that need savings, seating, and doubling problems.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

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

Exercise 1 - List the terms

Write the first five terms of $a_n = 3n - 2$.

Exercise 2 - Recursive formula

Write the first five terms of the sequence with $a_1 = 5$ and $a_n = a_{n-1} + 4$.

Exercise 3 - Arithmetic or geometric?

Sequence	Differences / ratios	Type
3, 6, 12, 24	?	?
20, 17, 14, 11	?	?
2, 6, 18, 54	?	?

Identify each sequence.

Decide whether each sequence in the table is arithmetic, geometric, or neither.

Exercise 4 - Explicit arithmetic formula

Write an explicit formula for $7, 11, 15, 19, \dots$ and find a_{20} .

Exercise 5 - Find a term

An arithmetic sequence has $a_1 = -4$ and $d = 3$. Find a_{15} .

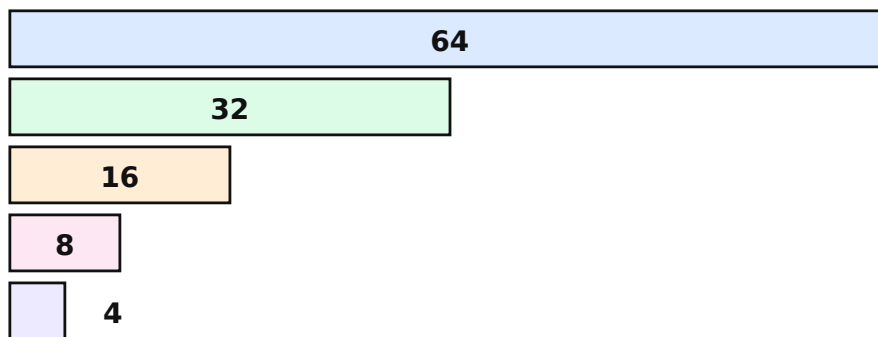
Exercise 6 - Find the position

Which term of $2, 5, 8, 11, \dots$ equals 62?

Exercise 7 - Geometric formula

Write an explicit formula for $3, 6, 12, 24, \dots$ and find a_8 .

Exercise 8 - Geometric with a fraction



A geometric sequence with ratio $\frac{1}{2}$: each bar is half the one above.

The bars show $80, 40, 20, \dots$ with ratio $\frac{1}{2}$. Find a_6 for the sequence starting at 80.

Exercise 9 - Recursive geometric

Write the first four terms of $a_1 = 2$, $a_n = 3a_{n-1}$.

Exercise 10 - Gauss's sum

1	2	3	4	5	6	7	8	9	10
10	9	8	7	6	5	4	3	2	1
11	11	11	11	11	11	11	11	11	11

10 pairs of 11 = 110, so $1 + 2 + \dots + 10 = 55$

Pairing the sequence with its reverse: every column sums to 11.

Find $1+2+3+\dots+100$ using the pairing idea shown for the numbers 1 to 10.

Exercise 11 - Arithmetic series

Find the sum of the first 20 terms of $5, 8, 11, \dots$.

Exercise 12 - Theater seats

A theater has 12 seats in the first row and each row has 2 more seats than the row before. There are 15 rows. How many seats are there?

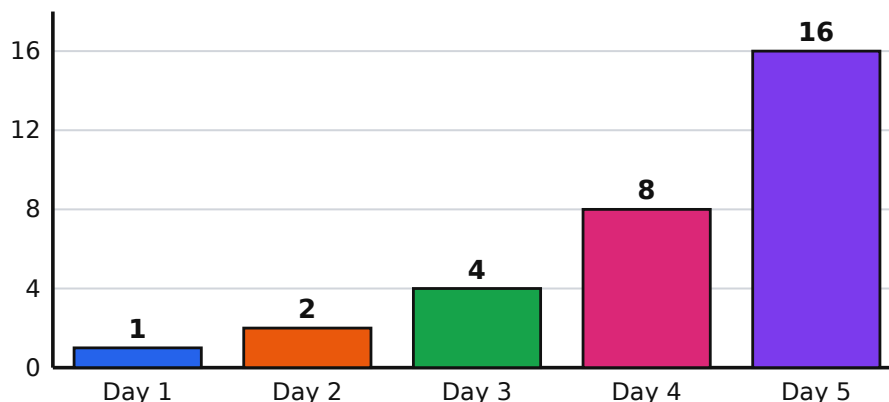
Exercise 13 - Geometric series

Find the sum of the first 8 terms of $3+6+12+\dots$.

Exercise 14 - Halving series

Find the sum of the first 7 terms of $64+32+16+\dots$.

Exercise 15 - Doubling pennies



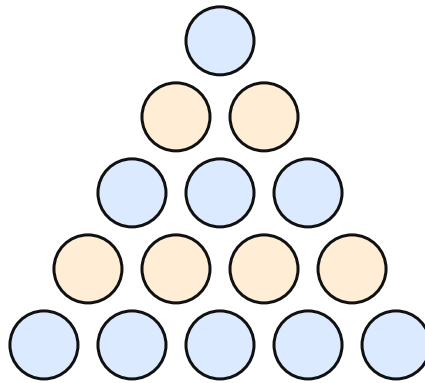
Pennies per day for the first five days.

Noah earns 1 cent on day 1, 2 cents on day 2, 4 cents on day 3, and keeps doubling. How many dollars has he earned in total after 30 days?

Exercise 16 - Savings plan

Mei deposits \$200 at the end of each year into an account that earns 5% per year. The balance after 10 years is $200+200(1.05)+\dots+200(1.05)^9$. Find it.

Exercise 17 - Triangular stack



$$5 + 4 + \dots + 1 = 15 \text{ logs}$$

A stack of logs with 5 in the bottom row.

A stack of logs has 20 logs in the bottom row, and each higher row has one fewer log, ending with 1 log. How many logs are in the stack? The picture shows a stack with 5 rows.

Exercise 18 - Fibonacci

A sequence has $a_1=1$, $a_2=1$, and $a_n=a_{n-1}+a_{n-2}$. Write the first 8 terms. Is it arithmetic or geometric?

Exercise 19 - Find the error

Aisha says 2,4,8,16 is arithmetic because it keeps increasing. Explain the error.

Exercise 20 - Two terms given

An arithmetic sequence has $a_3=11$ and $a_8=36$. Find d , a_1 , and a formula.