

# Unit 1 Family Support Materials

## Sequences and Functions

In this unit, students apply their skills using tables, equations, and graphs to identify patterns and learn about sequences. A **sequence** is a list of numbers, and each number in a sequence is called a **term**. If you have ever used “fill down” to continue a pattern in a spreadsheet, you have created a sequence. For each sequence of numbers here, can you figure out how to find the next number?

sequence *A*: 4, 7, 10, 13, \_\_\_\_\_

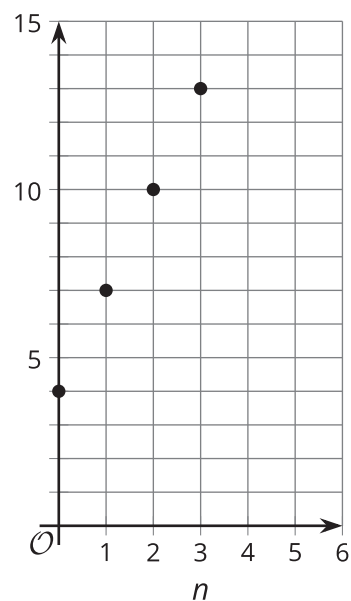
sequence *B*: 2, 6, 18, 54, \_\_\_\_\_

You probably noticed that, for sequence *A*, you can add 3 to any term to get the next term. There are different ways we could represent this sequence.

Using a table:

position in list	0	1	2	3	$n$
term	4	7	10	13	$4 + 3 \times n$

Using a graph:



Using words:

“To find the  $n^{\text{th}}$  term, multiply  $n$  by 3 and add 4.”

Using notation for defining a function:

$A(n) = 4 + 3 \times n$  (the value of the  $n^{\text{th}}$  term is  $4 + 3 \times n$ ). For example,  $A(2) = 4 + 3 \times 2$ , so  $f(2) = 10$  (the value of the 2nd term is 10).

**Here is a task to try with your student:**



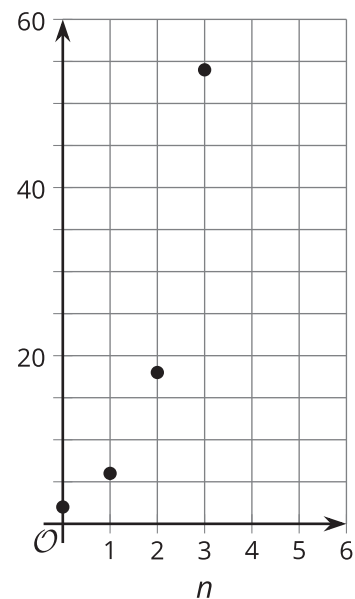
Let's revisit sequence  $B$ : 2, 6, 18, 54, ...

1. What do you notice about the sequence?
2. If the pattern is "multiply any term by 3 to get the next term," what is the next term?
3. If we call 2 the "0th term," what is the 10th term?
4. How could we express the  $n^{\text{th}}$  term?
5. Represent sequence  $B$  in as many different ways as you can.

**Solution:**

1. Students may notice:
  - a. All the numbers are even.
  - b. The values of the terms are increasing.
  - c. Each term is 3 times the value of the previous term.
2. 162
3. 118,098
4.  $2 \times 3^n$ . This can also be written  $2(3^n)$  or  $2 \cdot 3^n$ .
5. Here are some ways:

position in list	0	1	2	3	$n$
term	2	6	18	54	$2 \times 3^n$



"Multiply any term by 3 to get the next term."

$$B(n) = 2 \times 3^n$$