



SMP 3 - Construct Viable Arguments and Critique the Reasoning of Others

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- 1 SMP 3—Construct viable arguments and critique the reasoning of others—emphasizes the importance
2 of mathematical discourse, specifically argumentation, in the classroom.
- 3 Teachers who engage students in this practice create opportunities for them to explain, justify, and
4 challenge mathematical thinking. This might involve:
- 5 • Encouraging students to verbalize their thought processes when problem solving.
 - 6 • Inviting students to articulate agreement or disagreement with each others' ideas or strategies.
 - 7 • Sharing multiple solution strategies and asking students to compare and contrast the reasoning
8 of each.
 - 9 • Asking students to evaluate mathematics statements as always, sometimes, or never true, and
10 prompting them to justify their reasoning.
- 11 Mathematically proficient students make conjectures, analyze situations, and build logical progressions
12 of statements to explore whether or not their hypotheses hold true in a variety of situations or contexts.
13 They justify their conclusions, communicate their reasoning to others, and respond to counterexamples.
- 14 In elementary classrooms, students may construct arguments using concrete examples such as
15 objects, drawings, and diagrams. For example, in this first grade standard, students are expected to
16 apply properties of operations and the relationship between addition and subtraction to add and
17 subtract. As students explore these operations, they may begin to generalize the commutative property
18 through reasoning and discussion.
- 19 For example, a student might use a story context about batches of cookies to explore these ideas.



20 Upon discussion of the context, a student might explain: *Switching two piles of cookies doesn't change*

21 *how many there are in total. But giving a friend two cookies from a plate of four is not the same as*

22 *giving them four cookies from a plate of two.*

23 Through these conversations, students may develop a deeper understanding of the commutative

24 property of addition while refining their ability to construct arguments and critique reasoning—key skills

25 to support mathematical proficiency.

26 Engaging in SMP 3 helps students become confident mathematical thinkers who can justify their

27 reasoning, refine their ideas based on evidence, and make sense of and critique the reasoning of

28 others. Encouraging this type of discourse in the classroom fosters a learning environment where

29 students see mathematics as something to be explored, discussed, and understood—not just solved.