

Lesson 3: From Visual Patterns to Numerical Patterns

- Let's look at numerical patterns we can write to describe patterns in rectangles.

Warm-up: Number Talk: Patterns in Multiplication

Find the value of each expression mentally.

- 20×3

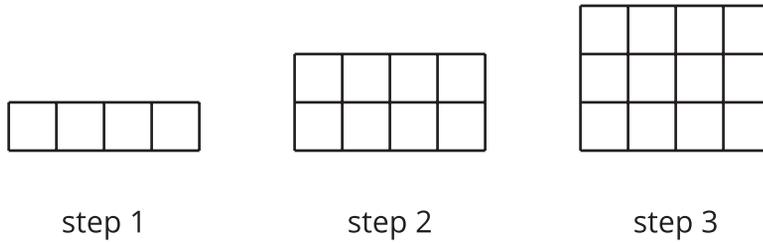
- 21×3

- 40×3

- 42×3

3.1: Growing Rectangles

Here is a pattern of rectangles that follows a rule.



- Priya says, “Each step increases by 1.”
 - Noah says, “Each step increases by 4.”
 - Lin says, “Each step increases by 2.”
1. Can you think of possible reasons that all of them could be correct even though they describe the patterns differently?

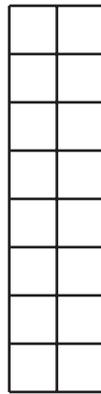
2. Revise the statement made by each student so that what they mean is clearer and more precise.

3.2: More Growing Rectangles

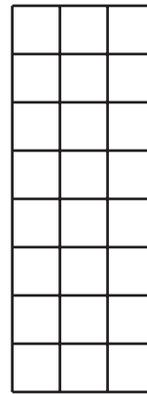
Here is another pattern of rectangles that also follows a rule.



step 1



step 2



step 3

1. The number list 1, 2, 3, ____, ____, ____ represents the number of vertical columns in the first six steps of the pattern. Complete the number list.
2. Find another feature of the rectangles that can be represented with a number list and would show a pattern. Write at least one list of numbers for the first six steps of that feature.

Feature: _____

Number list: ____, ____, ____, ____, ____, ____

3. Without writing out all the numbers, predict the 30th number in your list. Explain your reasoning by completing this sentence frame:

I know that the 30th number is ____ because . . .

3.3: No Grid This Time!

Here are steps 1 and 4 in a pattern of rectangles. One side length of the rectangle increases by 5 units each time.



step 1

step 2

step 3



step 4

1. Sketch the missing rectangles in steps 2 and 3. Label the sides with their lengths.
2. Write two numerical patterns that each represent the rectangles, from step 1 to step 6.

a. What are you representing? : _____

Numerical pattern: _____, _____, _____, _____, _____, _____

b. What are you representing? : _____

Numerical pattern: _____, _____, _____, _____, _____, _____

3. For each of the following questions, if you answer yes, show how you know and state the step number. If you answer no, explain or show why not.

If the pattern continues:

a. Could 82 inches be a side length of a rectangle?

b. Could 300 square inches be the area of a rectangle in the pattern?

c. Could 100 inches be the perimeter of a rectangle in the pattern?