Sequence Graphs

ID: 13227

Time required
20 minutes

Activity Overview

In this activity, students will work with both arithmetic and geometric sequences. Formulas will include both explicit and recursive forms.

Topic:

- Students will “see” the terms of a sequence, and will determine if it is arithmetic or geometric (linear or exponential).
- Students will answer some self- check questions to determine their level of understanding.
- A handout may be provided for students to record some of their observations or to take notes from the class discussion.

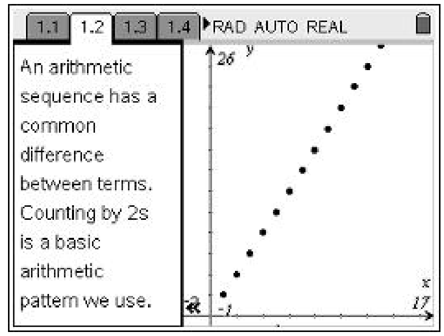
Teacher Preparation and Notes

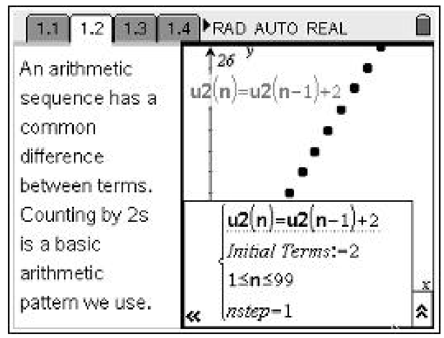
- *It is expected that students will know how to answer multiple choice format questions in the TI-Nspire.*
- *The teacher will most likely run this activity as a teacher-led group lesson with some room for individual self-evaluation and analysis.*
- ***To download the student TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter “13227” in the quick search box.***

Associated Materials

- *.tns file for students*

Pages 1.2-1.4 Arithmetic sequence

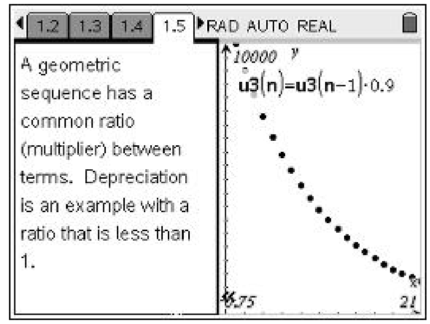




- Students are shown a nice visual of a sequence plotted by terms. The class should notice the linear shape of the plotted points. The teacher can open the function line to look at how the graph is plotted. Two different ways of entering sequence notation into the function entry line are provided. You will see u1(n) and u2(n). The first is written in an explicit form and the second is recursive.
- Remind students of how young children are taught these numeric patterns like counting by 2s or 5s or 10s. Discuss why a doctor might ask you to count "backwards from 100 going by 7s" when you are given anesthesia before a medical procedure. You might wish to have students try to write that sequence in either explicit or recursive form.
- Page 1.3 has a multiple choice question with more than one correct response. This is the time to begin the discussion of explicit vs. recursive formulas. The notation is a major hurdle here. Subscripting is difficult for students who think that there must be a computation done for the subscript.
- For the teacher, the formula is placed into the calculator in two different ways. U1(n) is written in a direct, explicit form while u2(n) is the recursive formula where each term depends on the next. Students will surely note the multiplication by 2 (slope) in the first form and the "+2" that appears in the recursive form.

Pages 1.5-1.6 Geometric sequence

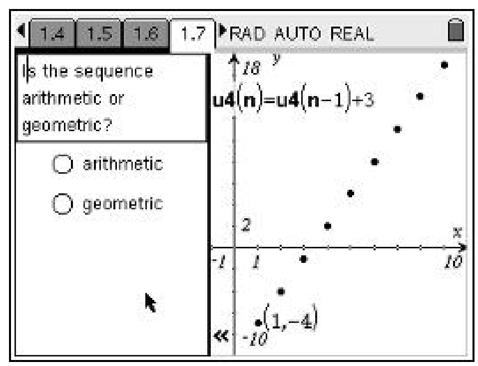
- This time, the students will see the decreasing curve as the graph of the plotted terms. The formula for u3(n) is shown in its recursive form. Perhaps students could write an explicit formula if they have knowledge of exponential functions. Some discussion of depreciation should take place now. Have students give examples of things that might "depreciate" over time.



- Discuss with students how the equation must be altered to create a "growth" or increasing function with a geometric pattern. Brainstorm examples of things that grow or appreciate.

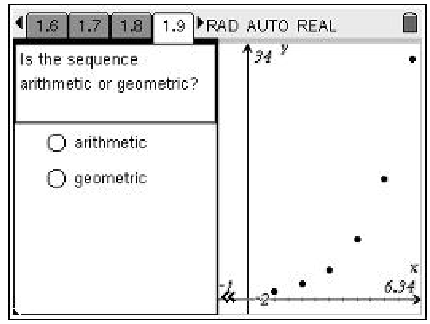
Pages 1.7-1.8 Linear sequence

- The formula for u4(n) is posted on the graphing window. This promotes rich discussion. An open-ended question is found on page 1.8, and a comment should be made about slope at this time. For instance, why would a slope be important here? Ask students how they identified whether the pattern was arithmetic or geometric. Some may have noticed the formula with addition of 3 in it, others see the linear shape.



- Discuss why a linear equation in the form y = mx + b is not appropriate, and why the "dots" aren't connected on this type of plot/graph. Have students write the explicit formula that would match this same graph.

Page 1.9-1.10 Geometric Growth



- Another plot, and the question about whether the data appears to be artihmetic or geometric (linear graph or exponential).
- This example happens to be the “doubling” pattern. Name an example of something that doubles…. Hint: cell division! Ask students how this might be different from tripling or quadrupling.
- Extensions are possible here, through exposing students to a variety of sequences that are neither arithmetic nor geometric. The Fibonacci sequence is a rich example that can only be described with a recursive formula. The triangular numbers appear in Pascal’s triangle as well as in other places. Have students build or draw the triangles, counting the number of items it takes to build it (there are other figurate numbers as well).