Unit 1, Lesson 7

Representing More Sequences

Let's learn about *Info Gaps*.

7.1 What Do You Want to Know?

Represent the first five terms of the sequence f by creating a table and sketching a graph.

What specific information do you need to be able to solve the problem?

7.2 Info Gap: Ways to Represent a Sequence

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the problem card:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need. "Can you tell me _____?"
3. Explain to your partner how you are using the information to solve the problem. "I need to know _____ because _____." Continue to ask questions until you have enough information to solve the problem.
4. Once you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.

If your teacher gives you the data card:

1. Silently read your card. Wait for your partner to ask for information.
2. Before telling your partner any information, ask, "Why do you need to know _____?"
3. Listen to your partner's reasoning and ask clarifying questions. Only give information that is on your card. Do not figure out anything for your partner!
   These steps may be repeated.
4. Once your partner says they have enough information to solve the problem, read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

Are you ready for more?

Make a visual pattern (for example, using dots or boxes), starting with Step 0, so the pattern for Step n contains $n^2 + 3n + 3$ dots.

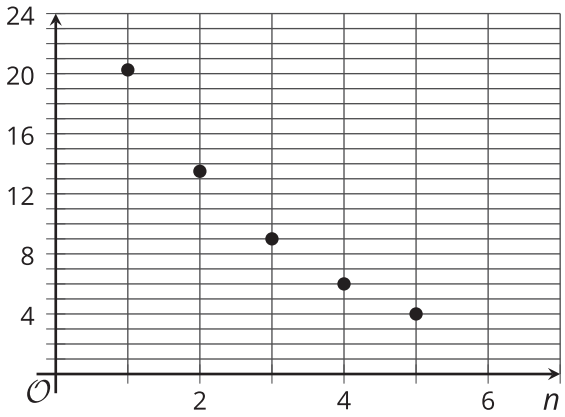
Lesson 7 Summary

Sometimes we need only a little bit of information to say a lot about a function. Let's say we know the function H is a geometric sequence with a growth factor of $\frac{2}{3}$ and a starting term of 20.25.

From here, we can calculate that the terms in the sequence after 20.25 are 13.5, 9, 6, 4, and so on because, in a geometric sequence, we multiply the current term by the growth factor to get to the next term.

We can also make a table of values showing how the terms are calculated. Or we can make a graph, which would help us see that H isn't linear if we didn't already know it is a geometric sequence.

n	$H(n)$
1	20.25
2	$20.25 \cdot \frac{2}{3} = 13.5$
3	$20.25 \cdot \frac{2}{3} \cdot \frac{2}{3} = 9$
4	$20.25 \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = 6$
5	$20.25 \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = 4$



Using function notation, we can say that $H(1) = 20.25$, $H(n) = H(n-1) \cdot \frac{2}{3}$ for $n \geq 2$.