B3. Mathematical, Statistical, or Computational General Education Rubric

Definition

Apply the appropriate mathematical, statistical, or computation strategies to problem solving. Mathematical, statistical, or Computational (MSC) courses are intended to advance competency in working with various forms of data, which includes the ability to understand and create sophisticated arguments supported by quantitative evidence and the ability to clearly communicate those arguments in a variety of formats including but not limited to using words, tables, graphs, equations, etc.

Framing Language

This rubric is recommended for use in evaluating student work that addresses the Mathematical, Statistical, or Computational (MSC) Student Learning Outcome (SLO) for purposes of general education. Results can be used by instructors to improve course content and instructional techniques in future offerings of the course, to help students achieve competency in areas where they struggle and reinforce diverse elements of the Student Learning Outcome. Students in all disciplines need to be well versed in the interpretation, appropriate analysis, and presentation of data. Assessable projects might include problem sets which demonstrate mastery of specific types of problems (geometry, algebra, calculus, statistics, etc.), or the analysis of data collected through experiments with appropriate presentation of results and conclusions, or discipline specific calculations (drug dosages, caloric intake, circuit design, power requirements, body mass index, economic indices, etc.). This competency cannot be assessed with lab notebooks, classroom notes, stand---alone calculations, or unsubstantiated data that is not somehow formally presented with appropriate labels and interpretation. While competence and accuracy in the actual computation step is important, the rubric also concentrates on competency in conceptualizing and planning for the solution process, as well as communicating and presenting the results. Regardless of the student's major field, conceptualizing, solving and communicating results for problems using mathematical, statistical or computational strategies is critical to contributing to modern society.

Mathematical, Statistical or Computational Strategies (MSC) Rubric

- For "full" designation, courses must address all 6 Elements.
- For "partial" designation, courses must address at least 3 of the Elements.

Elements	Competent	Approaches Competency	Beginning Competency
1. Interpretation Ability to explain information presented in mathematical, statistical, or computational forms.	Provides accurate explanations of information presented in mathematical, statistical, or computational forms with appropriate inferences drawn from the mathematical, statistical, or computational data.	Provides mostly accurate explanations of information presented in mathematical, statistical, or computational forms. Some computational or inferential errors are present.	Provides limited or minimal explanations of information presented in mathematical, statistical, or computational forms. Computational or inferential errors are significant.
2. Representation Ability to convert relevant information into various mathematical, statistical, or computational forms.	Identifies relevant information and converts information into appropriate and accurate mathematical, statistical, or computational forms.	Identifies some relevant information and converts information into mostly appropriate and/or accurate mathematical, statistical, or computational forms.	Did not identify relevant information and/or did not convert the information into appropriate and accurate mathematical, statistical, or computational forms.
3. Computation: Calculations Performs accurate calculations.	Performs appropriate sequence of mathematical, statistical, or computational steps to solve problem. Calculations are clear and accurate.	Performs a mostly appropriate sequence of mathematical, statistical, or computational steps to solve problem. Calculations lack some clarity or accuracy.	Does not perform appropriate sequence of mathematical, statistical, or computational steps to solve problem. Calculations lack clarity and accuracy
4. Computation: Analysis Analyzes results and derives conclusions.	Performs appropriate analysis of the information and draws accurate conclusions.	Performs a somewhat appropriate analysis of the information and draws some accurate conclusions.	Analysis is inappropriate or missing; conclusions are inaccurate or missing.

5. Communication: Explanation of the Computation Explains the steps taken and articulates the solutions.	Explains all steps taken in mathematical, statistical, or computational process. Consistently uses terminology appropriate for the discipline to explain the solution.	Explains most of the steps taken in the mathematical, statistical, or computational process. Sometimes uses terminology appropriate for the discipline to explain the solution.	Explains some or none of the steps taken in the mathematical, statistical, or computational process. Use of terminology to explain the solution is inappropriate or limited for the discipline.
6. Communication: Presentation of the Computation Presents the problem and solution in an appropriate and well-organized manner.	The problem and solution are presented in an appropriate and well-organized format (i.e. use of symbols, diagrams, and illustrations.)	The problem and solution are presented in a somewhat appropriate and well-organized format (i.e. use of symbols, diagrams, and illustrations.)	The problem and solution are not presented in an appropriate and well-organized format (i.e. use of symbols, diagrams, and illustrations.)