

# Arithmetic Sequences as Linear Functions

## Algebra 1 • Section 4.5

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

### Quick Review and Helpful Hints

A function pairs each input with exactly one output. Pay attention to what the input means, what rule is being applied, and whether the question asks for a value, a rule, a domain, or an interpretation.

▷ **Example:** For  $f(x) = 2x + 5$ , find  $f(4)$ .

**Work:** Replace  $x$  with 4:  $f(4) = 2(4) + 5 = 13$ .

★ **Answer:** 13

### ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- |  |       |   |       |
|--|-------|---|-------|
| 1. Find the next three terms: 5, 9, 13, ...          | _____ | 6. Find $a_8$ if $a_1 = 12$ and $d = -3$ .                      | _____ |
| 2. Find $a_n$ for 7, 10, 13, ...                     | _____ | 7. Write a recursive rule for 9, 14, 19, ...                    | _____ |
| 3. Find the 12th term of 4, 11, 18, ...              | _____ | 8. Which term of 3, 8, 13, ... is 48?                           | _____ |
| 4. Is 2, 6, 12, 20, ... arithmetic?                  | _____ | 9. Find $a_n$ if $a_1 = -2$ and $d = 6$ .                       | _____ |
| 5. Find the common difference in 31, 26, 21, 16, ... | _____ | 10. Find the missing term: 4, __, 18 in an arithmetic sequence. | _____ |

### ◆ Word Problems

11. A gym membership starts at \$30 and adds \$12 each month. Write the cost after  $n$  months.
12. A theater has 18 seats in row 1 and each row has 4 more seats. How many in row 9?



## Answer Keys

- |  |  |
|--|--|
| 1. <input type="text" value="17, 21, 25"/>   | 7. <input type="text" value="a_1 = 9; a_n = a_{n-1} + 5"/> |
| 2. <input type="text" value="a_n = 3n + 4"/> | 8. <input type="text" value="10th"/>                       |
| 3. <input type="text" value="81"/>           | 9. <input type="text" value="a_n = 6n - 8"/>               |
| 4. <input type="text" value="No"/>           | 10. <input type="text" value="11"/>                        |
| 5. <input type="text" value="-5"/>           | 11. <input type="text" value="a_n = 12n + 18"/>            |
| 6. <input type="text" value="-9"/>           | 12. <input type="text" value="50"/>                        |

### Step-by-Step Explanations

- Each term jumps up by 4, so just keep adding 4 to ride the pattern forward.
- Start at 7, step by 3:  $7 + 3(n - 1)$  tidies up into  $3n + 4$ .
- From 4, you take 11 steps of 7 to reach term 12:  $4 + 11(7) = 81$ .
- The gaps are 4, 6, 8 — they keep growing, and arithmetic sequences need the same gap every time.
- The terms are shrinking by 5 each step, so the difference is negative:  $-5$ .
- From the start, term 8 is 7 steps away:  $12 + 7(-3)$  drops you to  $-9$ .
- Recursive just means 'use the term before.' Begin at 9, then each term is the last one plus 5.
- Set  $3 + 5(n - 1) = 48$ . That gives  $5(n - 1) = 45$ , so  $n = 10$  — the 10th spot holds 48.
- Plug into the pattern:  $-2 + 6(n - 1)$  simplifies neatly to  $6n - 8$ .
- The middle of an arithmetic trio is just the average of its neighbors:  $(4 + 18)/2 = 11$ .
- Month 1 already costs 30, then 12 piles on each month:  $30 + 12(n - 1) = 12n + 18$ .
- Row 9 is 8 rows past the first, gaining 4 seats each step:  $18 + 4(8) = 50$ .



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