Problem Solving through Quantitative Literacy

This cover sheet should accompany a single submitted assignment and resulting student work from all students in one course to be assessed with the attached problem Solving through Quantitative Literacy rubric. The attached rubric and the data generated from student work are solely for program assessment purposes and are not intended for grading students, evaluating courses, or evaluating faculty.

Problem Solving Objective

Students will think critically and synthesize ideas within and across disciplines. They will fuse experience, training and research into considered judgment, then working individually or with others, form problem-solving strategies and evaluate their effectiveness. Among these strategies, students will analyze and interpret data as a means to evaluate arguments and make informed choices.

Using the Rubric

Analyzing a student's ability to apply quantitative knowledge and skills to solve a problem can be challenging. It's possible to find pages of mathematical problems, but what those problem sets don't demonstrate is whether the student was able to think about and understand the meaning of her work. In order to assess quantitative skills, faculty must identify assignments that require students to create work products which reveal their thought processes and demonstrate the range of their ability to apply their quantitative knowledge and skills to solve problems.

The rubric focuses on six criteria: Work is Correct and Complete, Using Formulas Properly and Appropriately, Creating Graphs, Tables and/or Statistics to Summarize Data, Explaining Patterns or Trends, Giving Clear, Precise and Relevant Explanations, and Applying Content Knowledge, Methods and/or Results to New Situations. In the spaces below, please provide your name or department name, the name of the assignment (attach a copy as well) and other information, including your own evaluation of which of the criteria are specifically taught in the course, addressed in the assignment prompt and which can be effectively assessed from the student work. The purpose of this information is to avoid incorrectly scoring student work as deficient when an element of the rubric is lacking because the students were not aware they needed to address that criterion. In some cases they should be aware because the criterion was taught as part of course instruction and in other cases because the assignment prompt mentions the criteria. Please indicate yes or no for each of these boxes and then make a final yes/no judgment on whether scorers should assess this criterion.

Faculty member or department name _____

Course Number_____ Course Name _____

Assignment name _____Number of students in course _____

Date _____ % of grade covered by assignment □ < 3% □ 3-5% □ 6-10% □ 11-20% □ > 20%

Problem Solving Criteria: **See rubric on back for details**	This criterion is . . .		
	Taught as part of course instruction	Addressed in the assignment prompt	Appropriate to be assessed
Work is correct and complete.			
Uses formulas properly, where and when appropriate.			
Creates figures, tables and/or statistics to summarize data.			
Explains patterns or trends in observations, data, figures and/or tables.			
Gives clear, precise and relevant explanations			
Applies content knowledge, methods and/or results to new situations.			

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	Proficient 3	Sufficient 2	Deficient 1
Work is correct and complete.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem in terms of all the values determined, units used and terminology applied.	Calculations attempted are either partially unsuccessful or represent only a portion of the calculations required to comprehensively solve the problem, but a subset of values, units and terminology are accurate.	Calculations are attempted but are both unsuccessful and are not comprehensive in terms of either the values determined, units used or proper terminology.
Uses formulas properly, where and when appropriate.	Uses formulas correctly and appropriately and with analysis/explanation.	Uses formulas correctly and appropriately but without analysis/ explanation.	Uses formulas incorrectly OR in inappropriate places.
Creates figures, tables and/or statistics to summarize data.	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.
Explains patterns or trends in observations, data, figures and/or tables.	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 suggest about future events.*	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 the 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.*
Gives clear, precise and relevant explanations	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
Applies content knowledge, methods and/or results to new situations.	Successfully applies content knowledge by insightfully discussing in detail relevant and supported limitations and implications of content knowledge, methods and results.	Presents basic, relevant and supported limitations or implications of content knowledge, methods and/or results.	Any presented limitations and implications are possibly irrelevant and unsupported.