



THE 2023 YOUNG MATHEMATICAL STORY AUTHOR (YMSA) COMPETITION

THE STUART J. MURPHY AWARD
(THE 8-11 YEARS OLD CATEGORY)

SHORTLISTED

'Food Fraction' by Putri Azzahra (9 years old)
at the International School Nanshan Shenzhen (China)

You can read the author's inspiration for the story and the judges' comments
on:

www.mathsthroughstories.org/ymsa2023

#YMSAMaths

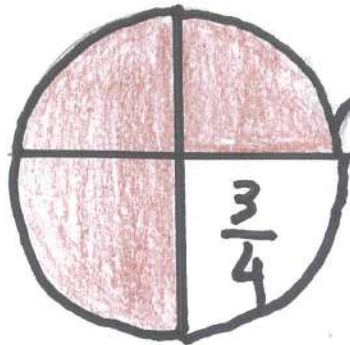
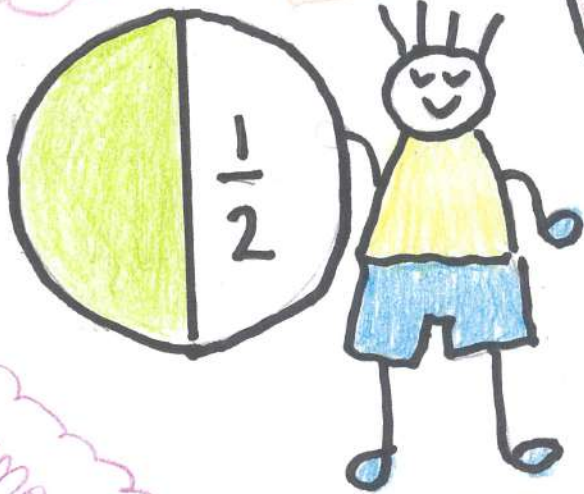
FOOD FRACTION

$\frac{5}{10}$

improper fraction

proper fraction

$\frac{2}{8}$



$2\frac{3}{4}$



denominator

numerator

PUTRI LATIFA AZZAHRA

INTERNATIONAL SCHOOL OF NANSHAN
SHENZHEN



Once upon a time, there was a village called FOODLICIOUS Village. This village had a group of children named Adam, Lily, and Jack. Lily's family was selling Pizza while Adam's family sold Cake. On the other hand, Jack's family had noodles as their business.

One day, these children heard that a fire occurred in their neighbor's village, FASHION KINGDOM, due to the heat. People there suffered because they lost their houses and had no food to eat.



The three kids (Adam, Lily, and Jack) then took the initiative to gather and think of how they could help the children from that village.

Lily started the conversation "How do you think we can help those people? What should we give them?"

Adam said "What about we give them some money?". Jack replied "We are children. We don't have money!"

Lily added "Hmmm, what if we give them food as our family is making and selling food every day!"

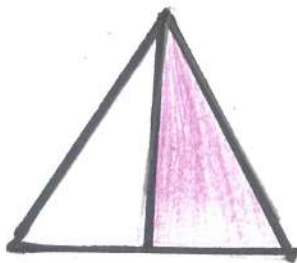
"What a brilliant idea!" Adam and Jack responded at the same time.

The three kids were happy and went home to tell their families. The next day they met again, and Lily started the conversation "My parent said yes, but they said they needed to sell the customers some pizza. Therefore, some boxes need to be divided. We can't give them all pizza that we make in a day."

"So, what should we do, and how do we count the food?" asked Jack.

"Wait! I remember our teacher taught us about FRACTIONS," said Lily. "Right, Lily, we can use a fraction to show the number of foods we will donate," added Adam.

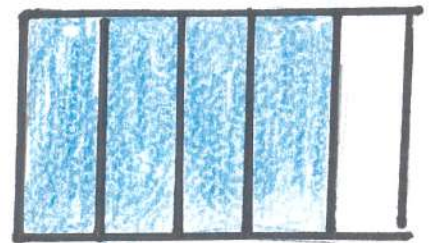
Fraction



$\frac{1}{2}$ = One half



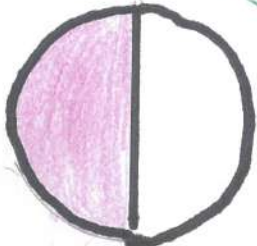
$\frac{2}{3}$ = two third



$\frac{4}{5}$ = four fifth

"What is a fraction?" Jack asked. Adam responded " A fraction is a **part of a whole** or a **portion of a group**. For example, $\frac{1}{2}$ represents half of a whole number or a thing. So, with fractions, we can express how many pieces of pizza we will donate even if we do not donate the entire boxes of pizza that we have."

Equivalent Fractions



$\frac{1}{2}$ 1 out of 2 parts



$\frac{2}{4}$ two out of four parts

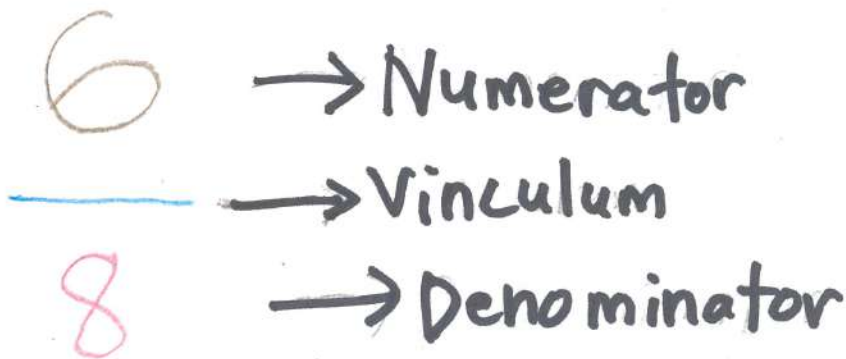


$\frac{3}{6}$ 3 out of 6 parts



$\frac{4}{8}$ 4 out of 8 parts

Jack asked again, "what do the top and bottom numbers represent?". Lily answered "the top part shows the numerator, and the bottom is the denominator".



"I still don't understand what you mean, Lily," said Jack. "Let's make it simple," Adam explained.

"For example, if Lily's family sells eight slices of pizza in a box and they only agree to donate six slices of pizza. The fraction will be $\frac{6}{8}$ ".

"Oh, I understand now. So, if they want to donate half of the pizza, we can say it as $\frac{4}{8}$," said Jack.

"Yes, you are right. We can even simplify the number as follows:

SIMPLIFYING FRACTION

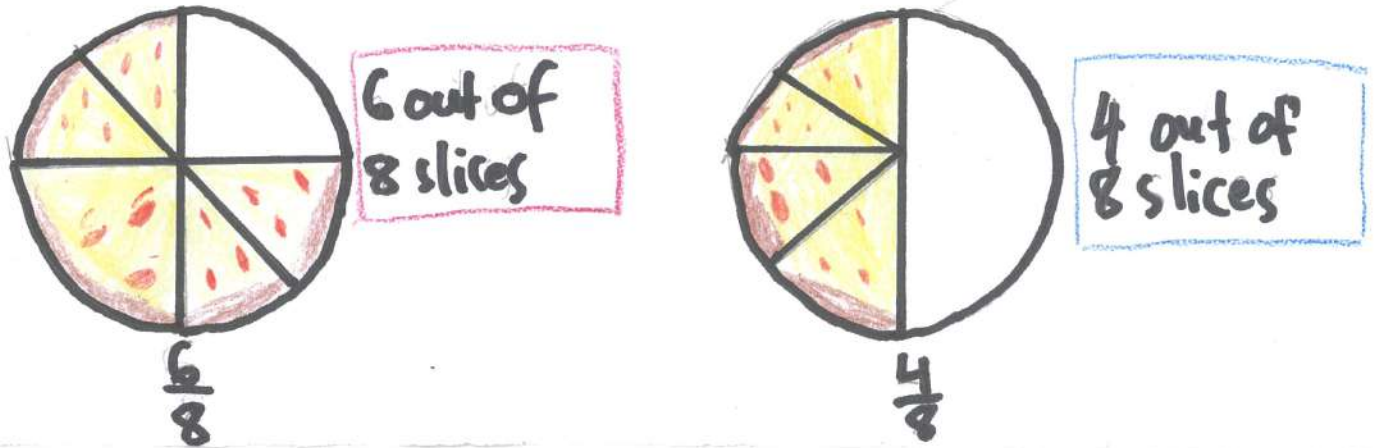
$$\frac{6}{8} = \frac{3}{4} \rightarrow 6 \div 2$$
$$8 \div 2 = 4$$

"How do you get that number?" Jack asked. "You need to divide both numbers with COMMON FACTOR. A common factor is a whole number which is a factor of two or more numbers." said Lily.

$$6 = 1, 2, 3, 6$$
$$8 = 1, 2, 4, 8$$
$$4 = 1, 2, 4$$

2 = Common factor

For the first case, you divided both numbers with two, and for the second case, you divided it with four," added Lily.



"Thanks for sharing about Fraction, Lily, and Adam! Do you know how many children there are in the Fashion Kingdom?" asked Jack.

"I heard they have 20 kids there," Lily said.

"I have the opposite problem here. My family wants to give away 25 slices of cake, but they only have 20 kids. How can we divide it equally?" asked Adam.

"Have you heard the term IMPROPER FRACTION where the numerator is more than the denominator, Adam? asked Lily.

Jack responded, "Does that mean the equation will be $\frac{25}{20}$? or $\frac{5}{4}$? "Yes, exactly! There will be more slices than one whole box of cake", Lily shouted.

Improper Fractions

$\frac{5}{4}$ → The number of slices we have

→ The number of parts we are dividing by



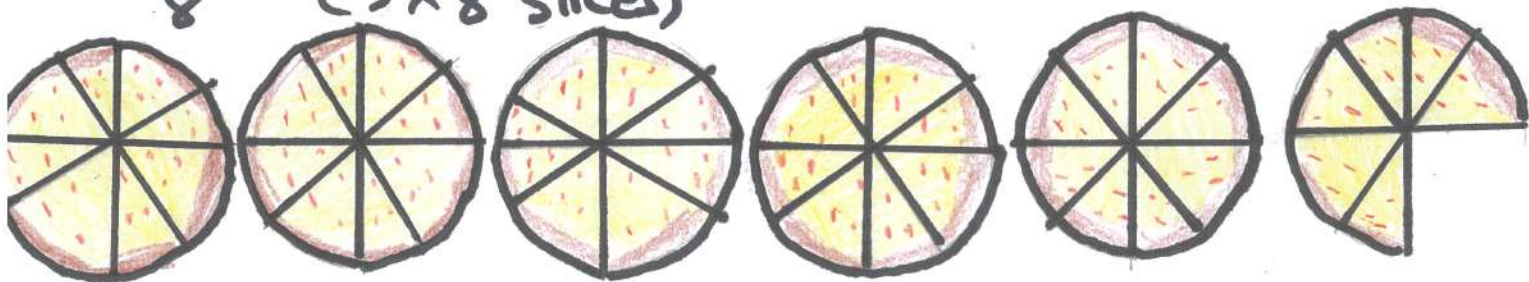
"Initially, we were talking about PROPER FRACTION where the numerator is less than the denominator."

"So, Lily, can you recall how many boxes of pizza your family will donate?" Adam asked. "Yes, my mom told me the exact number will be 5 boxes plus $\frac{6}{8}$ boxes," Lily answered.

"Wow, what kind of number is that?" Adam was surprised. "We called this kind of number a MIXED NUMBER. It means that my family will donate five full boxes of pizza; for the sixth box (last box), they will only donate 6 out of 8 slices. Does that make sense?" Lily asked.

Pizza to be Donated

$$5 \frac{6}{8} = 5 \text{ boxes } (5 \times 8 \text{ slices}) + 6 \text{ slices} = 40 + 6 = 46 \text{ slices}$$



MIXED NUMBER

"Wait! So, in total, how many slices will those children get? Adam asked. "Good questions!"
"Let's count together!" Lily added.

$$5 \frac{6}{8} = (5 \text{ boxes} \times 8 \text{ slices}) + 6 \text{ slices}$$
$$= 40 + 6 = 46 \text{ slices}$$

"That's great! My last question is can we change MIXED NUMBER to PROPER or IMPROPER FRACTION? Jack asked.

"Of course! Adam said we could change it to IMPROPER FRACTION, but NOT PROPER FRACTION.". Jack was still confused and asked another question, "Why only IMPROPER FRACTION but not PROPER FRACTION?"

Lily responded, " That is because a mixed number consists of a whole number and a fraction. The whole number will add more value to the numerator, and as a result, the numerator will be greater than the denominator. In my pizza case, if we change $5 \frac{6}{8}$ to IMPROPER FRACTION, it will be as follow:

$$5 \frac{6}{8} = \frac{46}{8} \rightarrow \frac{(8 \times 5) + 6}{8}$$

Mixed Number \rightarrow Improper number

"Oh wait! How about you, Jack? How many bowls of noodles will your family donate?" Lily wondered.

"Mine will be very simple, Lily. My family agreed to donate 20 bowls of noodles".

So, if no fraction is involved, what do we call that kind of number? Ask Lily.

"That must be called a WHOLE NUMBER," said Adam. "Yes, you are right, Adam. A whole number is any number that is NOT a fraction. For example, one bowl of noodles," Added Jack.

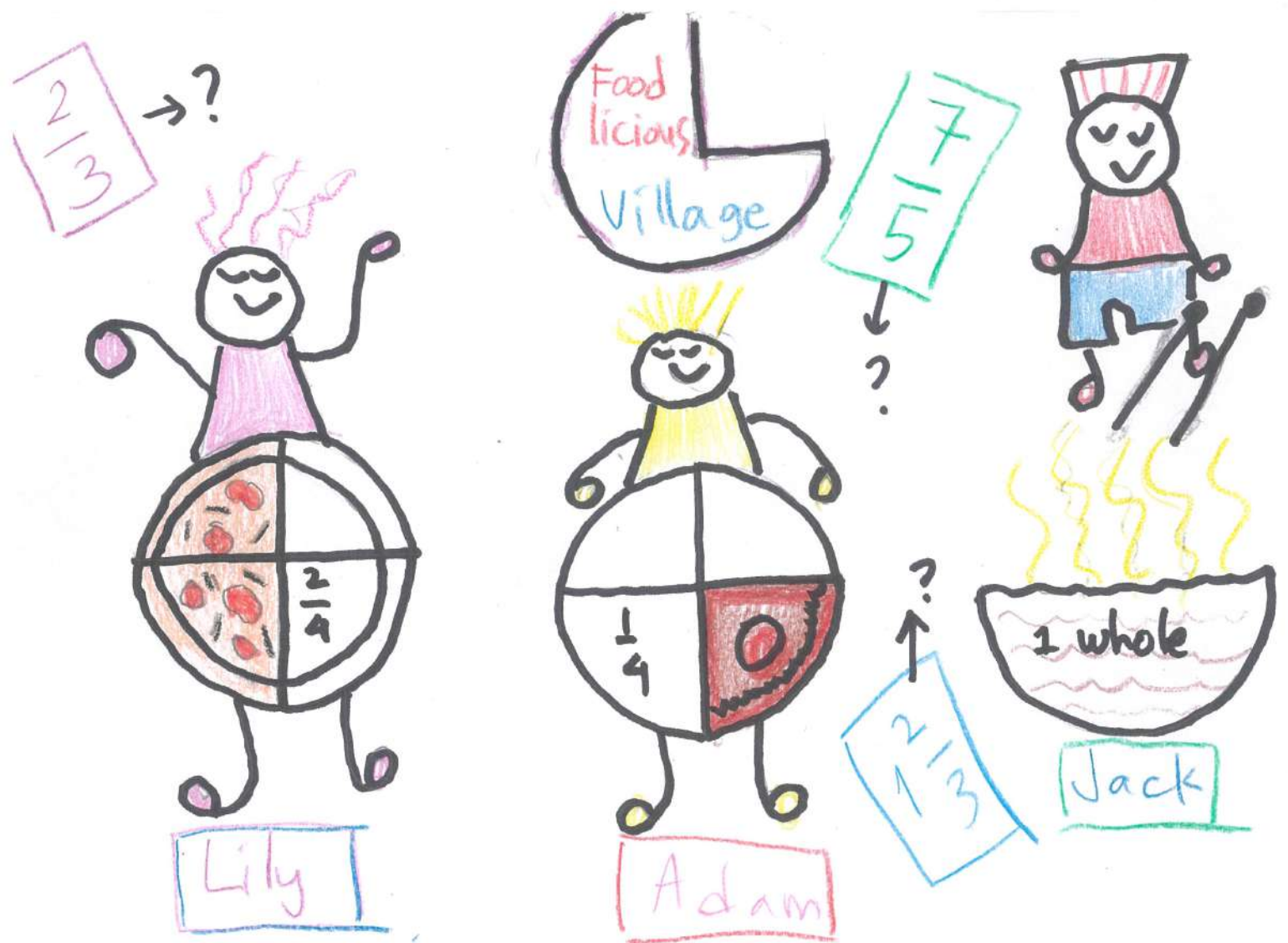
WHOLE NUMBER



Whole number = 1, 2, 3, 4...

"Wow, that's so cool!" shouted Jack and Adam simultaneously. "Now we know how to count our food even though it's not in whole numbers. Our problem is solved! Thanks to MATH FRACTION. Let's go and get the food and bring it to those children who urgently need our help! Remember that we are a sharing and caring community!" said Jack.

"Yes, let's go!" said Lily and Adam.



The three children (Lily, Adam, and Jack) from FOODLICIOUS village planned to donate food to their neighbor village, FASHION KINGDOM village, which suffered from fire. They wonder how to divide the food when the number of foods is not equal to the number of children in the FASHION KINGDOM.

Will they be able to divide the food? What kind of math equation will they use? How will they represent the numbers?