

Algebra 1 · Arithmetic and Geometric Sequences · Worksheet

Common Core F-IF.A.3, F-BF.A.2, F-LE.A.2 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

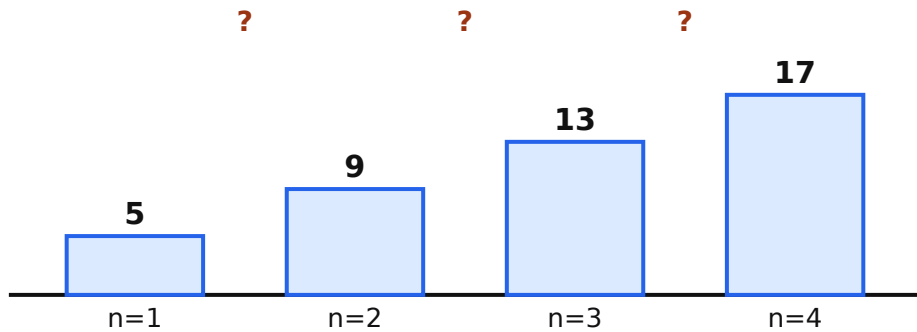
These twenty-two problems practice Common Core standards F-IF.A.3, F-BF.A.2 and F-LE.A.2. Identify arithmetic and geometric sequences, find terms, and write explicit and recursive formulas, including from two known terms or a graph.

The last six are word problems about savings, views, seating, value and bouncing balls. Work from easiest to hardest, and check every formula against a term you already know.

Algebra 1 Common Core: F-IF.A.3 · F-BF.A.2 · F-LE.A.2

Problem 1: Arithmetic: next terms

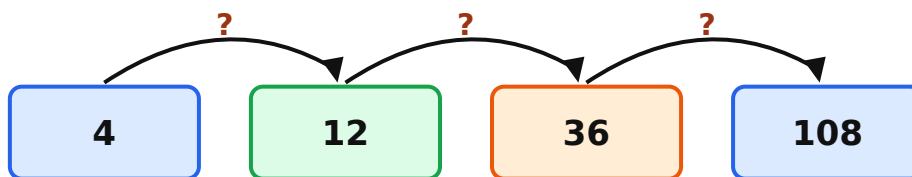
The sequence 5,9,13,17 is arithmetic. Find the common difference and the next two terms.



The first four terms.

Problem 2: Geometric: next terms

Find the common ratio of 4,12,36,108 and the next two terms.



The first four terms.

Problem 3: Decreasing arithmetic

Find the next three terms of the arithmetic sequence 50,43,36.

Problem 4: A ratio less than 1

Find the common ratio and the next three terms of the geometric sequence 80,40,20.

Problem 5: Arithmetic, geometric or neither

Classify each sequence as arithmetic, geometric, or neither. Give the common difference or ratio when there is one.

- a. 2,4,8,14
- b. 1,-2,4,-8
- c. 10,5,0,-5

Problem 6: Explicit rule: arithmetic

Write an explicit formula for the arithmetic sequence 6,11,16,21 and use it to find the 20th term.

Problem 7: Explicit rule: geometric

Write an explicit formula for the geometric sequence 5,10,20,40 and find the 8th term.

Problem 8: Recursive: arithmetic

Write a recursive formula for the arithmetic sequence 20,17,14,11, then find a_6 .

Problem 9: Recursive: geometric

Write a recursive formula for the geometric sequence 1.5,3,6,12, then find a_7 .

Problem 10: Use a_1 and d

An arithmetic sequence has $a_1 = -8$ and $d = 6$. Write the explicit formula and find a_{15} .

Problem 11: From a recursive rule

A sequence is defined by $a_1 = 4$ and $a_n = 3 \cdot a_{n-1}$ for $n \geq 2$.

- a. List the first five terms.
- b. Write an explicit formula and use it to verify a_5 .

Problem 12: Find the rule from two terms

An arithmetic sequence has $a_3 = 11$ and $a_7 = 27$. Find the common difference, a_1 and the explicit formula.

Problem 13: Geometric from two terms

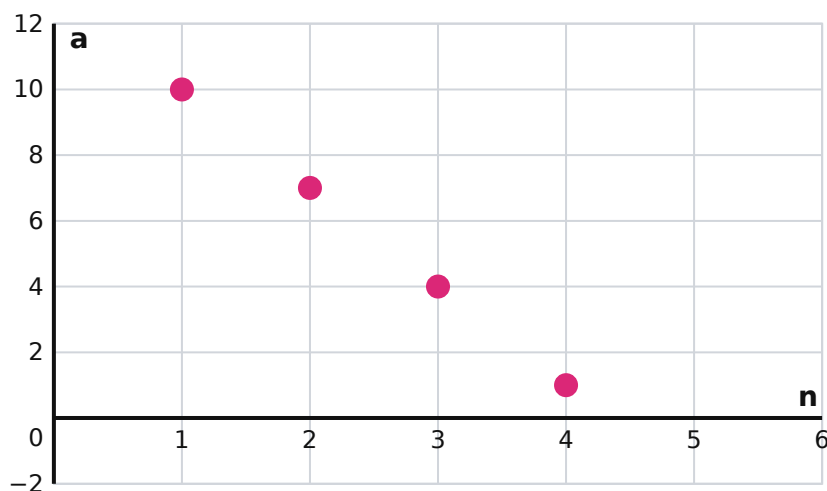
A geometric sequence has $a_2 = 6$ and $a_5 = 162$. Find the common ratio, a_1 and the explicit formula.

Problem 14: Which term?

In the arithmetic sequence 4, 10, 16, 22, which term equals 154?

Problem 15: Sequence from a graph

The graph shows the first four terms of a sequence.



The graph of a sequence.

- List the terms and decide whether the sequence is arithmetic or geometric.
- Write an explicit formula and find a_8 .

Problem 16: Decay by a third

A geometric sequence has $a_1 = 243$ and $r = \frac{1}{3}$. Find a_6 with the explicit formula.

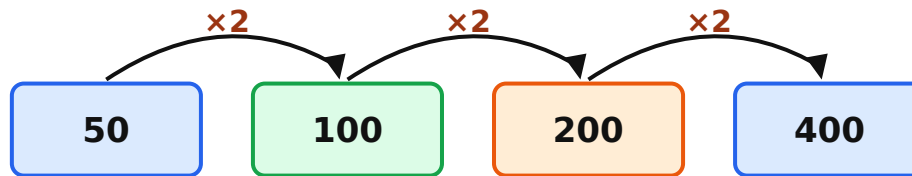
Problem 17: Weekly savings

Liam puts \$15 in a jar in week 1 and adds \$6 more each week, so the amount he deposits is an arithmetic sequence.

- Write an explicit formula for the amount a_n he deposits in week n .
- How much does he deposit in week 12?
- In which week does the deposit first exceed \$100?

Problem 18: Doubling views

A video gets 50 views on day 1, and the number of views each day is double the day before.



Views on days 1 to 4.

- Write a recursive formula and an explicit formula for the views a_n on day n .
- How many views does the video get on day 7?

Problem 19: Stadium rows

The first row of a section in a Little League stadium has 18 seats, and each row behind it has 2 more seats than the row in front.

- Write an explicit formula for the number of seats in row n .
- How many seats are in row 25?
- Which row has exactly 50 seats?

Problem 20: Car depreciation

A new car is worth \$20,000. Each year its value drops by 15% of the value the year before. Let a_n be its value at the start of year n , so $a_1 = 20000$.

- Write an explicit formula for a_n .
- Find the value at the start of year 4.
- At the start of which year does the value first fall below \$10,000?

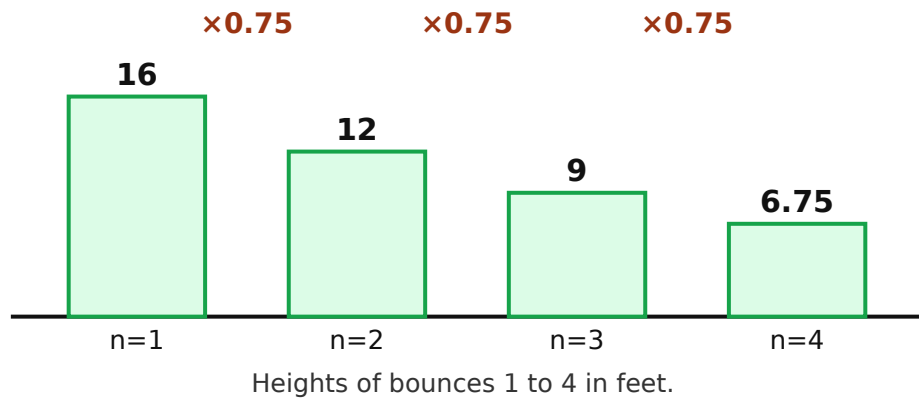
Problem 21: Two growth plans

Plan A starts with \$100 and adds \$25 each month. Plan B starts with \$10 and doubles each month. Let n be the month number, with month 1 as the starting amount.

- Write an explicit formula for each plan.
- In which month does Plan B first exceed Plan A?

Problem 22: Bouncing ball

A ball reaches 16 feet on its first bounce. Each later bounce reaches $\frac{3}{4}$ of the height of the bounce before it.



- Write an explicit formula for the height a_n of bounce n .
- How high is the 4th bounce?