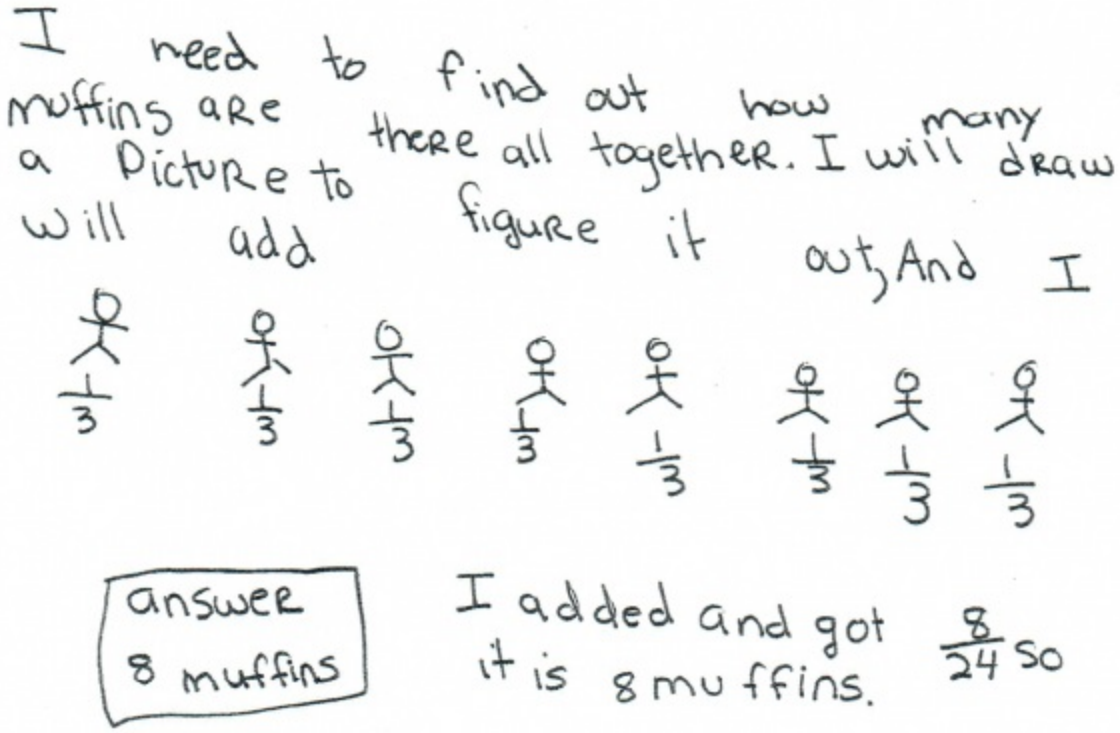
Title: Sharing Muffins

Achievement Level: Novice 1

Criteria and Performance Level	Rationales
Problem Solving *Novice*	The student's strategy of using a diagram to show eight friends with 1/3 written under each friend and adding the 1/3s for a total of 8/24 would not work to solve the task. The student's answer, "8 muffins," is not correct.
Reasoning & Proof *Novice*	The student does not indicate nine friends. The student does not show correct understanding of adding 1 1/3 nine times. The student adds the numerator and denominator of 1/3 eight times and uses the numerator total of eight as their answer.
Communication *Novice*	The student does not use any mathematical language. The student does not earn credit for the mathematical notation 1/3, 8/24 because the student does not demonstrate correct fractional understanding.
Connections *Novice*	The student solves the task and stops without making a mathematically relevant connection.
Representation *Apprentice*	The student attempts a diagram of friends and notes 1/3 for each friend. This is not accurate. The student provides no labels for the friends or the 1/3 notation.

Achievement Level: Novice 1

P/S	R/P	Com	Con	Rep	A/Level
N	N	N	N	A	N



Title: Sharing Muffins

Achievement Level: Apprentice 1

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of using a diagram to show nine friends with 1 1/3 muffins each and a total of 9 9/3 muffins works to solve the task. The student's answer, "Answer is 9 9/3 muffins because when you add 1/3 9 times you get 9/3 and when you add 1 9 times you get 9 muffins," is correct.
Reasoning & Proof *Apprentice*	The student demonstrates correct understanding of whole and fractional parts of a whole to arrive at an answer of 9 9/3 muffins. In this real-world problem-solving situation it would be expected to simplify the mixed number for a total of 12 muffins. The student does not demonstrate this correct reasoning.
Communication *Practitioner*	The student correctly uses the mathematical term *diagram*. The student correctly uses the mathematical notation *1/3, 9 9/3, 9/3*.
Connections *Novice*	The student solves the task and stops without making a mathematically relevant connection.
Representation *Apprentice*	The student's diagram is appropriate but not accurate. The student does not provide a key or text to label the nine friends. The student's answer provides the muffin label.

Note:

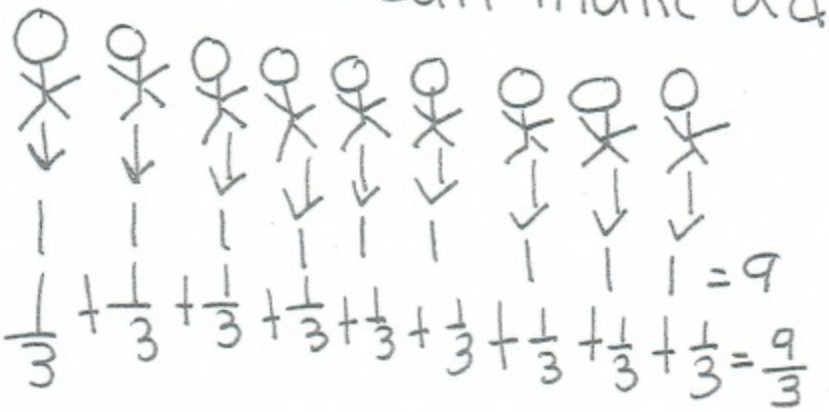
The overall achievement level for this piece of student work falls under Exemplars exception

to the rule category. If a student has all Apprentice scores or above, but a Novice in "Connections," the student may still receive an achievement level score of Apprentice. To learn more about Exemplars scoring, please refer to the section of your dashboard called "Tools for Success" and click on the link for “Using the Assessment Rubric.”

Achievement Level: Apprentice 1

P/S	R/P	Com	Con	Rep	A/Level
P	A	P	N	A	A

I have to find out how many muffins are there. I can make a diagram.



Answer is $9\frac{9}{3}$ muffins because when you add $\frac{1}{3}$ 9 times you get $\frac{9}{3}$ and when you add 1 9 times you get 9 muffins.

Title: Sharing Muffins

Achievement Level: Apprentice 2

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of using a table to show nine friends with 1 1/3 muffins each for a total of 12 muffins works to solve the task. The student's answer, "12 muffins," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the underlying mathematical concepts of whole, fractional parts of a whole, and addition of fractions.
Communication *Practitioner*	The student correctly uses the mathematical terms *diagram, first, second, third, fourth, fifth, sixth, seventh, eighth, ninth, equal, whole, three-thirds, total*. The student correctly uses the mathematical notation 1 1/3, 3/3.
Connections *Apprentice*	The student attempts a connection by adding another friend. The total muffins for 10 friends would be 13 1/3 muffins and not 12 1/3 muffins. A connection has to be accurate to earn the Practitioner level.
Representation *Apprentice*	The student's diagram is appropriate but not accurate. It appears that "# of muffins" is the title of the table. The column labels of friends and muffins are missing.

Achievement Level: Apprentice 2

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	A	A	A

I need to find out how many muffins all together.
My plan is to make a table.

# of	muffins	
First	$1\frac{1}{3}$	3
second	$1\frac{1}{3}$	
third	$1\frac{1}{3}$	
fourth	$1\frac{1}{3}$	3
fifth	$1\frac{1}{3}$	
Sixth	$1\frac{1}{3}$	
Seventh	$1\frac{1}{3}$	3
eighth	$1\frac{1}{3}$	
Ninth	$1\frac{1}{3}$	

↓

9 total muffins

The way I got my answer was that I knew $\frac{3}{3}$ is equal to 1 whole So there was 3, three thirds so that means that there was 3 wholes plus 9 wholes that equals 12 whole muffins

Answer: 12 muffins

Connection:

If there was 10 Friends they would have $12\frac{1}{3}$ muffins

Title: Sharing Muffins

Achievement Level: Practitioner 1

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of using a table to show nine friends with 1 1/3 muffins each for a total of 12 muffins works to solve the task. The student's answer, "12 muffins," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the underlying mathematical concepts of whole, fractional parts of a whole, and addition of fractions.
Communication *Practitioner*	The student correctly uses the mathematical terms *table, data, total, sum, dozen, fair share*. The student correctly uses the mathematical notation 1 1/3, 9/3.
Connections *Practitioner*	The student makes the mathematically relevant observations, "That is 1 dozen muffins," and, "Everyone gets a fair share."
Representation *Practitioner*	The student's table is appropriate and accurate. The student provides a title, each column is correctly labeled and the entered data is correct.

Achievement Level: Practitioner 1

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	P	P	P

I have to find out how many muffins are there altogether. I will make a table.

Table of friends and muffins

Friends	muffins
1	$1\frac{1}{3}$
2	$1\frac{1}{3}$
3	$1\frac{1}{3}$
4	$1\frac{1}{3}$
5	$1\frac{1}{3}$
6	$1\frac{1}{3}$
7	$1\frac{1}{3}$
8	$1\frac{1}{3}$
9	$1\frac{1}{3}$

9 wholes $\frac{9}{3} = 3$ $9 + 3 = 12$

Total 12 muffins

I made a table to solve the problem. After I aplied the data to the table. I found the total of all the $1\frac{1}{3}$'s and the sum I got was 12.

That is 1 dozen muffins everyone gets a fair share.

Answer 12 muffins

Title: Sharing Muffins

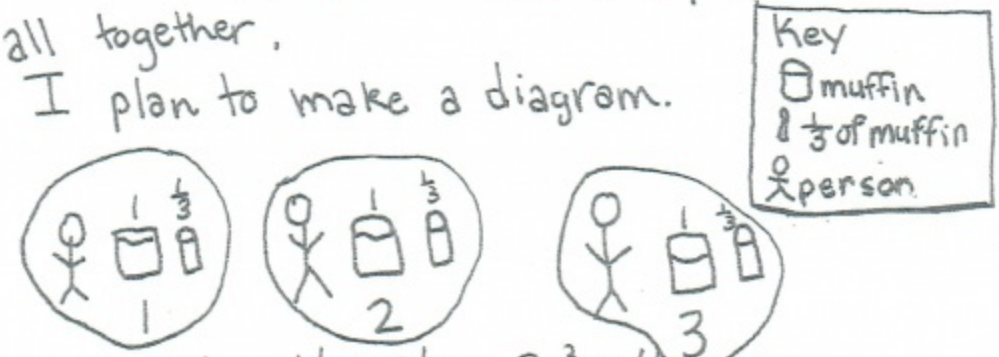
Achievement Level: Practitioner 2

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of using a diagram to show a group of three friends with 1 1/3 muffins each for a total of four muffins and then adding two more groups of three friends for a total of 12 muffins works to solve the task. The student also includes a second diagram to show counting on from the first diagram for four, eight, and 12 muffins. The student's answer, "The answer is twelve muffins because each person is getting 1 and 1/3 muffins," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the underlying mathematical concepts of whole, fractional parts of a whole, addition of fractions, and totaling groups of muffins. The student uses one diagram to demonstrate how the first four muffins were determined and then a second diagram to continue a running total of four, eight, and 12 muffins.
Communication *Practitioner*	The student correctly uses the mathematical terms *diagram, key, patterns*. The student correctly uses the mathematical notation 1/3, 1 1/3, 3 3/3.
Connections *Practitioner*	The student makes the mathematically relevant observation, "Patterns—person +1, muffins +1 1/3."
Representation *Practitioner*	The student's two diagrams are appropriate and accurate. The student provides a key to define a muffin, 1/3 of a muffin and a person.

Achievement Level: Practitioner 2

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	P	P	P

I need to find out how many muffins there are all together.
I plan to make a diagram.



$1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3} = 3\frac{3}{3} = 4$ muffins

3 people = 4 muffins
6 people = 8 muffins
9 people = 12 muffins

The answer is twelve muffins because each person is getting 1 and 1/3 muffins.

Patterns - person +1
muffins + $1\frac{1}{3}$

Title: Sharing Muffins

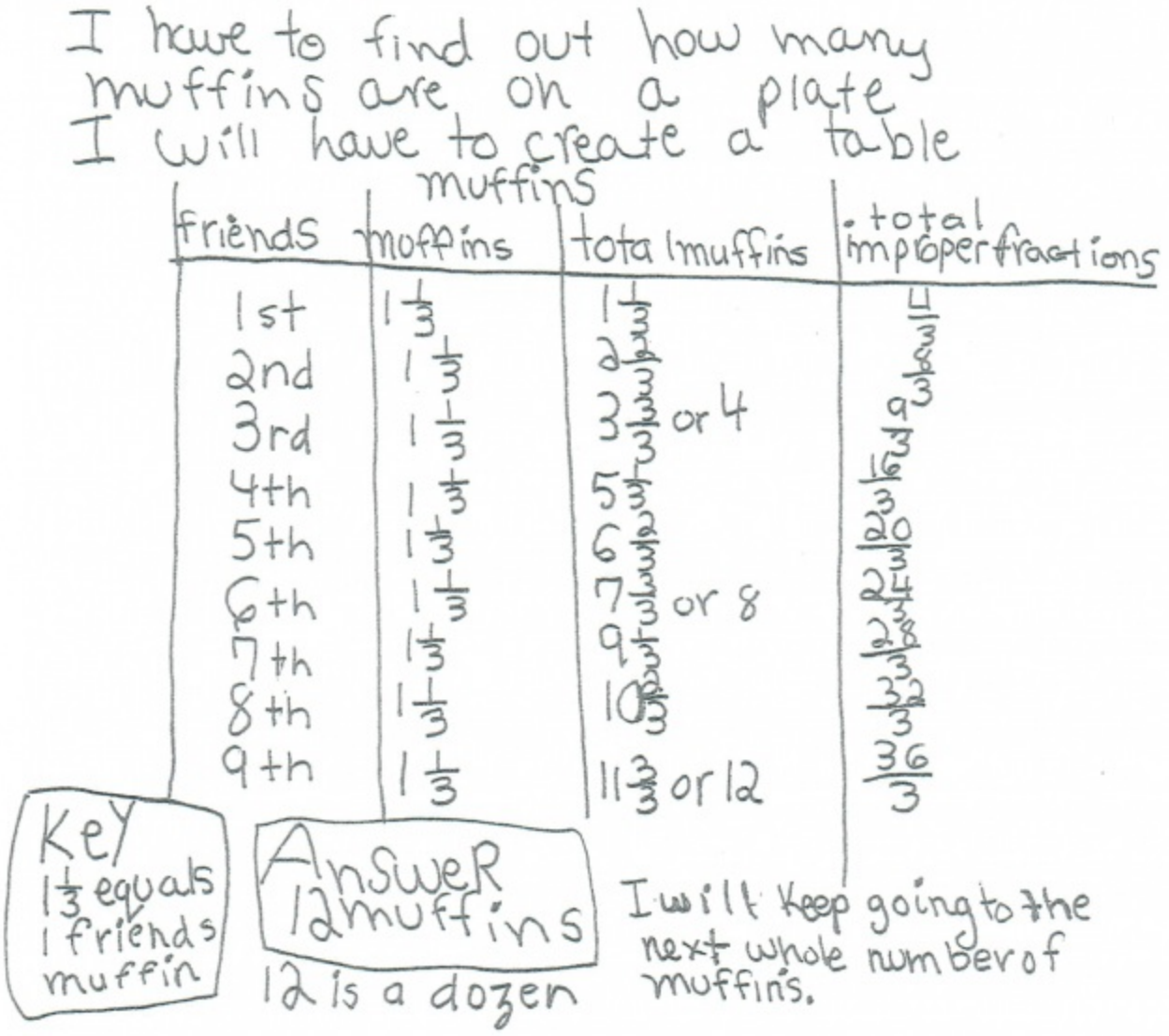
Achievement Level: Practitioner 3

Criteria and Performance Level	Rationales
Problem Solving *Practitioner*	The student's strategy of using a table to show the friends, muffins, total of 12 muffins, and total mixed numbers of muffins, works to solve the task. The student's answer, "12 muffins," is correct.
Reasoning & Proof *Practitioner*	The student demonstrates correct understanding of the underlying mathematical concepts of whole, fractional parts of a whole, and addition of fractions to find a total amount of muffins.
Communication *Practitioner*	The student correctly uses the mathematical terms *table, total, key, equals, dozen, whole number, equivalent*. The student correctly uses the mathematical notation 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 1 1/3, 2 2/3, 3 3/3, 5 1/3, 6 2/3, 7 3/3, 9 1/3, 10 2/3, 11 3/3, 4/3, 9/3, 16/3, 20/3, 24/3, 28/3, 32/3, 36/3, 13 1/3, 14 2/3, 15 3/3.
Connections *Practitioner*	The student makes the mathematically relevant observations, "12 is a dozen," and, "15 3/3 = 16 is called equivalent." The student recreates the task to continue to the next whole number of muffins and discovers that it is sixteen muffins. The student states, "I will keep going the next whole number of muffins." and, "It is 16 muffins."

Representation *Practitioner*	The student's first table is appropriate but not accurate. The third row for total improper fractions should read 12/3 and not 9/3. The student's second table is appropriate and accurate. Both tables have an accurate title and the labels for each column are correct. Only one representation out of two, three, etc. needs to be appropriate and accurate to be assessed the Practitioner Level.

Achievement Level: Practitioner 3

P/S	R/P	Com	Con	Rep	A/Level
P	P	P	P	P	P



muffins

friends	muffins	total muffins
10	$1\frac{1}{3}$	$13\frac{1}{3}$
11	$1\frac{1}{3}$	$14\frac{2}{3}$
12	$1\frac{1}{3}$	$15\frac{3}{3}=16$

It is 16 muffins

$15\frac{3}{3}=16$ is called equivalent

Title: Sharing Muffins

Achievement Level: Expert 1

Criteria and Performance Level	Rationales
Problem Solving *Expert*	The student's strategy of using a number line to show the number of muffins per friend and the total number of muffins works to solve the task. The student's answer, "The answer is twelve muffins," is correct. The student uses an alternative strategy of a table to verify their answer, and brings the knowledge of percents to the task.
Reasoning & Proof *Expert*	The student demonstrates correct understanding of the underlying mathematical concepts of whole, fractional parts of a whole, and addition of fractions to find a total amount of muffins. The student verifies that their answer is correct by using a table. The student makes a generalization about the multiples of three and four determining whole numbers of muffins and shows understanding of 33 1/3%.
Communication *Expert*	The student correctly uses the mathematical terms *total, amount, number line, per, patterns, dozen, table, whole, multiples, odd, even numbers, running total, equivalent, dozen, input, output, row, rule, more, percents, diagrams*. The student correctly uses the mathematical notation 1 1/3, 13 1/3, 14 2/3, 8/3, 32/3, 2 2/3, 3 3/3, 5 1/3, 6 2/3, 7 3/3, 9 1/3, 10 2/3, 11 3/3, 15 3/3, 17 1/3, 18 2/3, 19 3/3, 3/3, 100%, 33 1/3%, 1 1/2, 13 1/2.

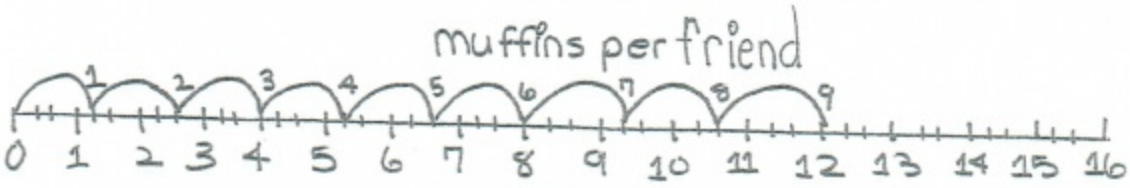
Connections *Expert*	The student makes the mathematically relevant Practitioner observations, "Patterns friend add 1, muffins add 1 1/3," "They ate a dozen muffins," "I can do some improper fractions. 2 friends is 8/3, 8 friends is 32/3," "You shouldn't leave them that way. You want to say 2 2/3 and 10 2/3 muffins. no one buys parts of muffins so you got to see whole muffins," "odd then even numbers," "patterns friends add 3, muffins add 4," "all even numbers," "I know 3/3 is equivalent to 1. That is important to know," "So 2 dozen friends eat 32 muffins," and, "If each friend eats 1 1/2 muffin you need 13 1/2 muffins so you have to buy 14 muffins." The student makes Expert connections. The student lists the number of muffins for 10, 11, and 12 friends and predicts, "so I think 15 friends is 20 muffins." The student verifies their thinking. "I can make a table to prove this and my answer." The student makes a table of 15 friends and muffins and states, "15 friends is 20 muffins. 9 friends are 12 muffins on my running total so I know my answer is correct. It matches my number line." The student makes another table to support their thinking that "the multiples of 3 match multiples of 4." The student states, "This matches my table. I went more friends." The student makes a generalization about their table of multiples. "The input to output numbers increase by 1 more each row That is a new pattern. It is like a rule because it is always one more muffin on my table. 3 - 4 + 1, 6 - 8 + 2, 9 - 12 + 3, 12 - 16 + 4" (with the + 1 pattern also indicated). The student also uses a diagram to compare a whole muffin to 100% and 1/3 of a muffin to 33 1/3%.

Representation *Expert*	The student's number line is appropriate to the problem and accurate. All necessary labels are indicated and the spacing between fractional parts is correct. The student's two tables are appropriate and accurate. All titles and column labels are correct and all entered data is correct. The student's diagram is appropriate and accurate. The muffins and fractional parts of one muffin are labeled correctly. The student uses their representations to verify the answer and support generalizations formed from patterns found in their tables.

Achievement Level: Expert 1

P/S	R/P	Com	Con	Rep	A/Level
E	E	E	E	E	E

I have to find the total amount of muffins.
I will make a number line



The answer is twelve muffins.

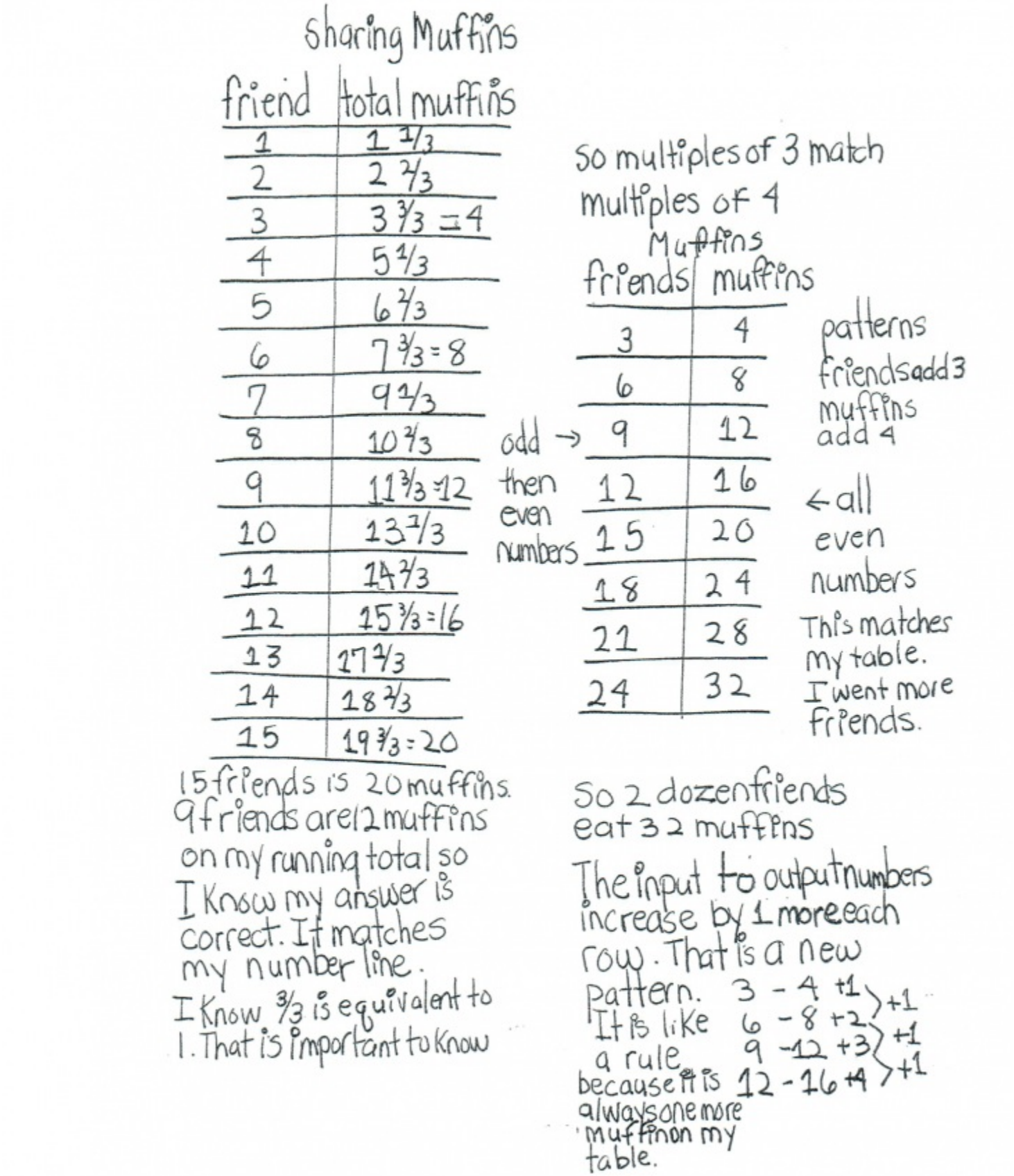
They ate a dozen muffins.

10 friends is 13 1/3 muffins
11 friends is 14 2/3 muffins
12 friends is 16 muffins
so I think 15 friends is 20 muffins
I can make a table to prove this and my answer.

no one buys parts of muffins so you got to see whole muffins

patterns
friend add 1
muffins add 1 1/3

I can do some improper fractions
2 friends is 8/3
8 friends is 32/3
You shouldn't leave them that way.
You what to say
2 2/3 and 10 2/3 muffins.



Sharing Muffins

friend	total muffins
1	1 1/3
2	2 2/3
3	3 3/3 = 4
4	5 1/3
5	6 2/3
6	7 3/3 = 8
7	9 1/3
8	10 2/3
9	11 3/3 = 12
10	13 1/3
11	14 2/3
12	15 3/3 = 16
13	17 1/3
14	18 2/3
15	19 3/3 = 20

15 friends is 20 muffins. 9 friends are 12 muffins on my running total so I know my answer is correct. If matches my number line.

I know 3/3 is equivalent to 1. That is important to know

So multiples of 3 match multiples of 4

Muffins

friends	muffins
3	4
6	8
9	12
12	16
15	20
18	24
21	28
24	32

odd → then even numbers

patterns
friends add 3
muffins add 4

← all even numbers

This matches my table. I went more friends.

So 2 dozen friends eat 32 muffins

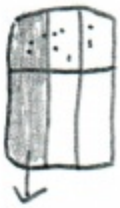
The input to output numbers increase by 1 more each row. That is a new pattern. It is like a rule because it is always one more muffin on my table.

3 - 4 +1
6 - 8 +2 } +1
9 - 12 +3 } +1
12 - 16 +4 } +1

I have one more conection - percents

muffins

100% is 1 whole muffin



1/3 muffin is 33 1/3% My dad shows me this

If each friend eats 1 1/2 muffin you need 13 1/2 muffins so you have to buy 14 muffins. This was my favorite problem so far. I like number lines for fraction better than diagrams