

Class #3

- Welcome back!
- Daily Math Workouts
- Where have we been and where are we going?
- What does it mean to prove something?
 - View video: What do elementary students think about proof?
 - Exercise in proving that a mathematical statement is true
- Wrap-up, announcements & assignments

Daily Math Workouts

- DMWs are an important part of this class
 - Practice what we've worked on
 - “Limber up” for future work
- Knowing math for yourself
- Knowing math for teaching

What Have We Covered So Far?

- Choosing and using mathematical definitions
 - Defined specific terms: e.g., factor, square number, prime number, even number, integers
 - Criteria of precision and usability
 - Evaluating and writing definitions
- Looking for patterns
- Giving mathematical explanations
 - Seeing the need for explanation, including explaining things you already know
 - Beginning to develop skills at giving explanations

What Have We Covered So Far?

- Knowing math as a teacher
 - Analyzing student errors
 - Appraising students' work and solution methods
 - Sizing up the mathematics in a textbook lesson
 - Learning to watch video -- paying close attention to the mathematics, the students' mathematical ideas, and the mathematical moves of the teacher

Where We're Headed (before the midterm)

- Mathematical proof
- Divisibility rules
- Place value
- Meanings of operations
- Giving and evaluating mathematical explanations
- Evaluating and selecting appropriate representations

Launching Our Work on Proof

Context for video:

- Third-graders
- Multi-cultural and multi-lingual class
- Working on proving statements with even and odd numbers

Thursday, January 18

Meeting with fourth grade class:
Even and odd numbers

Friday, January 19

Debriefing the meeting
(Return to conjectures about even and odd numbers)
Odd + odd = even
Even + even = even
Odd + even = odd

Shea brings up idea: 6 could be even or odd

Class attempts to refute, using three different definitions of even numbers: alternating (even, odd, even, odd. . .), fair share ($2k$ or $k + k$), pairing by twos ($k2$ or $2 + 2 + \dots + 2 + 2$)

Lin generalizes Shea's claim in an effort to refute it:
"What about 10? Why don't you call 10 an even and an odd number?"

Ogechi develops clearer expression of definition of odd numbers
(*numbers with a 1 in the middle $2 + 2 + 2 + \dots + 1 + \dots + 2 + 2 + 2$)

Rania observes pattern: 14, 18, 22, 26 . . .

Teacher labels the generalized class of even numbers "Shea Numbers"; class defines as "even numbers that have an odd number of groups of twos"

Definitions of even and odd number are reconciled and made more precise: $k2$ (even) and $k2 + 1$ (odd)

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Friday, January 26

Jillian and Shekira argue that it is not possible to prove Bernadette's conjecture: An odd number plus an odd number equals an even number.

Tuesday, January 30

Bernadette offers a proof of the conjecture.

Viewing Focus

- What do these students seem to know or think about proof?
- What does the teacher have to be sensitive to in terms of proof?

Exploring What it Means to Show that Something is True in Mathematics

Can you prove that:

**An odd number plus an odd
number equals an even number.**

**Have you shown that this would be
true for all odd numbers?**

Wrap Up

- Individual assignment (due Wednesday July 20)
 - Posted today by 5pm
- Wednesday's class at Plymouth library 12:45-3:35
- We will be collecting notebooks on Wednesday
- Don't forget Study Hall on Tuesday, from 4-6pm in 2400 conference room