

7.15-7.45PM

Report on the NCTM Lenses on High School Mathematics Report

William McCallum

Summary:

William McCallum went over what has been going on in preparation for the release of the NCTM standards for high school mathematics. He went over the structure and some of the language used in the document. In particular he focused on the chapter on reasoning and sense-making. He went over two examples to illustrate what they meant by reasoning and sense-making in the document.

Details:

He started with stating the commonality between the NCTM standards and the National Mathematics Panel Report; that both involved an agreement among different people who have very different opinions.

In 2006, the NCTM standards came out for earlier grades and it was intended to give a description. Naturally now we need to look into grade 9-12. There has been 3 drafts of this document. The future process of this document is explained on the slide.

-The structure of the document:

The document is not intended to be used as a curriculum but instead a framework.

It was difficult to form a foundation for what they were doing but they feel that reasoning and sense are important, making to be foundational. He noted that nothing that they were doing for the standards is new but it is built from the work of others.

-Chapter 3: Reasoning and Sense-Making

An illustration of what they mean by reasoning and sense-making is needed as it underlies everything that they are talking about. They also concluded that there are some areas in the curriculum that although people agree with the general principle, is not there in classrooms.

Below is additional information on the slide:

Students: He meant the nature of student body

Responsibility: He wanted to try to put out to other people in the community saying what their responsibility might be.

-Sample reasoning habits:

Using procedures with understanding: We have always wanted students to do procedures with understanding, CAS allows us to say what specifically what they need to do. It becomes more salient with technology.

-Reasoning in algebra:

This is their attempt to give a list of topics without giving a list of topics (☺).

-Meaningful use of symbols:

Mindful manipulation:

Reasoned solving:

...

Most kids think of algebra as doing things to stuff that you do not want. They do not want to look inside and explore. This contrasts very much with the perspective of most mathematicians who enjoy

doing so.

-Reasoning solving: seeing that solving=proving theorems.

Algebra and functions are separate sections. Algebra is the machinery inside the black box vs. the function that's a black box.

-Conclusion:

He concluded with showing 2 examples...

They thought it was important to say key elements of algebra and also to give explicit examples of what they mean. The example bares on issues of reasoning and sense-making. The two examples are simple algebra problems and it can be solved using equation or by thinking about it.

He offered two possible responses to the task. The second student is saying the same thing as the first student but without using the variable x , emphasizing that the steps in solving this problem is reasoning. He then went over this idea of FOIL vs. EWE (each with each). There is a follow up to this solution there are situations where you do not need to multiply everything out because of cancellation.

Some questions from the presentation:

1. Mark commented that Hopeful hasn't learned anything from this. Mark claimed that he did not see enough reasoning. He was looking more for inductive reasoning because that's what we do as mathematicians. His assertion was that algebra is connected in our minds to inductive reasoning, while deductive reasoning is issue of deductive reasoning.

Prof. McCallum recommended looking at part of the Math Panel Report

2. The equation that is quadratic and square root where the spurious solutions come from and the reasoning distinguishes the list of equivalent and the list of ...