

Bell work

- Monday - IXL Current
- Tuesday - Khan Mappers
- Wednesday - IXL Review
- Thursday - Xtra Math
- Friday - ThatQuiz/Kahoot/Quizzz

4.2 CONSTRUCTING ARITHMETIC SEQUENCES

ESSENTIAL QUESTION: WHAT IS AN ARITHMETIC SEQUENCE?

F-LEA.2 - CONSTRUCT ARITHMETIC SEQUENCES, GIVEN A GRAPH, A DESCRIPTION OF A RELATIONSHIP, OR TWO INPUT-OUTPUT PAIRS

STUDENTS WILL DEFINE AND GIVE EXAMPLES OF ARITHMETIC SEQUENCE AND COMMON DIFFERENCE.

You can order tickets for the local theater online. There is a fee of \$2 per order. Matinee tickets cost \$10 each. The total cost, in dollars, of ordering n matinee tickets online can be found by using $C(n) = 10n + 2$. The table shows the cost of 1, 2, 3, and 4 tickets.

Tickets	1	2	3	4
Total Cost (\$)	12	22	32	42

Domain: $\{1, 2, 3, 4, \dots\}$
 Range: $\{12, 22, 32, 42, \dots\}$
 First term: 12

Find the difference between each two consecutive terms in the sequence:

$$C(1) = 12 \qquad 10$$

VOCAB

Arithmetic sequence - the difference between consecutive terms is always equal

Common difference (d) - the difference between consecutive terms in an arithmetic sequence

Two Types of Arithmetic sequences: Explicit and Recursive

Explicit rule

the n th term of the arithmetic sequence is defined as a function of n .

Recursive rule

the first term of the sequence is given and the n th term is defined by relating it to the previous term

Determine if the sequence is arithmetic:

- 1). 2, 3, 4, 5... **yes**
- 2). 6, 12, 24, 30... **No**
- 3). 1, 4, 9, 16, 25... **No**
- 4). 23, 21, 19, 17... **yes $d = -2$**

Write a recursive rule and an explicit rule for the sequence described by each table.

The table shows the monthly balance in a savings account with regular monthly deposits. The savings account begins with \$2000, and \$500 is deposited each month.

Time (months)	n	1	2	3	4	5
Balance	$f(n)$	2000	2500	3000	3500	4000

Write a recursive rule.

- 1). Write the first term as a function
- 2). Identify the common difference

$$f(1) = 2000$$

$$d = 500$$

$$f(n) = f(n-1) + 500, \quad n \geq 2$$

n	$f(n)$
1	2000
2	2500
3	3000

4.2 Constructing Arithmetic Sequences

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Write a recursive rule and an explicit rule for the sequence described by each table.

The table shows the monthly balance in a savings account with regular monthly deposits. The savings account begins with \$2000, and \$500 is deposited each month.

Time (months)	n	1	2	3	4	5
Balance	f(n)	2000	2500	3000	3500	4000

Write an explicit rule

1. Identify the common difference
2. Common difference is multiplied by (n-1)

$$d = 500$$

$$f(n) = 2000 + 500(n-1)$$

Using a General Form to Construct Rules for Arithmetic Sequences

Arithmetic sequences can be described by a set of general rules. Values can be substituted into these rules to find a recursive and explicit rule for a given sequence.

General Recursive Rule

$$\text{Given } f(1), f(n) = f(n-1) + d \text{ for } n \geq 2$$

General Explicit Rule

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

$$f(1) = \dots$$

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

General Explicit Rule	
$n \geq 2$	$f(n) = f(1) + d(n-1)$

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

Write a recursive rule and an explicit rule for the sequence described by each table.

The table shows the monthly balance in a savings account with regular monthly deposits.

Time (months)	n	1	2	3	4	5
Balance	f(n)	5000	6000	7000	8000	9000

General Recursive Rule

$$\text{Given } f(1), f(n) = f(n-1) + d \text{ for } n \geq 2$$

General Explicit Rule

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

$$f(1) = 5000 \quad d = 1000$$

$$f(n) = f(n-1) + 1000$$

$$f(n) = 5000 + 1000(n-1)$$

Write a recursive rule and an explicit rule for the sequence described by each table.

The table shows the number of plates left at a buffet after n hours. Write a recursive rule and an explicit rule for the arithmetic sequence represented by the table.

Time (hours)	n	1	2	3	4	5
# of plates	f(n)	155	141	127	113	99

General Recursive Rule

$$\text{Given } f(1), f(n) = f(n-1) + d \text{ for } n \geq 2$$

General Explicit Rule

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

Recursive:

$$f(n) = f(n-1) - 14$$

$$f(1) = 155, \quad n \geq 2$$

$$f(n) = 155 - 14(n-1)$$

Write a general recursive and explicit rule for each arithmetic sequence.

General Recursive Rule

$$\text{Given } f(1), f(n) = f(n-1) + d \text{ for } n \geq 2$$

General Explicit Rule

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

100, 88, 76, 64, ... $d = -12$

Recursive:

$$f(1) = 100$$

$$f(n) = f(n-1) - 12$$

$$n \geq 2$$

Exp:

$$f(n) = 100 - 12(n-1)$$

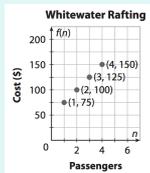
The explicit rule for an arithmetic sequence can be expressed as a function. You can use the graph of the function to write an explicit rule.

Write an explicit rule in function notation for each arithmetic sequence.

The cost of a whitewater rafting trip depends on the number of passengers. The base fee is \$50, and the cost per passenger is \$25. The graph shows the sequence.



- 1). Create a table to store the sequence
- 2). Find the common difference (d)
- 3). Write an explicit rule for the sequence.



1	75	$d = 25$
2	100	$f(n) = 75 + 25(n-1)$
3	125	
4	150	

4.2 Homework

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