

Standards of Student Practice in Mathematics Proficiency Matrix

| Students: | | Initial → Proficient | | |
|-----------|--|---|---|---|
| 1a | Make sense of problems | Explain their thought processes in solving a problem one way. | Explain their thought processes in solving a problem and representing it in several ways. | Discuss, explain, and demonstrate solving a problem with multiple representations and in multiple ways. |
| 1b | Persevere in solving them | Stay with a challenging problem for more than one attempt. | Try several approaches in finding a solution, and only seek hints if stuck. | Struggle with various attempts over time, and learn from previous solution attempts. |
| 2 | Reason abstractly and quantitatively | Reason with models or pictorial representations to solve problems. | Are able to translate situations into symbols for solving problems. | Convert situations into symbols to appropriately solve problems as well as convert symbols into meaningful situations. |
| 3a | Construct viable arguments | Explain their thinking for the solution they found. | Explain their own thinking and thinking of others with accurate vocabulary. | Justify and explain, with accurate language and vocabulary, why their solution is correct. |
| 3b | Critique the reasoning of others | Understand and discuss other ideas and approaches. | Explain other students' solutions and identify strengths and weaknesses of the solution. | Compare and contrast various solution strategies and explain the reasoning of others. |
| 4 | Model with Mathematics | Use models to represent and solve a problem, and translate the solution to mathematical symbols. | Use models and symbols to represent and solve a problem, and accurately explain the solution representation. | Use a variety of models, symbolic representations, and technology tools to demonstrate a solution to a problem. |
| 5 | Use appropriate tools strategically | Use the appropriate tool to find a solution. | Select from a variety of tools the ones that can be used to solve a problem, and explain their reasoning for the selection. | Combine various tools, including technology, explore and solve a problem as well as justify their tool selection and problem solution. |
| 6 | Attend to precision | Communicate their reasoning and solution to others. | Incorporate appropriate vocabulary and symbols when communicating with others. | Use appropriate symbols, vocabulary, and labeling to effectively communicate and exchange ideas. |
| 7 | Look for and make use of structure | Look for structure within mathematics to help them solve problems efficiently (such as $2 \times 7 \times 5$ has the same value as $2 \times 5 \times 7$, so instead of multiplying 14×5 , which is $(2 \times 7) \times 5$, the student can mentally calculate 10×7). | Compose and decompose number situations and relationships through observed patterns in order to simplify solutions. | See complex and complicated mathematical expressions as component parts. |
| 8 | Look for and express regularity in repeated reasoning | Look for obvious patterns, and use if/then reasoning strategies for obvious patterns. | Find and explain subtle patterns. | Discover deep, underlying relationships, i.e. uncover a model or equation that unifies the various aspects of a problem such as discovering an underlying function. |