

### Written Mathematical Argumentation Rubric

Category	Description Examples/Non-Examples	0	1	2	3
1. The <b>claim</b> presents the position being taken.	The claim is what is to be shown true or not true. <i>Example:</i> No, he won't have enough. He won't have 16 ounces. <i>Non-example:</i> I multiplied 3 times 5 and got 15, so 15 ounces.	No claim	Claim is included but not clear	Claim is clearly articulated	---
2. <b>Evidence</b> supports the claim.	Evidence can take the form of equations, tables, charts, diagrams, graphs, words, symbols, etc. It is one's "work" which provides the information to show something is true/false. <i>Example:</i> No, he won't have enough because $1.5 \times 10$ is 15 ounces and is not the needed 16 ounces. <i>Non-example:</i> No, he won't have enough because he has less than 16 ounces, and not the needed 16 ounces.	No evidence	Minimal evidence is included, <u>or</u> evidence is unrelated to the claim, <u>or</u> major mathematical error(s) are present	Some evidence is missing <u>or</u> minor mathematical error(s) are present	Sufficient evidence is presented <u>and</u> there are no mathematical error(s)
3. The <b>warrants</b> connect the evidence to the claim. (Note that some quality mathematical arguments may not include a warrant.)	Warrants can take the form of definitions, theorems, logical inferences, and agreed upon facts. Warrants collectively chain the evidence together to show the claim is true or false. <i>Example:</i> No, he won't have enough because he has 15 ounces total, which is 1 ounce short. I multiplied 3 times 5 to get 15 because there were 3 ounces of lemon juice for every 2 lemons, and with 10 lemons, that made 5 sets of 2 lemons. [Note: the warrants provided here are for the 3 and the 5. The warrant for using multiplication is not included. This example could have used 10 times 1.5 as well.] <i>Non-example:</i> No, he won't have enough because I multiplied 3 x 5 and got 15.	No warrant	Minimal support for evidence, <u>or</u> warrant unrelated to evidence is included <u>or</u> major conceptual error(s) are evident	Some evidence lacks a necessary warrant <u>or</u> minor conceptual error(s) are evident	Sufficient warrant <u>and</u> no conceptual error(s)
4. The <b>mechanics</b> help convey precise ideas that flow.	The language used must be at a sufficient level of precision to support the argument and with sufficient clarity. <i>Example:</i> No, he won't have enough lemon juice. He needs 16 ounces of juice, but he only has 15 ounces. I figured out he had only 15 ounces of juice by multiplying 10 lemons times 1.5 ounces per lemon. $10 \times 1.5 = 15$ . <i>Non-example:</i> No, he won't make it because all together it's 15 and it's less. (Note the lack of precision with language.)	The language has major imprecisions <u>or</u> does not flow, thus the ideas are unclear	The language has some imprecisions <u>or</u> thus the ideas are somewhat clear, thus the ideas are somewhat unclear but can be inferred	The language is precise <u>and</u> the ideas flow clearly	---