

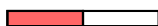
FRACTIONS

A DEFINITIONS

Discover: Hugo is very hungry after playing soccer. His dad baked two identical cakes. Hugo eats one whole cake:



Then, Hugo is still hungry, so he eats half of the second cake:



How much cake does Hugo eat in total? Write your answer as a fraction.

Answer:

- Hugo eats one whole cake and half of another cake.



- The numerator (top number) shows how many parts Hugo eats: 3.
- The denominator (bottom number) shows how many equal parts make one cake: 2.
- So Hugo eats $\frac{3}{2}$ cakes in total.

Definition Fraction

A **fraction** includes two numbers: the **numerator** and the **denominator**, separated by a bar.


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

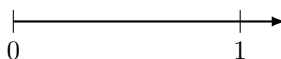
3 ← **numerator**: number of equal parts considered

2 ← **denominator**: number of equal parts the unit is divided

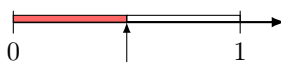
B ON THE NUMBER LINE

Discover:

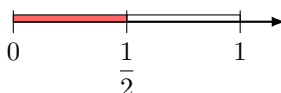
- Hugo is walking along a path.



- He stops and asks himself, "Where am I?"



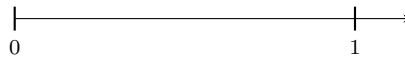
- His father says, "You are at half of the way that is $\frac{1}{2}$."



Method Representing a Fraction on the Number Line

To represent the fraction $\frac{2}{3}$ on a number line.

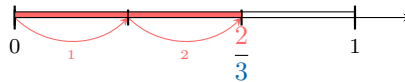
1. Draw a straight line and mark the points 0 and 1.



2. Divide the line between 0 and 1 into 3 equal parts.



3. Count 2 parts from 0 and mark the point.



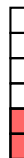
C EQUIVALENT FRACTIONS

Discover: Mr. Tariel has a cake that he cuts into **3 equal parts**. He plans to give **1 part** to his son, Louis.



Louis says, "I want **2 pieces!**"

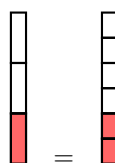
His dad replies, "Alright," and cuts each of the **3 parts** in half, making **6 smaller equal parts**. He then gives Louis **2 of these smaller pieces**.



Louis looks at his plate and feels disappointed.

Why is Louis still not happy?

Answer: Even though Louis got **2 pieces** instead of 1, the total amount of cake he received is the same as before. His dad just cut the cake into smaller pieces.

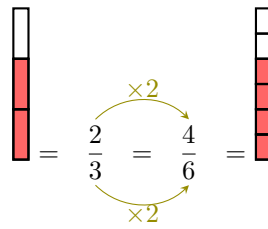


In fractions:

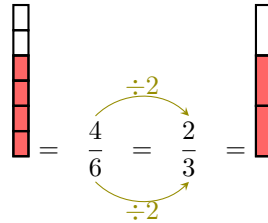
$$\frac{1}{3} = \frac{2}{6}$$

Definition Equivalent Fractions

- When you multiply the numerator and the denominator by the same number, the fractions are equals.

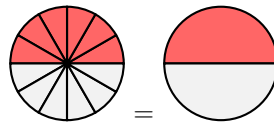


- When you divide the numerator and the denominator by the same number, the fractions are equals.



D SIMPLIFICATION

Discover: Pizza Time! Louis eats $\frac{6}{12}$ of a pizza. Hugo says, "Hey, $\frac{6}{12}$ is the same as $\frac{1}{2}$. It's easier to understand if you simplify the fraction!"

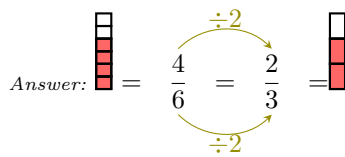


- Louis:** "How is $\frac{1}{2}$ easier?"
- Hugo:** "Because $\frac{1}{2}$ is the simplified form of $\frac{6}{12}$. It means you ate 1 out of 2 slices instead of 6 out of 12 slices. It's the same amount of pizza, but it's simpler to understand!"

Method Simplifying a fraction

To simplify a fraction, we find an equivalent fraction with the smallest possible numerator and denominator.

Ex: Simplify $\frac{4}{6}$



E ORDERING FRACTIONS

Discover:

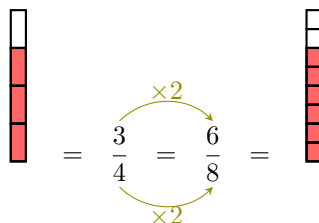
- Hugo eats $\frac{3}{4}$ of a cake.

- Louis eats $\frac{5}{8}$ of the same cake.

Who eats more cake?

Answer:

- We need to compare the fractions $\frac{3}{4}$ and $\frac{5}{8}$.
- To compare fractions, the pieces must be the same size. We do this by finding a common denominator.
- Convert $\frac{3}{4}$ to an equivalent fraction with denominator 8:



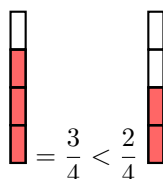
- Now, Hugo eats $\frac{6}{8}$ of the cake and Louis eats $\frac{5}{8}$.
- Since $\frac{6}{8} > \frac{5}{8}$, Hugo eats more cake.

Definition Ordering Fractions with the Same Denominator

For two fractions with the same denominator, the fraction with the larger numerator is larger.

Ex: Compare $\frac{3}{4}$ and $\frac{2}{4}$.

Answer:



Method Comparing Fractions with Different Denominators

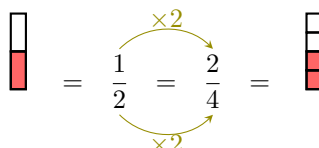
To compare two fractions with different denominators:

- Find a **common denominator**.
- Convert each fraction to an equivalent fraction with that denominator.
- Compare the numerators.

Ex: Compare $\frac{1}{2}$ and $\frac{3}{4}$.

Answer:

- Since $\frac{1}{2}$ and $\frac{3}{4}$ have different denominators, we change $\frac{1}{2}$ into an equivalent fraction with denominator 4:



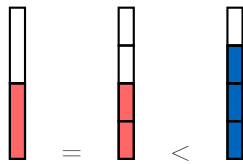
- Compare the numerators:

$$\frac{2}{4} < \frac{3}{4}$$

- Therefore,

$$\frac{1}{2} < \frac{3}{4}$$

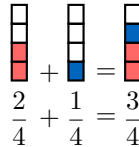
- In pictures:



F ADDITION AND SUBTRACTION WITH COMMON DENOMINATORS

Discover: Hugo eats $\frac{2}{4}$ of a cake:  and Louis eats $\frac{1}{4}$ of the same cake: 
Which fraction of the cake have Hugo and Louis eaten together?

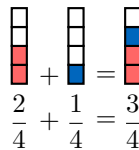
Answer:



So Hugo and Louis eat $\frac{3}{4}$ of the cake together: 

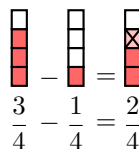
Definition Addition of Fractions with Common Denominators

When we **add** fractions with common denominators, we keep the denominator the same and add the numerators:



Definition Subtraction of Fractions with Common Denominators

When we **subtract** fractions with common denominators, we keep the denominator the same and subtract the numerators:

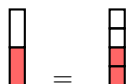


G ADDITION AND SUBTRACTION WITH DIFFERENT DENOMINATORS

Discover: Hugo eats $\frac{1}{2}$ of a cake:  and Louis eats $\frac{1}{4}$ of the same cake: 
What fraction of the cake have Hugo and Louis eaten together?

Answer:

- **Step 1: Find a common denominator:** To add the fractions, we need equal-sized parts. Divide each of Hugo's parts into two smaller parts:



So, Hugo eats $\frac{1}{2} = \frac{2}{4}$ of the cake.

- **Step 2: Add the fractions using the common denominator:** Now, we can add the two fractions:

$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

- **Step 3: Final Answer:** Hugo and Louis eat $\frac{3}{4}$ of the cake together:

Method Addition or Subtraction of Fractions with Different Denominators

To add or subtract fractions with different denominators:

- **Find a common denominator:** Choose a common multiple of the denominators.
- **Convert each fraction:** Rewrite each fraction so it has the common denominator.
- **Add or subtract the numerators:** Add or subtract the numerators and keep the denominator the same.