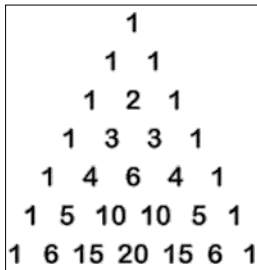


Overview of Session 9

- Recognizing the mathematical practices in action
- Scaling mathematics tasks and considering how to make mathematical practices more explicit with tasks

9.1a

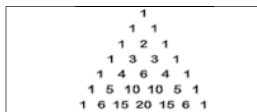
Pascal's Triangle



- What patterns do you see in the triangle?
- What "rules" do these patterns follow?
- If these patterns continue, what numbers would be in the seventh row? How do you know?

9.2a

Pascal's Triangle: Partner work



- What patterns do you see in the triangle?
- What "rules" do these patterns follow?
- If these patterns continue, what numbers would be in the seventh row? How do you know?

- As you discuss the questions, consider:
- Whether your explanations:
 - Have a clear purpose
 - Have a logical structure
 - Use representations and language clearly and carefully
 - Have a focus on meaning and an orientation to the listener(s)
 - How you and your partner are using the Pascal's triangle representation in your explanations

9.2b

Discussion of solutions to the Pascal's Triangle Problem

To what extent does the explanation:

- Have a clear purpose
- Have a logical structure
- Use representations and language clearly and carefully
- Have a focus on meaning and an orientation to the listener(s)

9.2c

Focus questions

- Which of the mathematical practices are particularly relevant to work on this problem?
- Which of the mathematical practices are less connected to work on this problem?

9.3a

The mathematical practices (CCSS)

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP.3. Construct viable arguments and critique the reasoning of others.
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.
- MP.8. Look for and express regularity in repeated reasoning.

9.3b

Pascal's Triangle

<pre style="font-family: monospace; font-size: 1.2em;"> 1 1 1 1 2 1 1 3 3 1 1 4 6 4 1 1 5 10 10 5 1 1 6 15 20 15 6 1 </pre>	<ul style="list-style-type: none"> What patterns do you see in the triangle? What "rules" do these patterns follow? If these patterns continue, what numbers would be in the seventh row? How do you know?
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9.3c

Using Pascal's Triangle

How might you use this problem at your grade level?

- What recording sheet would you use?
- What questions would you pose?
- How could you make the mathematical practices explicit?

9.3d

Focal teaching practices

- Establishing an environment that emphasizes sense-making, justifying, and collective mathematical work
- Scaling tasks and infusing tasks with reasoning opportunities
- Making mathematical practices explicit

9.4a

Infusing reasoning into Guess My Rule

- Modify the task in different ways
 - What, specifically, did you change about the task?
 - How do you think each modification enhances the potential to engage students in mathematical reasoning or practices?

9.4b

Approaches to modifying problems

Try modifying a task by:

- Changing it to have more than one right answer
- Reversing the task to work backwards
- Making it into a multi-step problem
- Making it into one where students have to find all solutions
- Turning it into an analytic task, e.g.:
 - Analysis of an alternative method
 - A general claim
 - Evaluation of correctness or validity
 - If incorrect, error analysis

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9.4c

Using modified tasks to make mathematical practices explicit

- Modify the task in different ways
 - What, specifically, did you change about the task?
 - How do you think each modification enhances the potential to engage students in mathematical reasoning or practices?
- Select one of the modified tasks to use as the context for making a mathematical practice explicit
 - Model the use of a mathematical practice as you complete the task making key facets of that practice explicit as you work

9.4d

Summary

In this session, you:

- Explained how particular patterns function and how they are produced
- Identified examples of the mathematical practices in action
- Planned instruction for reasoning and engagement in mathematical practices

9.5a
