

2.3 Finding the n^{th} Term

Objectives:

- I CAN find the n^{th} term in a linear sequence using a function rule.
- I CAN develop a function rule for a linear sequence.

Vocabulary

Function Rule:

rule that gives the n^{th} term of a sequence

Linear Function:

an equation whose graph is a line
 $f(n)$ means
“the function f of the variable n ”

Ordered Pair:

$(x, y) = (\text{term number}, \text{value})$

Example #1

Complete each table. Find the difference between consecutive values.

n	1	2	3	4	5	6	7	8
$n - 5$	-4	-3	-2	-1	0	1	2	3

Difference
+1

n	1	2	3	4	5	6	7	8
$4n - 3$	1	5	9	13	17	21	25	29

+4

n	1	2	3	4	5	6	7	8
$-5n + 3$	-2	-7	-12	-17	-22	-27	-32	-37

-5

What do you notice about the differences and the rules?

Example #2

Complete the conjecture below.

Then use it to find the rule for the n^{th} term of the sequence below.

If the difference between the values of consecutive terms of a sequence is the constant m , then the coefficient of n in the formula is m .

<i>Term</i>	1	2	3	4	5	6	...	n
<i>Value</i>	15	9	3	-3	-9	-15	...	


-6 -6 -6 -6 -6

$$f(n) = -6n + b$$

$$f(1) = -6(1) + b = 15$$

$$f(n) = -6n + 21$$

$$-6 + b = 15$$

$$b = 21$$

Example #3

Find the rule for the sequence:

7, 2, -3, -8, -13, -18, ...

Differences = -5

$$f(n) = -5n + b$$

$$f(1) = -5(1) + b$$

$$7 = -5 + b$$

$$12 = b$$

$$f(n) = -5n + 12$$

Example #4

If you place 200 points on a line, into how many non-overlapping rays and segments does it divide the line?

Points	1	2	3	4	5	...	n	...	200
Rays	2	2	2	2	2	...	2	...	2
Segments	0	1	2	3	4	...	$n - 1$...	199
Total	2	3	4	5	6	...	$n + 1$...	201



If you place 200 points on a line, then they divide the line into 201 non-overlapping rays and segments.