

## Assessment of Student Outcomes Rubric: *Analytical Reasoning and Problem Solving (ARP)*

**Learning Outcome:** Students will be able to apply the methods of mathematics, statistics, or analytical reasoning to critically evaluate data, solve problems, and effectively communicate findings verbally and graphically.

(The phrase “analytical reasoning” is used as a generic phrase to include algorithmic, logical, mathematical, and statistical methods across disciplines.)

#	Student Achievements	Unsatisfactory	Satisfactory	Exemplary
1	<b>Student responses exhibit knowledge and appropriate application of principles, concepts, and terms of the discipline.</b>	Student response indicates a lack of knowledge or frequent misuse of basic principles, concepts, and terms of the discipline.	Some knowledge of principles, concepts, and terms is evident, although occasionally these are used or referenced inappropriately.	Student response indicates a clear understanding of principles, concepts, and terms relevant to the assigned task.
2	<b>Student responses include mathematical (in a broad sense) modeling and/or problem solving involving quantitative relationships among the variables.</b>	Student response shows an inability to understand, manipulate, or relate variables and, where called for, modeling and/or problem setup are absent or wholly inappropriately undertaken.	A reasonable attempt is made to identify the relevant problem and describe, manipulate, or relate variables, though some aspects of modeling or problem setup may be incorrectly implemented.	Student response clearly describes the problem, along with variables and their relationship. Modeling and problem setup are effectively implemented.
3	<b>Student responses include appropriate quantitative methods and/or analytical reasoning principles to evaluate and solve problems, using technology where appropriate.</b>	Student does not use appropriate methods or reasoning to solve the problem. Where technology is needed, it is absent or badly misused.	Student uses acceptable methods and/or reasoning to solve the problem, although implementation may not be perfect. Where called for, technology is used mostly correctly, although minor incorrect usage or interpretation may occur.	Student correctly implements appropriate methods and/or reasoning to solve the problem. Where called for, technology is used and results interpreted correctly.
4	<b>Student responses demonstrate an ability to evaluate, describe and interpret data.</b>	Student response indicates a lack of ability to convert information in a source or summary form (numbers, tables, graphs, and equations) to an evaluative, descriptive, or interpretative statement about data.	Student response shows a familiarity with using the source or summary form and an attempt to evaluate, describe, or interpret data, although minor errors in translating the information may be evident.	Student expertly translates information in a source or summary form into a correct evaluation, description, or interpretation of data.