Representing More Sequences

Lesson 7

Learning Target

I can ask questions to get the information needed to represent a sequence in different ways.

Let's learn about Info Gaps

7.1 Which One Doesn't Belong: Recursive Definitions

A. $f(1) = 6$

$f(n) = f(n-1) - 5$ for $n \geq 2$

B. $f(1) = 6$

$f(n) = \frac{1}{2} \cdot f(n-1)$ for $n \geq 2$

C. $f(0) = 6$

$f(n) = 10 \cdot f(n-1)$ for $n \geq 1$

D. $f(1) = 6$

$f(n) = f(n-1) + n^2$ for $n \geq 2$

Activity Synthesis

Explain why each one doesn't belong.

A. $f(1) = 6$

$f(n) = f(n-1) - 5$ for $n \geq 2$

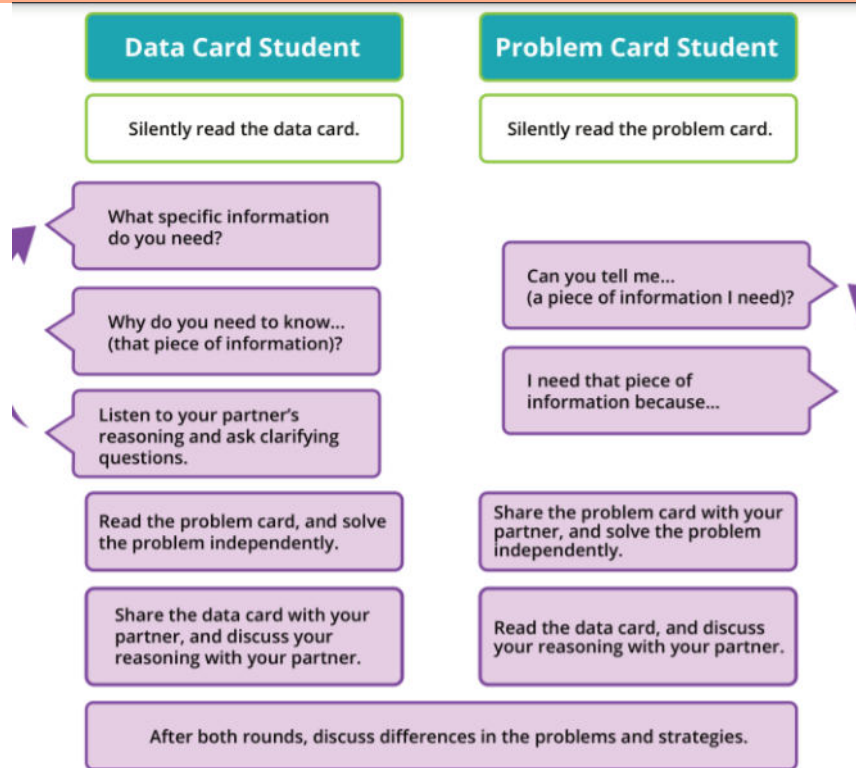B. $f(1) = 6$

$f(n) = \frac{1}{2} \cdot f(n-1)$ for $n \geq 2$

C. $f(0) = 6$

$f(n) = 10 \cdot f(n-1)$ for $n \geq 1$

D. $f(1) = 6$

$f(n) = f(n-1) + n^2$ for $n \geq 2$

7.2 Info Gap: Ways To Represent A Sequence

Data Card Student

Silently read the data card.

What specific information do you need?

Why do you need to know... (that piece of information)?

Listen to your partner's reasoning and ask clarifying questions.

Read the problem card, and solve the problem independently.

Share the data card with your partner, and discuss your reasoning with your partner.

Problem Card Student

Silently read the problem card.

Can you tell me... (a piece of information I need)?

I need that piece of information because...

Share the problem card with your partner, and solve the problem independently.

Read the data card, and discuss your reasoning with your partner.

After both rounds, discuss differences in the problems and strategies.

7.2 Info Gap: Ways To Represent A Sequence

Problem Card 1

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

It is the job of the person with the problem card (in this case, the whole class) to think about what information they need to answer the question.

What specific information do you need to represent the first five terms of the sequence?

Why do you need that information?

Activity Synthesis

Problem Card 2

1. What is the fifth term of sequence K ?
2. Represent the first five terms of sequence K by sketching a graph.

Data Card 2

- $K(1) = 16$

- $K(n) = K(n-1) - n$ for $n \geq 2$
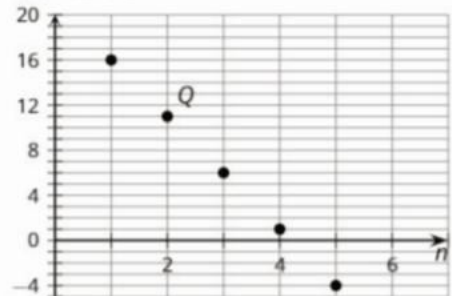
Problem Card 3

1. Represent the first five terms of sequence Q by making a table.
2. Write a recursive definition for sequence Q.

Data Card 3

Lesson Synthesis

Sequence J: 2, 8, 32, 128, . . .

Represent this sequence in as many ways as you can think of.

Did someone come up with a different way then you did?

Lesson Synthesis

Explain each type of representation

- Using function notation: $J(1) = 2, J(2) = 8, J(3) = 32, J(4) = 128$ where the input is the term number and the output is the value of the term

- Using a table of inputs and outputs

- Writing a recursive definition like $J(1) = 2, J(n) = 4 \cdot J(n-1), n \geq 2$

- Sketching a graph that includes the points $(1, 2), (2, 8), (3, 32), (4, 128)$