Rubric for evaluating student math problem solving skills

Skill		Level of Achievement 1	2*	3	4**	5
A	Understanding of problem	No clear understanding indicated; Lack of comprehension of the basic parts of the problem; Didn't understand enough to start to work the problem;		Able to glean basic parts of the problem and the general framework; No serious misconceptions; Adequate to work most of the problem;		Full grasp of concepts and relationships between concepts; Identifies all the important elements of the problem;
B	Use of terms and symbols	Unable to communicate any math concepts though terminology; Absent of technical or mathematical terms, or used inappropriately; Mathematical symbols are not used, or used incorrectly;		Uses most terminology and symbols correctly; Evidence of reasonable understanding of terms and symbols;		Clear, concise communication of ideas; Thoughts thoroughly explained with the correct terminology and clearly displayed appropriate symbols; Demonstrates superior knowledge of the language of mathematics/science
C	Calculations	No evidence of manipulation of mathematical expressions; Arithmetic errors prevalent in the work;		Mainly accurate with some minor arithmetic errors; Appropriate to work the problem, but not a sophisticated presentation;		Fully arithmetically accurate; Clearly represented with various computation steps shown; Executes algorithms completely and correctly;
D	Solution	Shows significant misunderstand-ing of the process; Does not correctly apply or even make attempt to apply appropriate solution; Reflects inappropriate strategy for solving the problem; Attempts to use irrelevant information; No (or incorrect) graphical representation of the mathematical thought process;		Reflects reasonable strategy for solving most of the problem; Displayed in a rote manner showing simple conceptualization; Shows understanding of some of the problem's mathematical concepts; Presented in an orderly manner, but lacking some details; Represented graphically with only minor flaws;		Represented with detail through logical sequence and systematic progression; Reflects excellent problem-solving skills; Presents strong supporting arguments; Use of relevant outside information; Results are represented graphically in clear and illuminating way;
E	Answer	No expression of any empirical finding; Units if stated are incorrect; Conclusion is not valid;		Expressed empirical findings but limited in identification of related issues; Answer is stated in correct units;		Complete response with a clear, unambiguous, accurate explanation; Fully described findings in words; Stated in correct units with any unit changes clearly illustrated;
F	Difficulty of Problem	Values plug directly into equation; No mathematical manipulation;		Combines two related concepts;		Requires multiple steps with development of concepts evolving into the solution;

* 2 - Exhibits most characteristics of '1' and some characteristics of '3'
** 4 - Exhibits most characteristics of '3' and some characteristics of '5'