Family Support Materials

Sequences and Functions

In this unit, your student will be remembering ways to represent functions. In mathematics, we can think of a function as a rule that tells us how to go from an input to an output. A *sequence* is a special type of function in which the input is a position in a list, and the output is the number in that position. If you have ever used "fill down" to continue a pattern in a spreadsheet, you have created a sequence. For each sequence of numbers, can you guess a possible rule for creating the next number?

Sequence A: 4, 7, 10, 13, _____

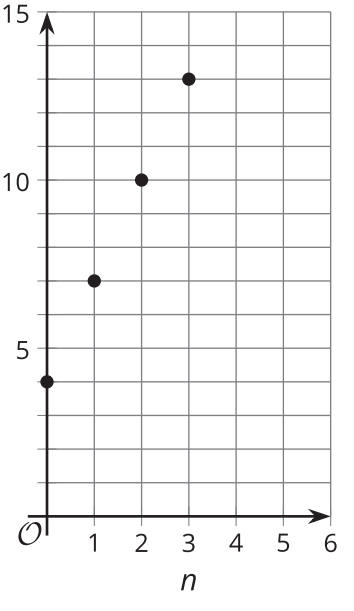
Sequence B: 2, 6, 18, 54, _____

You probably noticed that a rule for Sequence A could be "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 nth term, multiply n by 3 and add 4."

Using notation for defining a function:

$f(n) = 4 + 3 \times n$ (the value of the nth term is $4 + 3 \times n$). For example, $f(2) = 4 + 3 \times 2$, so $f(2) = 10$ (the value of the 2nd term is 10).

Here is a task to try with your student:

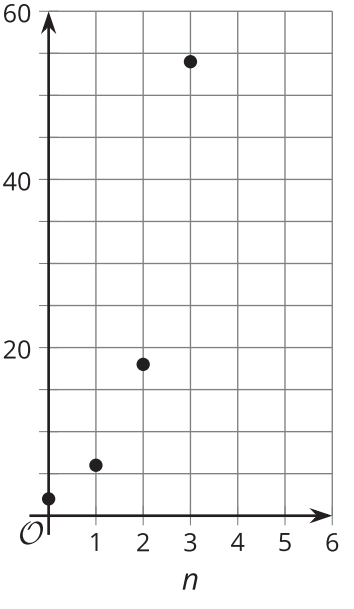
Let's revisit Sequence B: 2, 6, 18, 54, . . .

1. Describe any patterns you notice.
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 nth term?
5. Represent Sequence B in as many different ways as you can.

Solution:

1. It is possible to describe many patterns in this list.
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." $f(n) = 2 \times 3^n$