SMP

Standards for Mathematical Practice

Mathematically Proficient Students:

1 Make sense of problems and persevere in solving them

- Explain the meaning of the problem to themselves
- Look for entry points
- Analyze givens, constraints, relationships, goals
- Make conjectures about the solution
- Plan a solution pathway
- Consider analogous problems
- Try special cases and similar forms
- Monitor and evaluate progress, and change course if necessary
- Check their answer to problems using a different method
- Continually ask themselves, "Does this make sense?"

2 Reason abstractly and quantitatively

- Make sense of quantities and their relationships in problem situations.
- Decontextualize— to abstract a given situation, represent it symbolically, and manipulate the representing symbols as if they have a life of their own
- Contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved.

3 Construct viable arguments and critique the reasoning of others

- Use assumptions, definitions, and previous results
- Make a conjecture
- Distinguish correct logic
- Build a logical progression of statements to explore the conjecture

EXPLAIN FLAWS → ANALYZE SITUATIONS BY BREAKING THEM INTO CASES → COMMUNICATE CONCLUSIONS

ASK CLARIFYING QUESTIONS → RECOGNIZE AND USE COUNTER EXAMPLES → JUSTIFY CONCLUSIONS; RESPOND TO ARGUMENTS

4 Model with mathematics

- Make assumptions and approximations to simplify a situation, realizing these may need revision later
- Interpret mathematical results in the context of the situation and reflect on whether they make sense

PROBLEMS IN EVERYDAY LIFE… → …REASONED USING MATHEMATICAL METHODS

5 Use appropriate tools strategically

- Are sufficiently familiar with appropriate tools to decide when each tool is helpful, knowing both the benefit and limitations detect possible errors
- Identify relevant external mathematical resources, and use them to pose or solve problems

6 Attend to precision

- Communicate precisely to others
- Use clear definitions
- State the meaning of the symbols they use
- Specify units of measurement
- Label the axes to clarify correspondence with problem
- Calculate accurately and efficiently
- Express numerical answers with an appropriate degree of precision

7 Look for and make use of structure

- Look closely to discern a pattern or structure
- Step back for an overview and shift perspective
- See complicated things as single objects, or as composed of several objects

8 Look for and express regularity in repeated reasoning

- Notice if calculations are repeated and look both for general methods and for shortcuts
- Maintain oversight of the process while attending to the details, as they work to solve a problem
- Continually evaluate the reasonableness of their intermediate results

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