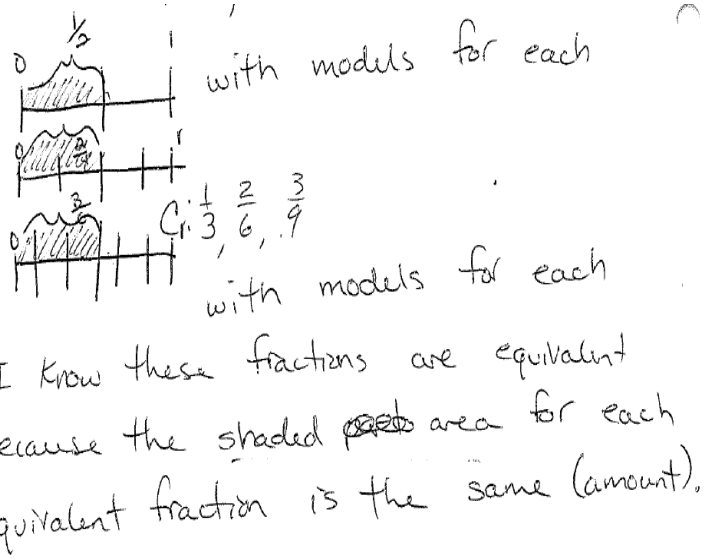
Student A

A: 1/6, 2/12, 3/18
B: 1/2, 2/4, 3/6



Commentary

This student's argument was categorized **High Quality**.

Student A's claim is that the fractions they wrote were equivalent to the fraction represented in the rectangle.

Student A provided clearly labeled models (using area and number lines) as evidence and explained why the models show that the fractions are equivalent.

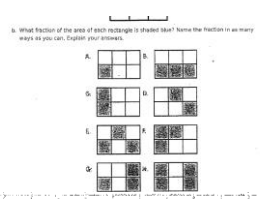
Student A correctly named at least two equivalent fractions for the given fraction and drew models that represented how all of the fractions show the same area or value.

Models may include rectangles or number lines and should clearly demonstrate understanding of comparison of equivalent wholes.

Argumentation Components

Claim	**Evidence**
I know these are fractions equivalent.	Sufficient examples of equivalent fractions are given using area models and number lines.
Warrants	**Language & Computation**
The warrant states "the shaded area for each equivalent fraction is the same (amount)."	The mathematical language used is precise and ideas flow clearly. Vocabulary used includes: -equivalent -equivalent fraction -same amount

Student B



a. 2x3=6. The formula for area is L x W=A

bA. $\frac{1}{6}\ \frac{2}{12}\ \frac{4}{24}\ \frac{8}{48}\ \frac{16}{96}\ \frac{32}{192}\ \frac{64}{384}\ \frac{128}{768}\ \frac{256}{1536}$ each time I make the fraction smaller, but all of the fractions listed above are equal.

bB. $\frac{1}{2}\ \frac{2}{4}\ \frac{3}{6}\ \frac{4}{8}\ \frac{5}{10}\ \frac{6}{12}\ \frac{7}{14}\ \frac{8}{16}\ \frac{9}{18}\ \frac{10}{20}\ \frac{11}{22}\ \frac{12}{24}\ \frac{13}{26}\ \frac{14}{28}\ \frac{15}{30}\ \frac{16}{32}\ \frac{17}{34}\ \frac{18}{36}$ (I can keep going but that would take a while.) all of these fractions are equal because they are halves.

bC $\frac{1}{3}\ \frac{2}{6}\ \frac{3}{12}\ \frac{4}{24}\ \frac{5}{48}\ \frac{6}{96}\ \frac{7}{192}\ \frac{8}{384}\ \frac{9}{768}\ \frac{10}{1536}$ all of these are equal, and they all can be reduced to 3rds (except for the $\frac{1}{3}$).

bD. $\frac{1}{3}\ \frac{2}{6}\ \frac{4}{12}\ \frac{8}{24}\ \frac{16}{48}\ \frac{32}{96}\ \frac{64}{192}\ \frac{128}{384}\ \frac{256}{768}\ \frac{512}{1536}$ These are all equal and can be reduced to $\frac{1}{3}$ (except for the $\frac{1}{3}$).

bE. $\frac{1}{2}\ \frac{18}{36}$ all of the fractions are halves.

bF. $\frac{1}{2}\ \frac{18}{36}$ all of the fractions are halves.

bG. $\frac{1}{2}\ \frac{18}{36}$ all of the fractions are equal because they are halves

bH. $\frac{4}{6}\ \frac{8}{12}\ \frac{16}{24}\ \frac{32}{48}\ \frac{64}{96}\ \frac{128}{192}$ all of these fractions are equal because if reduced, all can come to $\frac{4}{6}$

Commentary

*This student's argument was categorized as **Adequate quality**.*

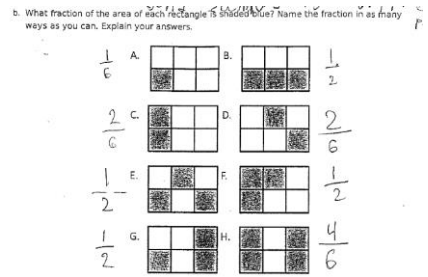
Student B's claim is that the fractions are equivalent. Student B provided multiple examples of equivalent fractions and evidence of how the student found some of these examples, as in example bC , bD and bH, yet the warrants are incomplete. There is not enough explanation of why the fractions are equivalent other than the statement that they can be reduced to the same simplest form.

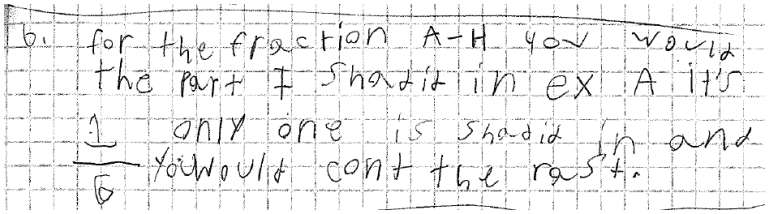
There is also a misconception about making a fraction "smaller" versus reducing or simplifying it.

Argumentation Components

Claim	Evidence
The fractions I listed are equal.	*Sufficient examples are provided.*
Warrants	**Language & Computation**
Warrants are incomplete: "All fractions can be reduced to (simplest form)."	*The mathematical language used is precise and ideas flow clearly. Vocabulary used includes:* *-reduced* *-equal*

Student C





Commentary

This student's argument was categorized as **Low quality**.

Student C identified the shaded portions of the rectangles but did not create equivalent fractions. There is no claim, warrant or examples.

Argumentation Components

Claim	**Evidence**
None	None
Warrants	**Language & Computation**
None	None

Rubric

Category	Description with Examples/Non-Examples	0	1	2	3
1. The **claim** presents the position being taken.	The claim is what is to be shown true or not true. It may be explicitly stated or implied through examples. *Example:* ½, 2/4, 3/6, 4/8 (implied); 2/4, 3/6, and 4/8 are equivalent to 1/2 *Non-example:* ½ = 4/6; not equivalent fractions	No claim	Claim is included but not clear	Claim is clearly articulated	---
2. **Evidence** 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. *Example:* 1/2, 2/4, 3/6, 4/8, etc. *Non-example:* incorrect statements about equivalent fractions	No evidence	Minimal evidence is included, or evidence is unrelated to the claim, or major mathematical error(s) are present	Some evidence is missing or minor mathematical error(s) are present	Sufficient evidence is presented and there are no mathematical error(s)
3. The **warrants** 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. *Example:* I know these fractions are equivalent because the shaded area for each equivalent fraction is the same amount. *Non-example:* These fractions are equivalent because they are equal.	No warrant	Minimal support for evidence, or warrant unrelated to evidence is included or major conceptual error(s) are evident	Some evidence lacks a necessary warrant or minor conceptual error(s) are evident	Sufficient warrant and no conceptual error(s)
4. The **mechanics** 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. *Example:* ½, 2/4, 3/6, 4/8 are equivalent. Since the areas of the fractions all show the same amount those fractions must be equivalent. *Non-example:* They are the same.	The language has major imprecisions or does not flow, thus the ideas are unclear	The language has some imprecisions or thus the ideas are somewhat clear, thus the ideas are somewhat unclear but can be inferred	The language is precise and the ideas flow clearly	---

Key Connecting Sorting Packet to Argumentation Resource Packet

Student number (Sorting Packet)	Resource Packet Sample
1	C
2	A
3	B
4	
5	
6	
7	
8	
9	

Student number (Sorting Packet)	Resource Packet Sample (category)
2	A (high)
3	B (adequate)
1	C (low)
	D ( )
	E ( )
	F ( )
	G ( )
	H ( )
	I ( )