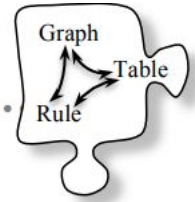


3.1.1 What is the rule?

Extending Patterns and Finding Rules

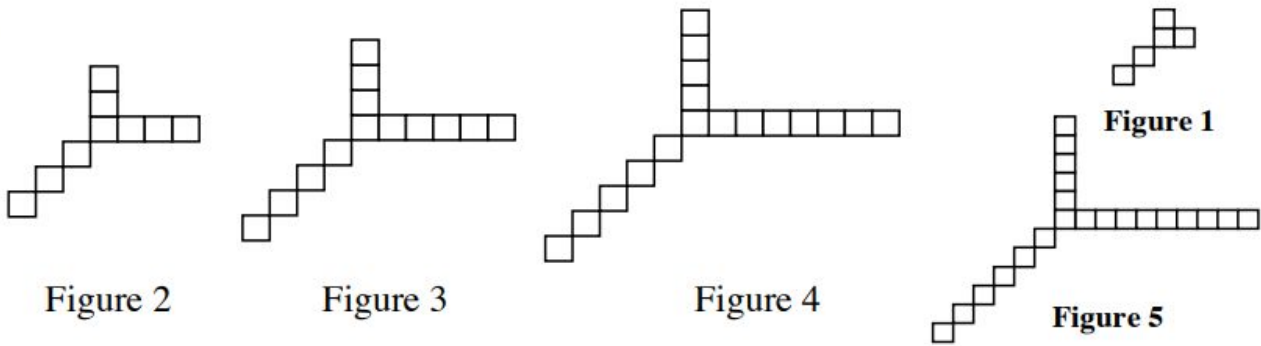


You have been learning how to work with variables and how to find values for variables in equations. In this section, you will learn how to extend patterns and how to generalize your pattern with a rule. As you work with your team, use these questions to focus your ideas:

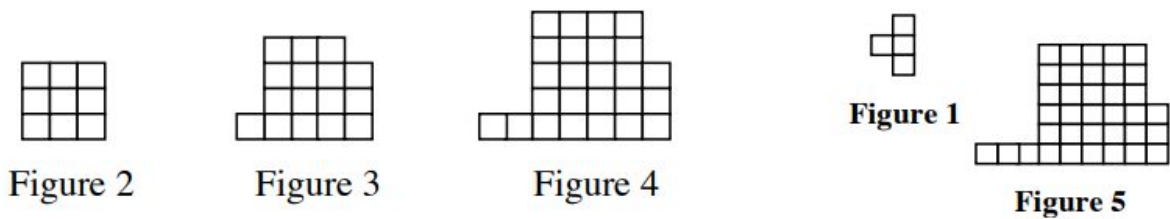
- How is the pattern growing?** **What is the rule?**
- Is there another way to see it?** **How can you tell if your rule is correct?**

3-1. Some people describe mathematics as “the study of patterns.” For both patterns, what does Figure 100 look like? Explain how you know.

a.



b.



3-2. FINDING RULES FROM TABLES How can you describe the rule that governs a pattern or table? Find the pattern, fill in the missing parts, and extend each table with at least two more $x \rightarrow y$ pairs that fit the pattern. Then generalize the pattern's rule in words.

a.

IN (x)	OUT (y)
	C
L	N
	F
Q	
W	Y








Rule:

b.

IN (x)	OUT (y)
easy	
	light
hot	cold
up	down
left	

Rule:

c.

IN (x)	OUT (y)
	
	
	
	
	

Rule:

d.

IN (x)	OUT (y)
8	17
-2	
	9
12	25
10	21

Rule:

e.

IN (x)	OUT (y)
100	51
4	
6	4
30	16
	31

Rule:

f.

IN (x)	OUT (y)
4	16
-1	1
	9
12	
-6	

Rule:

3-4. For each $x \rightarrow y$ table given, copy the table, find the pattern and fill in the missing entries. Then write the rule for the pattern in words.

a.

IN (x)	OUT (y)
	8
0	-2
-4	-10
10	18
-2	
	198
0.5	

Rule:

b.

IN (x)	OUT (y)
3	-9
10	
-1	3
	6
0	
	-36
-5	15

Rule:

c.

IN (x)	OUT (y)
0.5	
	37
2	5
-10	101
-5	
0	1
	50

Rule:

d.

IN (x)	OUT (y)
6	
11	5
	-4
23	17
-7	
	40
-4	-10

Rule:

e.

IN (x)	OUT (y)
2	6
4	20
10	110
-3	
	30
7	56
1	

Rule:

f.

IN (x)	OUT (y)
-8	
10	53
3	18
0	
	8
19	
4	23

Rule:

3-5. At the fair, Kate found a strange machine with a sign on it labeled, "Enter a number." When she pushed the number 15, the machine displayed 9. When she entered 23, the machine displayed 17. Perplexed, she tried 100, and the machine displayed 94.

a. What is the machine doing?

b. What would the machine display if she entered 77?

