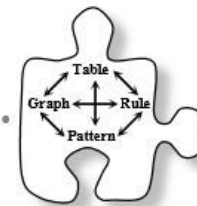## 4.1.3 How does it grow?

Connecting Linear Rules and Graphs

You have been looking at geometric patterns and ways in which those patterns can be represented with x → y tables, graphs, and equations. In Lesson 4.1.2, you worked with four different tile patterns and looked for connections between the geometric shapes and the numbers in the equations. Today you will go back to those four equations and look for connections to other representations.

 By the end of this lesson, you should be able to answer these target questions:

How is growth shown in a graph?
How is growth shown in a rule?
How can you determine the number of tiles in Figure 0 from a graph?
How can you determine which tile pattern grows faster from a graph?

4-22. Examine the tables below.

a. Write out a rule for each tile pattern below.

#1 _____   #3 _____

#2 _____   #4 _____

b. Complete the table for each rule.

Tile Pattern #1

Figure #	0	1	2	3	4
# of Tiles					

Tile Pattern #2

Figure #	0	1	2	3	4
# of Tiles					

Tile Pattern #3

Figure #	0	1	2	3	4
# of Tiles					

Tile Pattern #4

Figure #	0	1	2	3	4
# of Tiles					

c. Create a graph for each pattern. Put all patterns on the same set of axes. Use different colors for each pattern.
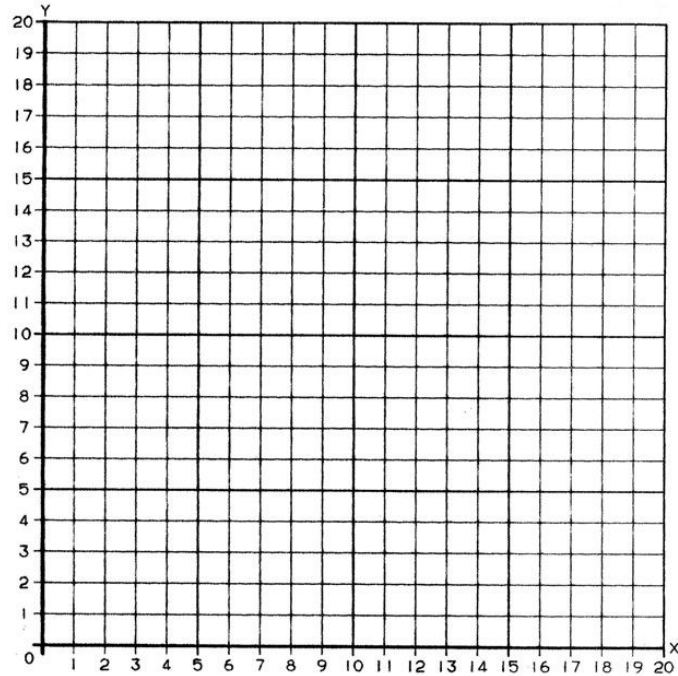
d. Explain how the **growth** appears in the pattern, in the table, in the graph, and in the rule.

Pattern - _____

Table - _____

Graph - _____

Rule - _____

e. What connections do you see between these representations? Describe any connections you see.

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4-23. The graph at right gives information about three new tile patterns. Remember that in this course, tile patterns will be considered to be elements of continuous relationships and thus will be graphed with a continuous line or curve.

a. What information does the circled point (O) on the graph tell you about tile pattern A?

b. Find the growth of each tile pattern. For example, how much does tile pattern A increase from one figure to the next? Explain how you know.

c. Look at the lines for tile patterns A and B. What is the same about the two lines?
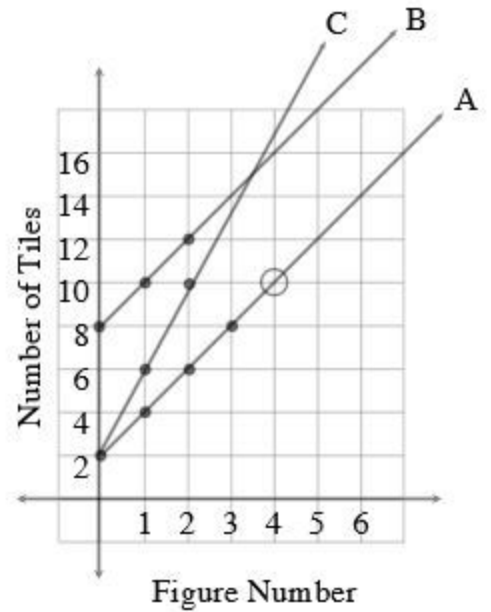
What is different about the lines? What does this tell you about the tile patterns?

d. Look at lines A and C on the graph. What do these two lines have in common?

In what ways are the lines different? What does this tell you about the tile patterns?

Review & Preview

4-25. Two of the connections in your Representations of Patterns Web are pattern → table and pattern → rule. Practice these connections as you answer the questions below.

a. Draw Figure 0 and Figure 4 for the pattern below.

Figure 1   Figure 2   Figure 3

Figure 0   Figure 4
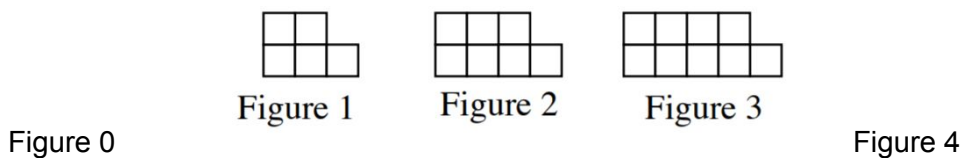
b. Represent the number of tiles in each figure with a table.

c. Represent the number of tiles in each figure with an algebraic rule. _____

4-28. Another one of the connections in your Representations of Patterns Web is graph → table. In Chapters 1 through 3, you developed tools to find a table from a graph. Consider this connection as you complete the table below. The table is based on the graph at right.

IN (x)	-3	-2	-1	0	1	2	3
OUT (y)							