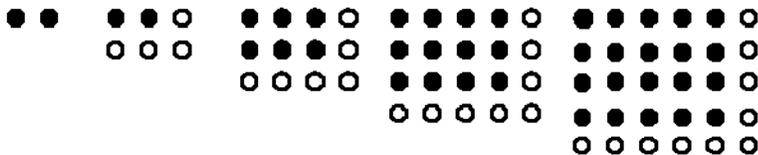


Patterns with Rectangular Numbers from Multiple Perspectives

John LaMaster, lamaster@ipfw.edu

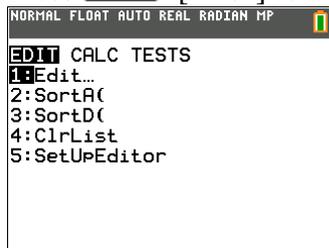
Rectangular numbers can be modeled in a rectangular array of rows and columns as shown below.

1. Ask students to discuss the connection between the rectangles and the sums of consecutive even numbers. Discuss what the “open dots” and the “solid dots” each represent.

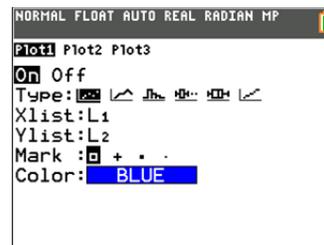


2	2
2+4	6
2+4+6	12
2+4+6+8	20

2. Press **STAT** [1:Edit] to enter the term index in L1 and the value of the term in L2.



L1	L2	L3	L4	L5	2
1	2				
2	6				
3	12				
4	20				

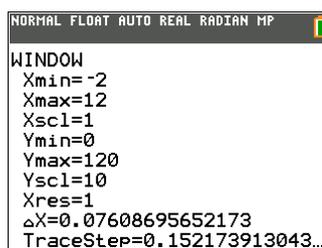


3. Press **2nd** [STATPLOT] and turn Plot 1 on. Use the default settings.

4. Press **MODE**, highlight GRAPH-TABLE, and press ENTER.

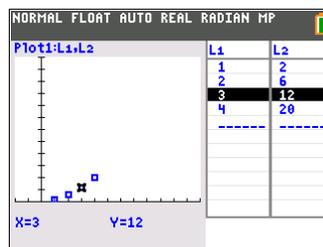


Press **WINDOW** and enter these settings.



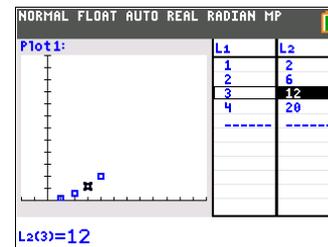
Press **GRAPH**.

5. Press **TRACE**. This will put you on the left pane, which is the graph screen. Press the **▶** and **◀** keys. Notice the right pane is gray.



After pressing TRACE you are in the left pane (graph screen). Notice the right pane is gray.

Press **2nd** [TABLE]. You are on the right pane, which is the dynamic list editor. Press **▼** and **▲**. Notice the right pane is black.



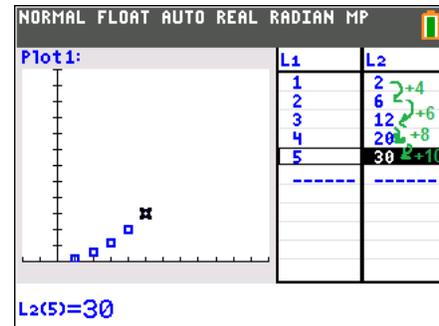
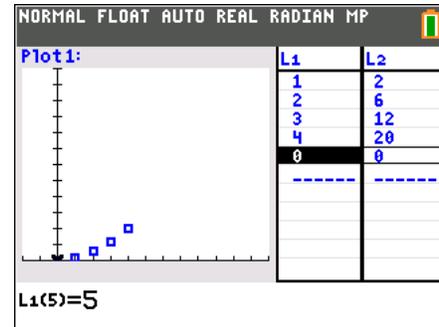
After pressing 2nd TABLE you are in the right pane (list editor). Notice the right pane is black.

6. While in the right pane, press \downarrow to reach the last empty row. Press ENTER . A new row is created with placeholder (0,0).

Type the index of the next term in L1. Press ENTER .

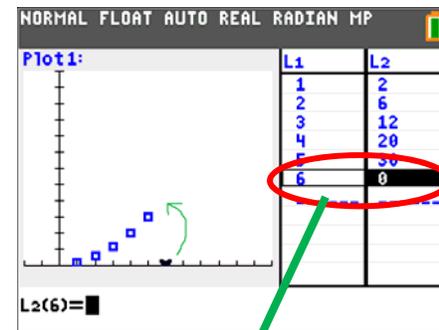
Warning: Plotting interactively works better if you have only **one plot active** or plots which have no dependencies. For example, if another stat plot was turned on that had L1 paired with a list other than L2, an error of Dimension Mismatch would occur when more elements to L1 are added or deleted.

Press \rightarrow and enter the value of the fifth term in L2.



Repeat for the sixth term, entering its index in L1 and value in L2.

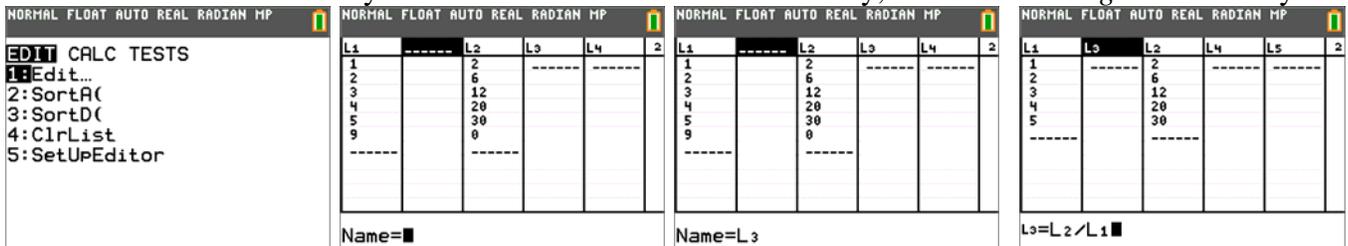
When on the right pane, if you highlight a row and press the DEL key, both pairs will be deleted so that no mismatch occurs. This kindness is not preserved if you perform this action in the List editor. In the List Editor, if you delete an element in L1, its match in L2 is not deleted.



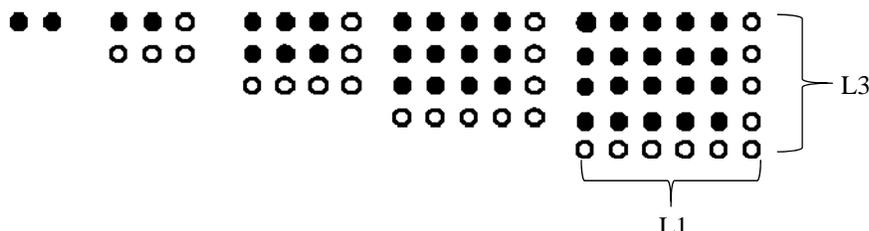
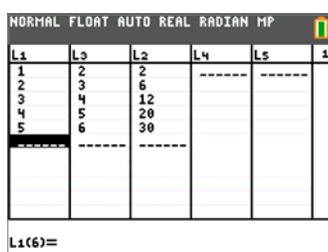
In G-T mode, while the Graph Screen is live, if you press DEL the entire pair is removed to prevent a mismatch.

7. Enter the list editor by pressing STAT [1:Edit]. On the top row of the list editor, press 2^{nd} [INS], then 2^{nd} [L3] ENTER .

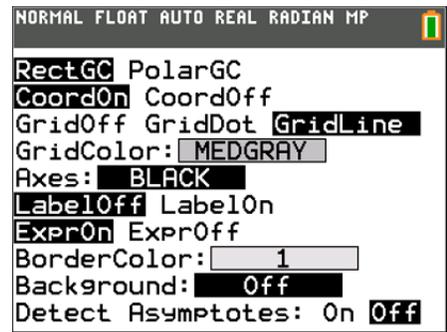
If L1 is the *width* of the array and L2 is the *total number* in the array, let L3 be the *length* of the array.



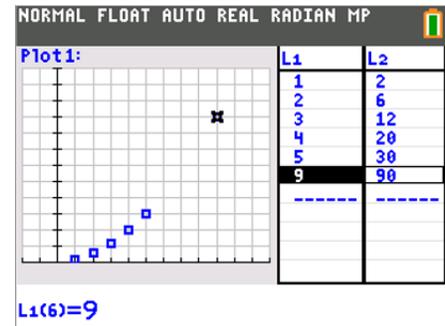
Make $L3 = L2/L1$.



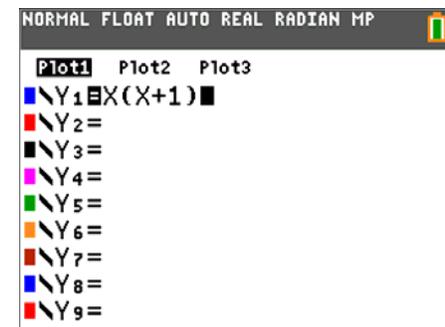
8. Press 2nd [FORMAT], highlight GridLine, and press **ENTER**.



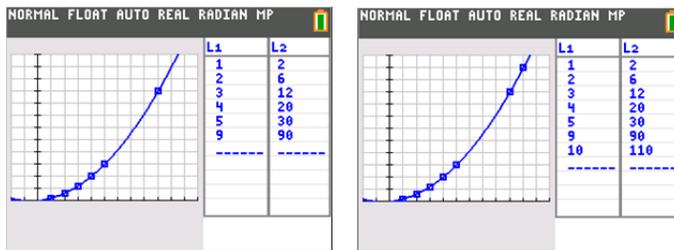
9. Press 2nd [TABLE] to get on the right pane of the G-T screen. For the ninth term, enter the index in L1 and value in L2.



9. Press **Y=** to generalize for any value of x .



Press **GRAPH**. Repeat as desired.



10. Press **STAT** [5:SetUpEditor] **ENTER** to return the list editor back to the default setting.

