

Rubric for Quantitative and Computational Reasoning (QCR) Artifact Assessment

Intended Learning Outcomes	Sufficient	Insufficient
<p>QCR ILO 1: Represent and interpret information in numeric, symbolic, or graphical forms.</p>	<p>A student sufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Represent information: Generate information in numeric, symbolic, and/or graphical form, or translate information from one of these forms into another. Examples may include using a table of numbers to create a graph, or conducting a statistical test and reporting on the results. <p>AND*</p> <ul style="list-style-type: none"> ● Interpret information: Use numeric, symbolic, and/or graphical information to answer a question, solve a problem, or draw a conclusion. <p>*These two competencies may be completed within the same task or across separate tasks (e.g., two different exam questions, possibly with different data).</p>	<p>A student insufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Simply reproduce or describe information as given to them in the assignment or question. <p>OR</p> <ul style="list-style-type: none"> ● Do not use information to answer a question, solve a problem, or draw a conclusion.
<p>QCR ILO 2: Identify and use quantitative and computational approaches to solve a problem in context.</p> <p>See the ILO description document for an extensive list of examples of possible quantitative and computational approaches and uses. This same document notes that “problem solving should be interpreted broadly to</p>	<p>A student sufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Identify approaches: Given a <i>problem</i> in disciplinary or interdisciplinary context, select a quantitative or computational approach to help advance understanding or solve the problem <p>AND*</p> <ul style="list-style-type: none"> ● Use approaches: Apply a quantitative or computational approach to arrive at a quantitative result.** 	<p>A student insufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Do not show any signs of making a decision about the approach/technique to solve the problem <p>OR</p> <ul style="list-style-type: none"> ● Do not actually go through with using the selected/provided quantitative or computational approach.

<p>include advancing knowledge and providing critical insights to questions arising in a disciplinary or interdisciplinary context.” We also use the word “problem” in an encompassing sense for this rubric.</p> <p>Ideal prompts will provide less scaffolding to the student (e.g., “Determine whether the difference between group A and group B is statistically significant”) rather than asking them to use a particular quantitative or computational approach (e.g., “Use a t-test to determine whether the difference between group A and group B is significant”).</p>	<p>*These two competencies may be completed within the same task or across separate tasks (e.g., one only asks students to identify an appropriate method and the other asks them to use a specific approach).</p> <p>** Interpreting/evaluating this result in the context of the original problem is NOT the focus of this ILO but rather of parts of ILOs 1&3.</p>	
<p>QCR ILO 3: Evaluate interpretations derived from quantitative analysis.</p> <p>The quantitative analysis can be either the student’s own or another’s.</p>	<p>A student sufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Recognize the context of a quantitative analysis. These could be the assumptions or limitations of the analysis. When appropriate this could be a comparison of the merits and constraints of different approaches to the problem. <p>AND</p> <ul style="list-style-type: none"> ● Make a judgement or draw a conclusion <i>based on</i> the context and/or the results of the quantitative analysis 	<p>A student insufficiently demonstrates this ILO if they:</p> <ul style="list-style-type: none"> ● Do not show any signs of recognizing assumptions, limitations, or merits/constraints of a quantitative analysis. <p>OR</p> <ul style="list-style-type: none"> ● Do not make a judgement or draw a conclusion based on the context and/or the results of the quantitative analysis