



gg90495335 www.gograph.com

Fractions



philipmartin.info



CONTENT

S

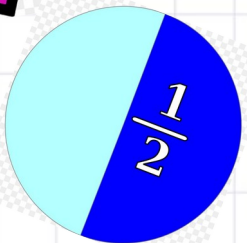
- **What are fractions?**
 - **Examples**
 - **Need of fractions**
 - **Parts of fractions**
 - **Examples**
 - **Types of fractions**
 - **Mixed fractions**
- **Like and unlike fractions**
- **Equivalent fractions**
- **Operations on Fraction**



What exactly are fractions?

- Fractions are for counting part of something.
- Loosely speaking, a fraction is a quantity that cannot be represented by a whole number.
- A fraction (from the Latin word fractus, broken) is a number that can represent part of a whole. The earliest fractions were reciprocals of integers: ancient symbols representing one part of two, one part of three, one part of four, and so on. A much later development were the common or "vulgar" fractions which are still used today ($1/2$, $5/8$, $3/4$, etc.)

$$\frac{1}{2}$$



$$\frac{3}{4}$$

Examples



1 2/10



2/8



1/8

Need of fractions

Consider the following scenerio

- Can you finish the whole cake?
- If not, how many cakes did you eat?
- 1 is not the answer, neither is 0
- This suggest that we need a new kind of number i.e. Fractions



Parts of Fractions

- As the fraction is written in p/q form, fraction is divided into two types
- **Denominator**:- The **denominator** tells us how many congruent pieces the whole is divided into, thus this number cannot be 0.
- **Numerator**:- The **numerator** tells us how many such pieces are being considered.

$$\frac{2}{4}$$

Numerator

Denominator

Examples

How much of a pizza do we have below?

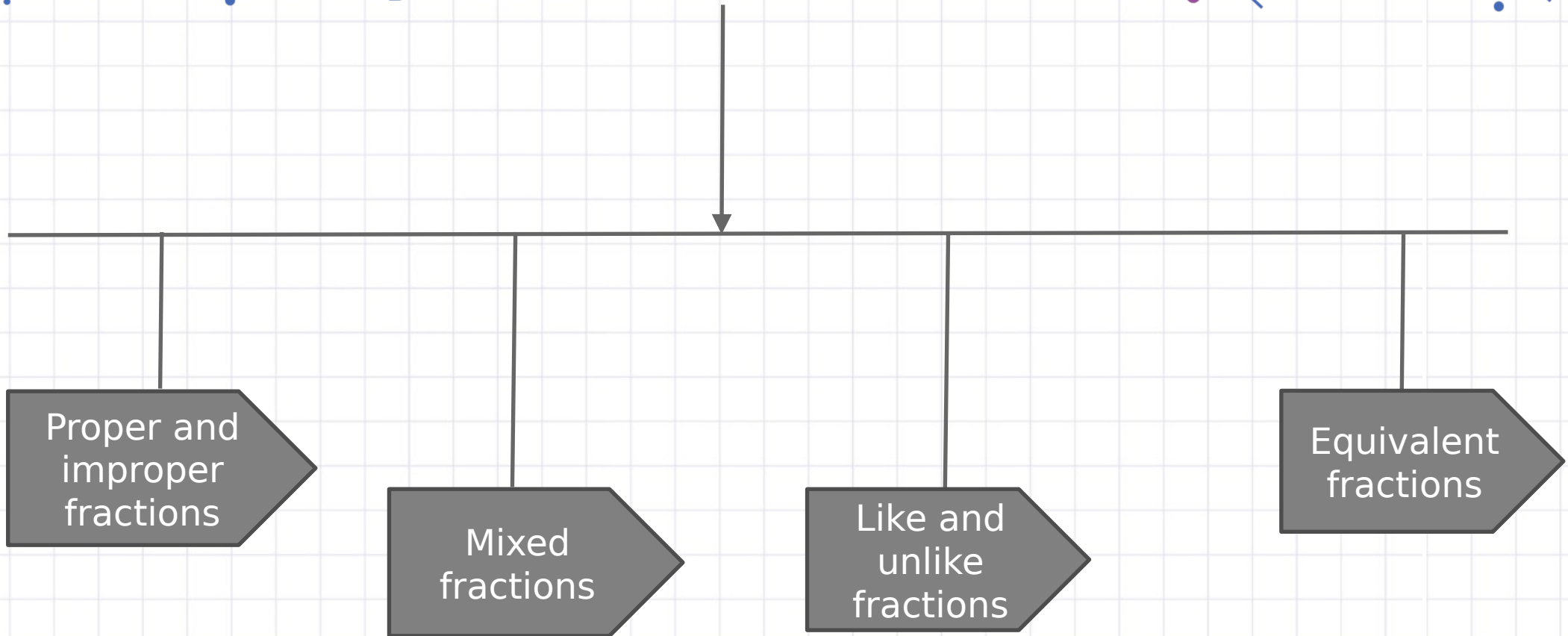
The blue circle is our whole.

If we divide the whole into 8 congruent pieces, the denominator would be 8

We can see that we have 7 of these pieces. Therefore the numerator is 7, and we have $\frac{7}{8}$ of a pizza.



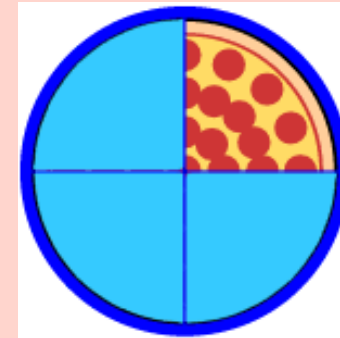
Types of fraction



Proper and improper Fractions

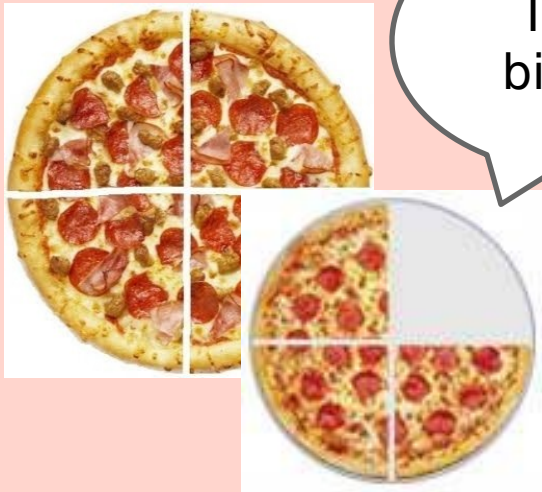
Proper fractions:- a fraction whose numerator is smaller than its denominator.
Example:- $3/4$, $2/11$, and $7/19$ are proper fractions

$1/4$



I am smaller

$7/4$



I am bigger

Improper fractions:- a fraction whose numerator is equal to or greater than its denominator.
Example:- $5/2$, $8/5$, and $12/11$ are improper fractions

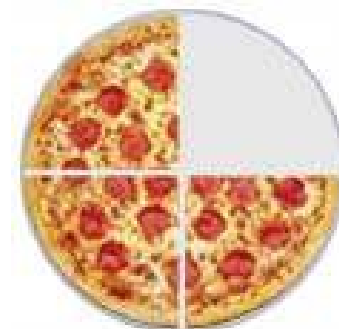
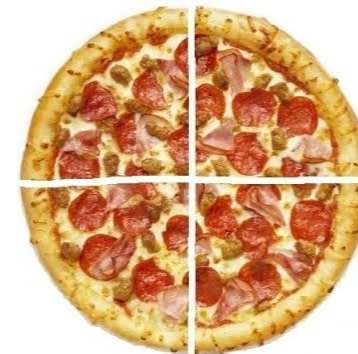
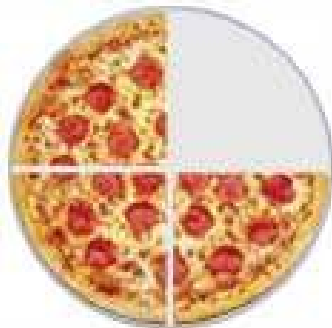
Mixed fractions

Mixed fractions:- in mixed fractions, a whole number and a proper fraction are together

Example:- $2 \frac{1}{4}$, $16 \frac{2}{5}$


- Mixed fractions and improper fractions are same
- We can use any to show the same amount

$1 \frac{3}{4}$



$\frac{7}{8}$

Conversion




Improper to mixed fraction:- for this conversion we should divide the numerator by the denominator the quotient is the leading number, remainder as the new numerator

$$\text{Say } 2 \frac{3}{7} = \frac{2 \times 7 + 3}{7} = \frac{17}{7}$$

$\frac{9}{8} = 1 \frac{1}{8}$ got the number by dividing the numerator by the denominator

Mixed to improper fraction:- for this conversion we should multiply the whole number with the denominator and the numerator to it. The answer is the numerator and the denominator is

Like and unlike fractions



Like fractions:- in like fractions, the denominators of the fractions are same


$$\frac{1}{5}$$


$$\frac{8}{5}$$

$$\frac{3}{5}$$

$$\frac{5}{1}$$

$$\frac{5}{8}$$

$$\frac{5}{3}$$



Unlike fractions:- in unlike fractions, the denominators of the fractions are different.



Conversion

Conversion of Unlike fractions to Like fractions

- Simplify all the fractions.
- Find LCM of all the denominator
- Multiply all the fractions with a special form of 1 to get 84 (here). Now these are Like fractions.

$$\frac{3}{4}, \frac{5}{3}, \frac{4}{7} = \frac{63}{84}, \frac{113}{84}, \frac{48}{84}$$

$$\begin{aligned} 2 \times 2 \times 3 \times 7 &= \\ 84 & \\ \text{By LCM} & \end{aligned}$$

Equivalent Fractions



- They are the fractions that may have many different appearances, but are same .
- In the following picture, we have $\frac{1}{2}$ of a cake as the cake is divided into two congruent parts and we have only one of those parts.
- But if we cut the cake into smaller congruent pieces, we can see that. Example:- $\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{3}{6}$



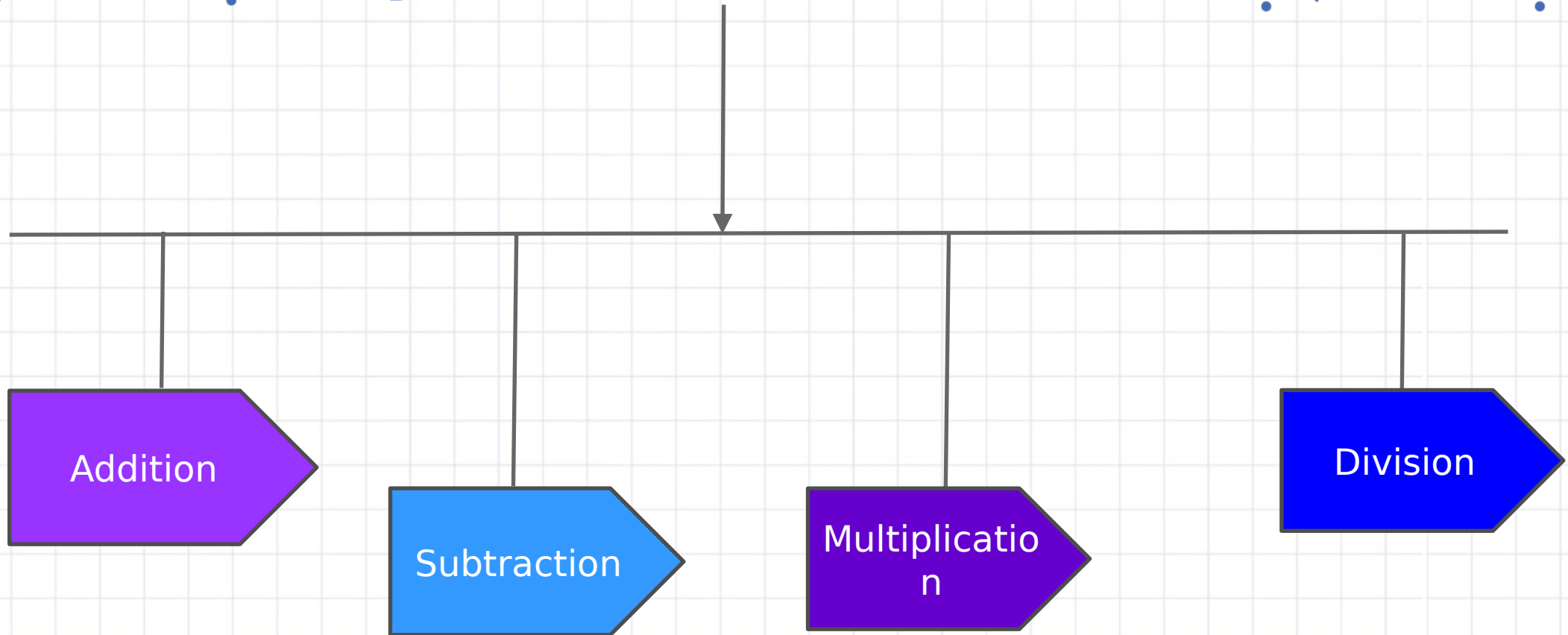


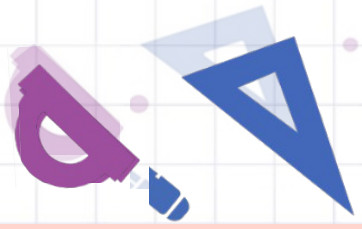
Equivalent Fractions



- To know that two or more fractions are equivalent we must simplify (change to its lowest term) them
- Simplify:- a fraction is in its lowest terms (or is reduced) if we cannot find a whole number (other than 1) that can divide into both its numerator and denominator.
- Example:- $5/10$: 5&10 can be divided by 5. $5/10 = 1/2$
- To make equivalent fractions, we multiply the fraction with a special form of 1(same numerator & denominator- $4/4$, $10/10$ etc.
- E.g. : $4/5 = 4 \times 5 / 5 \times 5 = 20/25$

Types of fraction





Simple rules to remember



Things to know!!!!!!!

- Simplifying
- Like and unlike
- Like fractions are compulsory to add or subtract
- If they are unlike fractions, then convert them to like fractions
- They should not be added or subtracted
- Always change improper fraction to a mixed fraction.



Adding Fractions with Same denominators



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

Add the numerator
and
leave the denominator as it is.

This is done with having same number in denominator and if the number is divisible, then you can simplify it into lowest terms

Adding Fractions with Different denominators



If there are different denominators in the fractions, then we change them to like fractions.

$$\frac{1}{3} = \frac{5}{15}$$

$$\frac{1}{3} + \frac{2}{5}$$

$$\frac{2}{5} = \frac{6}{15}$$

$$\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$$

Subtracting Fractions with Same denominator

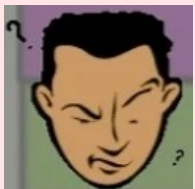


$$\frac{4}{6} - \frac{2}{6} = \frac{2}{6} = \frac{1}{3}$$

Subtract the numerator
and
leave the denominator as it is.

This is done with having same number in denominator and if the number is divisible, then you can simplify it into lowest terms

Subtracting Fractions with different denominators



If there are different denominators in the fractions, then we change them to like fractions.

$$\frac{2}{3} = \frac{10}{15}$$

$$\frac{2}{3} - \frac{2}{5}$$

$$\frac{2}{5} = \frac{6}{15}$$

$$\frac{2}{3} - \frac{2}{5} = \frac{10}{15} - \frac{6}{15} = \frac{4}{15}$$

Adding and Subtracting mixed fractions



- Change the mixed fraction to improper fractions and then to like fractions
- At last, add or subtract the improper like fractions.
- Don't forget to change the answer to mixed fraction again.

Multiplication of fractions



➤ To Multiply Fractions we Multiply both - The numerators and the Denominators separately.

$$\frac{2}{4} \times \frac{3}{2} = \frac{2 \times 3}{4 \times 2} = \frac{\cancel{2}^1 \cdot 3}{\cancel{2}_1 \cdot 4} = \frac{3}{4}$$

If the both the numerator and denominator are divisible, then we can convert into simplest form.

Multiplying mixed fractions



- **Change the Mixed fractions to Improper Fractions.**
- **Then multiply the Improper Fraction.**
- **Don't forget to change the answer to Mixed Fraction again.**

Dividing fractions



- To Divide Fractions we change the Second Fraction with its Reciprocal.
- Then Multiply the Reciprocal with the First Fraction.

$$\frac{2}{4} \div \frac{4}{5} = \frac{2 \times 5}{4 \times 4} = \frac{\cancel{10}}{\cancel{16}} = \frac{5}{8}$$

If the both the numerator and denominator are divisible, then we can convert into simplest form.

Dividing mixed fractions



- **Change the Mixed fractions to Improper Fractions.**
- **Then Multiply the Improper Fraction.**
- **Don't forget to change the answer to Mixed Fraction again.**