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Mathematical Situations: Tools for looking at the Mathematical Knowledge of Teaching

I. Mathematical Knowledge related to the situation from a methods course about the ideas of inverse.

Representation of functions
Structure of mathematics
Notation
Mathematical concepts:
- Additive inverse
- Multiplicative inverse
- Multiplicative inverse
- Identities
- Inverse of a function
- Function as a mapping
- Reciprocal
- Doing and undoing
- Symmetry in Cartesian plane
- Reflection about the line $f(x) = x$

II. Things a mathematics teacher would need to know that would not be important to most mathematicians.

Multiple ways to represent the inverse of a function
Importance of precise vocabulary
Ways to form questions that would help students see the differences between the ideas of inverse operations and inverse functions.
Examples that highlight the nature of inverse functions.
Examples that illustrate a variety of inverse operations.
Use of a graphing calculator/computer to dynamically illustrate inverse functions.