Sec. 4-7 Arithmetic Sequences

sequence: ordered list of numbers that often form a pattern

term of a sequence: each number in the list

Problem 1:

Describe the pattern and find the next two terms of the sequence.

a. 4, 6, 8, 10, ... (2, 2, 2; 6−4, 8−6, 10−8) Arithmetic common difference: 2

add 2 to the previous term; 12, 14

b. 1, 3, 9, 27, ... Geometric

multiply the previous term by 3; 81, 243

arithmetic sequence: difference between consecutive terms is constant

difference ⟶ common difference.

Problem 2:

Tell whether the sequence is arithmetic. If so, what is the common difference?

a. 7, 11, 16, 22, ... (4, 5, 6) not arithmetic

b. 3, 9, 15, 21, ... (6, 6, 6) arithmetic cd: 6

recursive formula: function (rule) that relates each term of a sequence after the first to the ones before it

7, 11, 15, 19, ... CD: 4

Let n = the term number

$A(n)$ = the value of the n^{th} term

value of term 1 = $A(1) = 7$

value of term 2 = $A(2) = A(1) + 4 = 11$

value of term 3 = $A(3) = A(2) + 4 = 15$

value of term 4 = $A(4) = A(3) + 4 = 19$

value of term n = $A(n) = A(n-1) + 4$

$A(n) = A(n-1) + 4$,

where $A(1) = 7$

Problem 3

Write the recursive formula for the arithmetic sequence 25, 31, 37, 43, ... What is the value of the 7th term?

CD: 6

$A(1) = 25$

$A(2) = A(1) + 6 = 31$

$A(3) = A(2) + 6 = 37$

$A(4) = A(3) + 6 = 43$

$A(n) = A(n-1) + 6$, where $A(1) = 25$

$A(5) = A(4) + 6 = 43 + 6 = 49$

$A(6) = A(5) + 6 = 49 + 6 = 55$

$A(7) = A(6) + 6 = 55 + 6 = \boxed{61}$

explicit formula: function rule that relates each term of a sequence to the term number

$$A(n) = A(1) + (n-1)d$$

CD: 5

3, $\underset{+5}{\_\_8}$, $\underset{+5}{\_\_13}$, $\underset{+5}{\_\_18}$, $\underset{+5}{\_\_23}$

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