Unit 7, Lesson 2

# Describing Patterns

Let's explore visual patterns.

## 2.1 Continue the Pattern

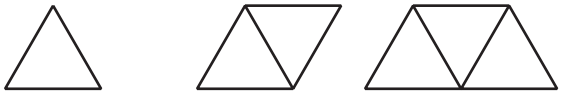
Consider a list that starts $1, \frac{5}{2}, \ldots$ What would be the next three numbers in the list, if it followed a pattern that grew:

1. exponentially?

2. linearly?

## 2.2 Patterns of Sticks

1. Here's a pattern.




   a. How do you see the pattern changing?

   b. Extend the pattern to show your prediction of the next two steps.

2. Here are tables that represent the pattern.

| step | 0 | 1 | 2 | 3 | 6 | 11 | $n$ |
|---|---|---|---|---|---|---|---|
| | 3 | 5 | 7 | | | | |

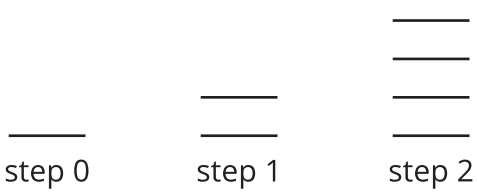
| step | 0 | 1 | 2 | 3 | 6 | 11 | $n$ |
|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | | 9 | | |

   a. In each pattern, what quantity is represented in the second row?

   b. Complete each table.

   c. Describe each pattern as linear, exponential, or neither. Be prepared to explain how you know.

3. Here is another pattern.




   a. Lin says that step 3 will have 8 segments. Andre says that step 3 will have 7 segments. How does each student see the pattern growing?

   b. Complete the tables to show the relationship between step number and number of segments, as Lin and Andre would see it.

   c. Describe each pattern as linear, exponential, or neither. Be prepared to explain how you know.

**Lin**

| step | 0 | 1 | 2 | 3 | 6 | 9 | $n$ |
|---|---|---|---|---|---|---|---|
| number of segments | 1 | 2 | 4 | | | | |

**Andre**

| step | 0 | 1 | 2 | 3 | 6 | 9 |
|---|---|---|---|---|---|---|
| number of segments | 1 | 2 | 4 | | | |

# 2.3 Patterns of Dots

1. Here is a pattern of dots.




   a. Describe how you see the pattern growing.

   b. Draw the next step.

   c. Complete the table to continue the pattern.

| **step** | 0 | 1 | 2 | 3 | 4 | 6 | $n$ |
|---|---|---|---|---|---|---|---|
| **number of dots** | 3 | 6 | | | | | |

   d. Is the relationship between step number and number of dots linear, exponential, or neither? Explain how you know.

2. Here is another pattern of dots.




   a. Describe how you see the pattern growing.

   b. Draw the next step.

   c. Complete the table to continue the pattern.

| **step** | 0 | 1 | 2 | 3 | 4 | 6 | $n$ |
|---|---|---|---|---|---|---|---|
| **number of dots** | 5 | 7 | | | | | |

   d. Is the relationship between step number and number of dots linear, exponential, or neither? Explain how you know.