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, _____

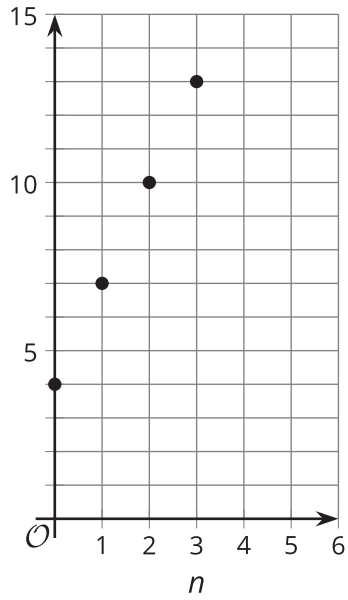
sequence B: 2, 6, 18, 54, _____

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^{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^{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:

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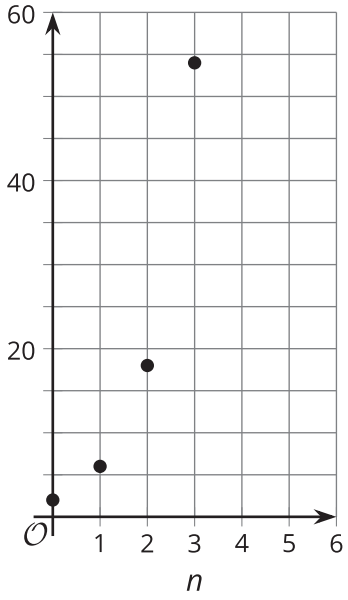
Let's revisit sequence B: 2, 6, 18, 54, . . .

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^{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. 2×3^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	2×3^n



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

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