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As a part of class, I want to share my thoughts about math teaching.

INTUITION: A DISDAINED WAY OF TEACHING MATH

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"How does "dividing a fraction by a fraction" work anyway? Dividing two thirds of an apple by one fourth... that could mean you divide two thirds of an apple among four people. How many parts of the apple does a person get, right?"

"Wrong, wrong, wrong! That's multiplying fractions."

"Huh? How come? Does a number become smaller when you multiply it?"

"Two thirds of an apple divided by a quarter means... uh... it is totally off track! You can't understand this because you're fussing about apples! You'll have no trouble if you'd just simply memorize that you leave multiplication as is and switch in division."

"But how can I imagine dividing two thirds of an apple by a quarter...

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These are the lines from the film "Only Yesterday" (1991) which is my favorite film among the STUDIO GHIBLI films. The main character, an elementary school girl, is learning math from her sister. While watching the film, I also kept asking myself "how can I imagine dividing two thirds of an apple by a quarter?" How many people can explain the meaning of dividing a fraction by a fraction with an apple? We all graduate from elementary school but why is it still hard to understand the meaning of such a basic thing? I think, one of the reasons is the lack of the power of intuition.

We usually consider intuition as having a light bulb go on, like a magic. It seems far from reasoning, the best virtue of math, so people tend to disdain intuition in math. However, Hatamura Yotaro, the Japanese mathematician, thought differently. He differentiated intuition from feeling. Hatamura Yotaro (2005) argued that intuition is having a thinking process in mind and the thinking process cannot be obtained without thorough observation and without understanding the essence of concept. For example a student, who observes the feature of division thoroughly and grasps the meaning of division, become to have her own thinking process which connects starting point and ending point of the dividing process. Once she has it, whenever she sees a division problem, she can jump the thinking process and arrive at the ending point instantly. This is the power of intuition. However we are busy to urge students to memorize definitions and formulas such as "switching and multiplying" in the name of problem solving skill.

The essence or meaning of "dividing A by B" is that "how many Bs are contained in A." Then, we can imagine dividing two thirds of an apple by a quarter as how many "fourths of an apple" can be contained in "two thirds of an apple". Textbooks need to provide opportunities for students to observe mathematical experiences closely and to understand concepts rigorously by emphasizing the meaning and nature of mathematical concepts, not by just providing a lot of math problems. Ultimately, by highlighting intuition in math, we could expect that students have fun in math and use intuitive thinking skills learned from math later when they are outside of school.