

# Quantitative Reasoning General Education Rubric

**DEFINITION:** Proficiency in mathematical thinking and its most useful methodologies.

**RATIONALE:** The solutions to real world problems require the ability to apply mathematical methods.

**USE:** This rubric can be used in departments who wish to assess how their program supports Holyoke Community College's General Education Outcomes. It is not specific to any particular discipline; departments are encouraged to apply it in a way that best suits their own needs. NOTE: the General Education Assessment Committee has determined that a score of 3 represents the benchmark of competency that a student should achieve upon their graduation from HCC.

<b>Quantitative Reasoning</b> (3 is the benchmark)	<b>4</b> <b>Accomplished</b>	<b>3</b> <b>Competent</b> <b>(Benchmark)</b>	<b>2</b> <b>Developing</b>	<b>1</b> <b>Beginning</b>	<b>0</b> <b>Missing</b>	<b>N/A</b> <b>assignment</b> <b>didn't ask</b> <b>for it</b>
<b>Interpret mathematical models</b> SLO 1. Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.	Accurately explains the information, and draws thoughtful inferences beyond the obvious.	Accurately explains the information presented and begins to draw inferences from the information.	Explanation of the information presented is mostly accurate, possibly with some minor errors. Inferences are missing or inaccurate.	States some of the information presented, with several inaccuracies, but has no valid interpretation.		
<b>Represent mathematical information</b> SLO 2. Represent mathematical information symbolically, visually, numerically, and verbally	Creates clear and informative mathematical representations of information, can translate between forms and understands the best form for the situation.	Creates clear and informative mathematical representations of information, and can translate between forms.	Creates mathematical representations that are either slightly unclear or masters one type of representation but cannot translate between multiple representations.	Creates simple lists or visuals.		
<b>Use various methods</b> SLO 3. Use arithmetical, algebraic, geometric or statistical methods to solve problems.	Uses a variety of appropriate methods effectively to solve problems.	Uses an appropriate method effectively to solve problems.	Uses an appropriate method but doesn't use it effectively to solve problems.	Uses inappropriate methods or uses them incorrectly to solve problems.		
<b>Reasonableness of answers</b> SLO 4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results. (CT) <sup>1</sup>	Estimates or checks answers, comments on reasonableness, justifies optimal results including mentioning alternatives if applicable.	Estimates or checks answers, and comments on reasonableness.	Estimates or checks answers.	Comments on reasonableness of answers.		

<sup>1</sup> CT: Critical Thinking. Critical thinking outcomes at HCC are distributed across the other four general education outcomes; a student is considered competent in critical thinking if they are also considered competent in the other four outcomes.

<p><b>Assumptions and Limitations</b> SLO 5. Recognize that mathematical and statistical methods have limitations, and be able to identify how <b>assumptions</b> limit the accuracy of the final results.</p>	<p>States limitations and assumptions and explains how they limit the accuracy of the final results.</p>	<p>States limitations and assumptions specific to the given situation. Or states limitations or assumptions and explains how they limit the accuracy of the final results.</p>	<p>States limitations or assumptions specific to the given situation.</p>	<p>States broad limitations and assumptions without applying them to the given situation</p>		
<p><b>Application and Analysis</b> SLO 6. Apply quantitative and/or qualitative techniques, tools, formulas and theories in the solution of problems and recognize when to apply those techniques, tools, formulas, and theories in real world problems. (CT)</p>	<p>Applies quantitative and/or qualitative techniques, tools, formulas and theories in the solution of problems and recognizes when to apply those techniques, tools, formulas, and theories in real world problems.</p>	<p>Applies quantitative or qualitative techniques, tools, formulas and theories in the solution of problems and begins to recognize when to apply those techniques, tools, formulas, and theories in real world problems.</p>	<p>Applies quantitative or qualitative techniques, tools, formulas and theories in the solution of problems.</p>	<p>Applies quantitative or qualitative techniques, tools, formulas and theories in the solution of problems inappropriately or incorrectly.</p>		
<p><b>Scientific method</b> SLO 7. Apply the scientific method, including carefully qualifying the results of scientific inquiry. (CT)</p>	<p>Applies the scientific method, including carefully qualifying the results of scientific inquiry.</p>	<p>Applies the scientific method including conclusions but does not qualify the results of scientific inquiry.</p>	<p>Applies the scientific method but has errors or is missing strong and valid conclusions.</p>	<p>Shows the steps of the scientific method</p>		
<p><b>Effective communication</b> SLO 8. Effectively communicate quantitative information in a variety of formats.</p>	<p>Effectively communicates quantitative information in a variety of formats.</p>	<p>Effectively communicates quantitative information in at least one format, or communicates mostly effectively in a variety of formats.</p>	<p>Communication of quantitative information is mostly clear in one format or somewhat clear in multiple formats.</p>	<p>Communication of quantitative information is simple or unclear.</p>		