

Table 4. Problem-Solving Skills for the Proposed Quantitative Literacy Framework from Roohr et al. (2014)

Problem-Solving Skill	Brief Description	Focus of Assessment
Interpretation	The understanding and explanation of mathematical information, such as the ability to understand data, read graphs, draw conclusions, and recognize sources of error.	<p><i>Understand mathematical terms and representational devices</i></p> <p>Read and interpret basic mathematical notation, concepts, and terminology, such as percentage and average, as well as relationships between quantities expressed in terms of equations, formulas, or data representations, such as tables, graphs, and other diagrams.</p>
Strategic Knowledge & Reasoning	The formulation and evaluation of mathematics problems using heuristics, and the ability to recognize relationships about mathematical concepts and situations.	<p><i>Build and develop mathematical strategies</i></p> <p>Construct and explore mathematical strategies and heuristics to solve problems using inductive and deductive reasoning.</p> <p><i>Develop and test conjectures</i></p> <p>Formulate mathematical hypotheses and evaluate their consequences.</p> <p><i>Evaluate the validity of mathematical strategies</i></p> <p>Evaluate the accuracy of solutions and detect any potential flaws or improbable results.</p> <p><i>Draw appropriate inferences and conclusions</i></p> <p>Explain and justify mathematical results in different mathematical forms.</p>
Modeling	The process of capturing relationships present in the environment or in mathematical forms, and expressing the model in one or more mathematical representations.	<p><i>Translate information into mathematical forms</i></p> <p>Convert informal contextual information into equations, graphs, diagrams, tables, or mathematical text.</p> <p><i>Map mathematical relationships</i></p> <p>Use tools such as equations, inequalities, diagrams, two-way tables, graphs, flow-charts, and formulas to express quantitative relationships (e.g., linear relationships, triangle inequality).</p> <p><i>Apply mathematical models</i></p> <p>Apply mathematical models and relationships to real-world contexts.</p>

Problem-Solving Skill	Brief Description	Focus of Assessment
	The evaluation and revision of a model for accuracy and applicability.	<p><i>Determine reasonableness of a mathematical model</i></p> <p>Use estimation methods to check a solution; interpret the results and reflect on whether a solution makes sense.</p> <p><i>Revise mathematical models</i></p> <p>Adjust mathematical models to make improvements if a model has not served its purpose.</p>
Communication	<p>The presentation of higher-level concepts and ideas (e.g., mathematical arguments and models) as well as solutions to problems and more standard procedures.</p> <p>The communication may take various mathematical forms and is customized to the appropriate target audience.</p>	<p><i>Present mathematical concepts, data, procedures, and solutions in a variety of forms</i></p> <p>Communicate procedures and results in written, graphical, or tabular format using correct mathematical terminology and notation.</p>