 nth term of an geometric sequence

The activities below lead students to discover the relationship between the nth term, , the first term, , and the common ratio, .

Activity 1 – using graphing software.

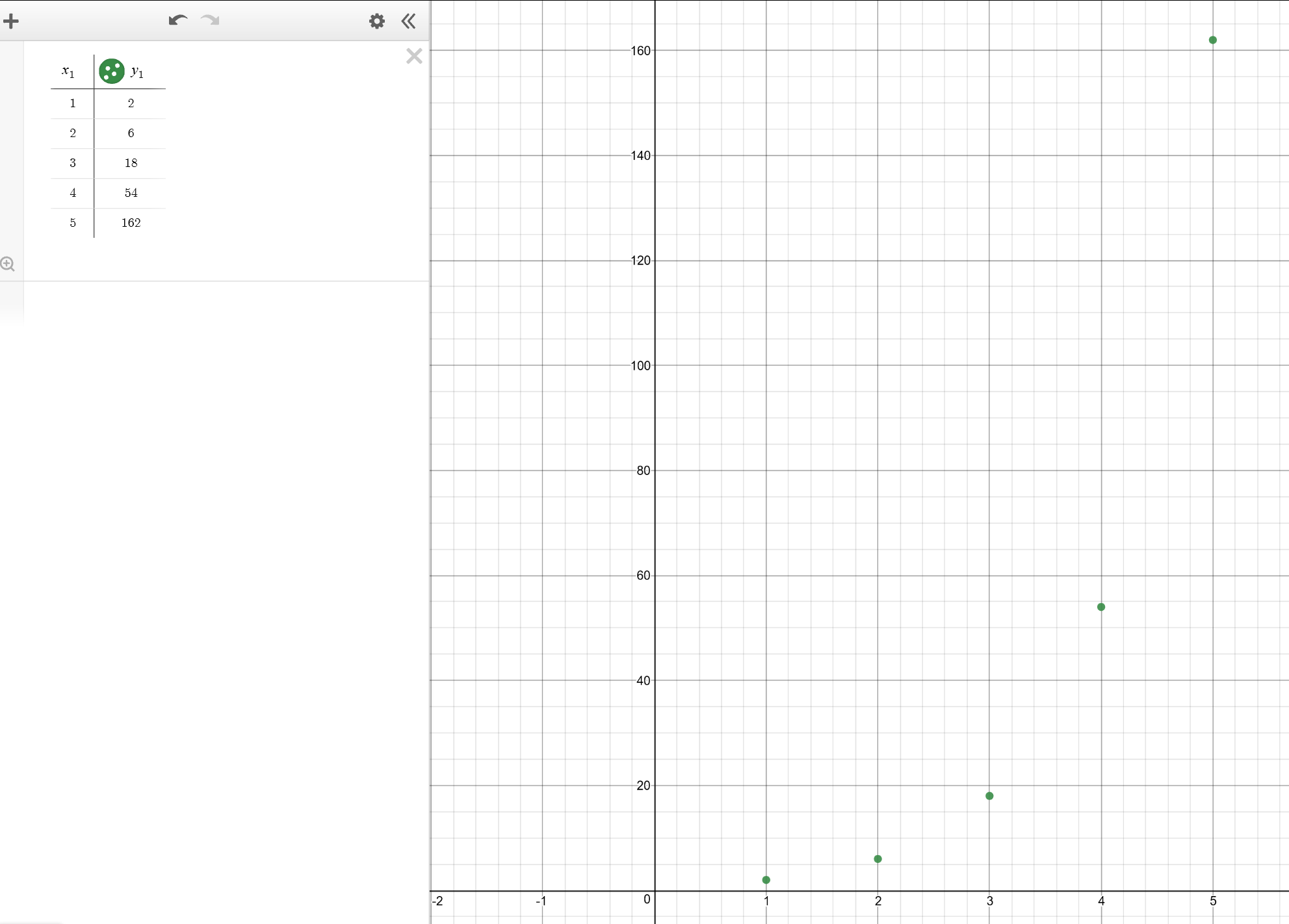
1. Students to construct the first 5 terms of a geometric sequence by defining a first term, , and a common ratio .

Example: Let and , then the sequence is 2, 6, 18, 54, 162…

| n | 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- | --- |
|  | 2 | 6 | 18 | 54 | 162 |

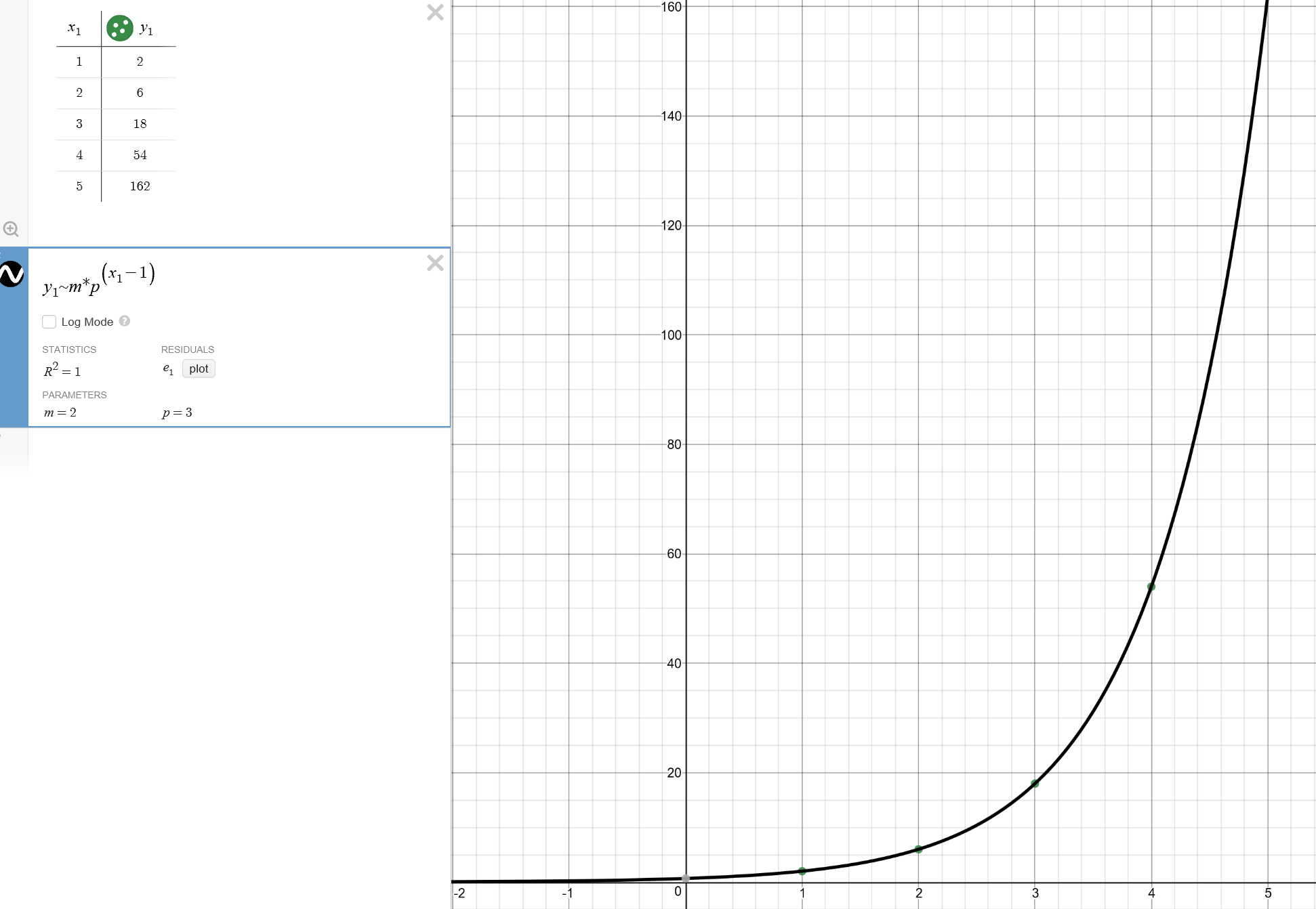
1. Student to use graphing software to graph the 5 points represented by verse .

Example: Using Desmos:



1. Students to describe the relationship in terms of the shape of the graph.
2. Students to input a curve through the points to express the relationship between and .  
   y1~m\*n^(x1-1)

Example:



1. Students to note the values of and and record the equation:

Example:

1. Student to re-write this rule in terms of , n, a and r.

Example: y = , , ,

Activity 2 – using a spreadsheet.

1. Open the file: nth-term-geometric-sequence.XLSX

Students have two options,

* With formulas and graph (skip steps 3 and 4)
* Without formula and graph

1. Students set a value for and .
2. Student use the definition of to complete the table of values for the first terms.
3. Students are to graph the relationship between and .
4. Students to describe the relationship in terms of the shape of the graph.
5. Students to come up with a new formula for using , and without referencing the previous term. Write a formula to check the values in column D.