Student Learning Outcome #7: Quantitative and Qualitative Reasoning

Criteria	Accomplished	Proficient	Developing	Beginning
Interpretation: Ability to explain information presented in mathematical forms (e.g. equations, graphs, diagrams, tables, words).	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. *For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggests about future events.*	Provides accurate explanations of information presented in mathematical forms. *For instance, accurately explains the trend data shown in a graph.*	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. *For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of a trend line.*	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. *For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.*
Calculation: Performing calculations and presenting their results clearly, correctly and concisely.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.).	Calculations attempted are essentially successful, but presentation may not be complete or clear.	Calculations attempted are either unsuccessful, incomplete, or very difficult to follow.	Calculations are attempted but are both unsuccessful and are not comprehensive.
Mathematical Modeling: Ability to appropriately express a problem mathematically (e.g. arithmetical, algebraic, geometric, statistical) in a way that would allow one to draw conclusions.	Skillfully expresses a problem mathematically, describing appropriate assumptions, and choosing a technique or framework that accounts for the structure of the problem (e.g. size, type of input, and nature of the result).	Attempt to express the problem mathematically is essentially successful, but does not fully consider assumptions and/or possible solution techniques.	Attempt to express problem mathematically is only partially correct or appropriate.	Attempts to express problem mathematically, but effort is mostly unsuccessful or inappropriate.
Quantitative Evaluation: Ability to evaluate the reasonableness of a hypothesis, result, or assertion based on quantitative analysis.	Skillfully evaluates the reasonableness of a claim, showing deep insight. Such analysis should include consideration of factors such as tolerances, uncertainty, limits of statistical inference, and benchmarks as appropriate.	Analysis of reasonableness of a claim is essentially complete with most appropriate factors considered.	Analysis of reasonableness of a claim is missing significant factors or is not performed correctly.	Attempt is made to address reasonableness of a claim, but it is mostly unsuccessful.
Qualitative Evaluation: Ability to evaluate the reasonableness of a hypothesis, result, or assertion based on qualitative analysis.	Skillfully evaluates the reasonableness of a result, showing deep insight. Such analysis should include consideration of factors such as units, sign, order of magnitude, limiting behavior, and shape of graph as appropriate.	Analysis of reasonableness of a claim is essentially complete with most appropriate factors considered.	Analysis of reasonableness of a claim is missing significant factors or is not performed correctly.	Attempt is made to address reasonableness of a claim, but it is mostly unsuccessful.