

ILO 7: Quantitative Reasoning

Definition: Quantitative reasoning represents the ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations.

Outcome: Students will

- Be able to create arguments or algorithms supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, and computer programs as appropriate)

Guidelines for General Education Assessment

1. This rubric should be used for **assessment**. It is not meant to be used for grading.
2. You will be asked to report your assessment data in the **Level 1-4** format. Any other reporting format (0-100, for example) will create an inconsistency in scoring and render the data invalid.
3. When using this rubric, it is **not** always expected that all categories on the rubric are assessed in a single assignment. Only report on the categories actually assessed.
4. Set expectations **before** you give an assignment. The expectations for how many students achieve at each level will depend on the level of the course. For example, 100-level courses may rarely have students in the Level 4 category, while higher-level courses will likely have more students achieving Level 4.
5. Ideally, General Education courses that have more than one section should use the same signature assignments and rubrics to assess an ILO in all the sections.
6. Collect data from as many sections as possible. For courses that have multiple sections, it is ideal to have a departmental assessment coordinator. The coordinator can then collate all assessment data.
7. It is the responsibility of the chair of the department (who may delegate to the assessment coordinator) to ensure that all adjuncts who teach General Education courses use agreed-upon signature assignments and collect assessment data.
8. For courses that offer multiple sections, submit data from as many sections as possible. However, if data is missing from one or two sections, simply state this in the narrative and give information for only the sections for which data exists.
9. Remember to collect artifacts (completed student assignments) for each level represented in your course. Artifacts should NOT have any student identifying information (remove names).

This rubric was adapted from the Association of American Colleges and Universities (AAC&U) Quantitative Literacy VALUE Rubrics. Retrieved from <https://www.aacu.org/value-rubrics>

QUANTITATIVE REASONING RUBRIC

	Level 4	Level 3	Level 2	Level 1
<p>Interpretation and Representation Ability to explain and convert information presented into various mathematical forms</p>	<p>Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.</p>	<p>Provides accurate explanations of information presented in mathematical forms. Competently converts relevant information into an appropriate and desired mathematical portrayal.</p>	<p>Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.</p>	<p>Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.</p>
<p>Identify Strategies and Calculation Ability to solve or calculate the problem that apply within a specific context.</p>	<p>Identifies multiple approaches for solving the problem that apply within a specific context. Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.)</p>	<p>Identifies multiple approaches for solving the problem, only some of which apply within a specific context. Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem.</p>	<p>Identifies only a single approach for solving the problem that does apply within a specific context. Calculations attempted are either unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem.</p>	<p>Identifies one or more approaches for solving the problem that do not apply within a specific context. Calculations are attempted but are both unsuccessful and are not comprehensive.</p>
<p>Propose Solutions / Analysis / Assumptions Ability to propose one or more solutions/hypotheses that indicates of the problem. Ability to make judgments and draw appropriate conclusions based on the estimation, modeling, and data analysis</p>	<p>Proposes one or more solutions/hypotheses that indicates a deep comprehension of the problem. Solution/hypotheses are sensitive to contextual factors as well as all of the following: ethical, logical, and cultural dimensions of the problem. Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work. Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.</p>	<p>Proposes one or more solutions/hypotheses that indicates comprehension of the problem. Solutions/hypotheses are sensitive to contextual factors as well as the one of the following: ethical, logical, or cultural dimensions of the problem. Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work. Explicitly describes assumptions and provides compelling rationale for why assumptions are appropriate.</p>	<p>Proposes one solution/hypothesis that is “off the shelf” rather than individually designed to address the specific contextual factors of the problem. Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work. Explicitly describes assumptions.</p>	<p>Proposes a solution/hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement. Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work. Attempts to describe assumptions.</p>
<p>Communication and Evaluate Outcomes Ability to express quantitative evidence in support of the argument or purpose of the work and review results relative to the problem to predict strategy for solving future problems</p>	<p>Uses quantitative information in connection with the argument or purpose of the work, presents it in an effective format, and explicates it with consistently high quality. Reviews results relative to the problem defined with thorough, specific considerations of need for further work.</p>	<p>Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven. Reviews results relative to the problem defined with some consideration of need for further work.</p>	<p>Uses quantitative information, but does not effectively connect it to the argument or purpose of the work. Reviews results in terms of the problem defined with little, if any, consideration of need for further work.</p>	<p>Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. Reviews results superficially in terms of the problem defined with no consideration of need for further work</p>