# MATH

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CHAPTER 5: FRACTIONS

FRACTIONS

➢ FRACTIONS

Faction is a number, which is used to represent the part of a whole. It is expressed, in the form of $\frac{P}{Q}$ where P and Q are natural numbers. The upper part of the fraction is called **numerator** and the lower part is **denominator.** For example, $\frac{5}{9}$ is a fraction, where 5 is numerator and 9 is denominator.

Example:

Represent the shaded part of the figure as a fraction.
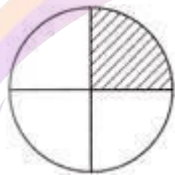
Solution: $\frac{1}{4}$

Real – Life Example

❖ Time is a very good example of fractions. Time is divided into various denominations of hours, minutes and seconds For example, 1 hour has 60 minutes or it can also be said that 1 hour can be divided into 60 equal fractions each being equal to 1 minute.

QUICK CONCEPT REVIEW

❖ Fractional Part: The fractional part of a number is the part of the number that appears after the decimal point.

❖ A fraction is a way of representing division of a 'whole* into parts.

❖ A fraction is a way of representing division of a 'whole* into parts. It has the form

Numeratar Denominatar Where the Numerator = Number of parts chosen And the Denominator = Total number of the parts

Amazing Fact

❖ The number Pi (the ratio of the circumference to the diameter of a circle) can't be expressed as a fraction. When written as a decimal it never repeats and never ends.

Here is Pi written to 50 decimal

Places: 3.14159265358979323846264338327950288419716939937510

Example: Fraction 1/3 is shown by the pie chart below. The pie is divided into 3 equal parts. The green part is equal to one third of the pie, thus 1/3.

Part of a whole

3/4
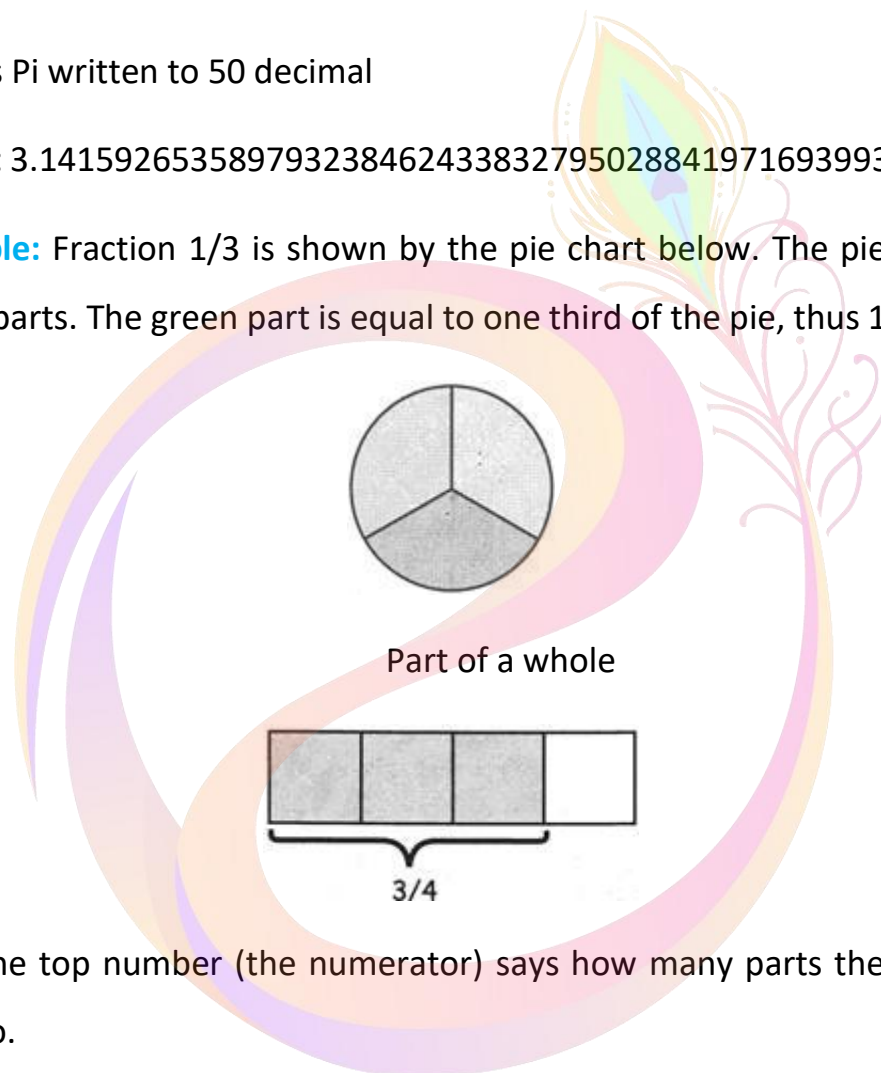
√ the top number (the numerator) says how many parts the whole is divided into.

√ the bottom number (the denominator) says how many you have.

Comparing fractions: Fractions are compared to see if one fraction is equal to (=), greater than (>) or smaller than (<) the other fraction.

❖ While comparing the fractions, if the fraction are like fractions, the fraction with bigger numerator is greater.

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❖ If the fractions are not like fractions, convert fraction into like fraction using the LCM of the denominator and then compare.

Steps to compare two fractions :

Step 1: Find a common denominator by taking L.C.M of all different denominators.

Step 2: Make equivalent fractions with the new denominator.

Step 3: Compare the numerators.

Example: Compare the fractions 3/5 and 7/9.

Step 1: L.C.M of 5 and 9 =45

Step 2: $\frac{3}{5} = 35 \times 99 = \frac{27}{45} ; \frac{7}{9} = 7 \times 59 \times 5 = \frac{35}{45}$

Step 3: Since 27 < 35 so 3/5 < 7/9.

Note: If the numerator is same, the fraction with greater denominator is smaller.

Shortcut Method: To compare the two fractions, simplify cross multiply them.

Historical preview

❖ In ancient Rome. Fractions were written using words instead of numbers.

❖ Fractions were firstly used in the Indus Valley civilization, followed by the Egyptians and the Greeks.

❖ By about 500 AD, the Indians had developed a system from a way of writing called brahmi, which had nine symbols and a zero. In India fractions were written very much like we do now, with one number (the numerator) above another (the denominator), but without a line. It was the Arabs who added the line (sometimes drawn horizontally, sometimes on a slant) which we now use to separate the numerator and denominator.

Equivalent Fraction

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To find equivalent fractions, multiply the numerator and denominator by the same number (except zero).

Equivalent fractions may look different, but they have the same value.

3/4 = 6/8 = 9/12
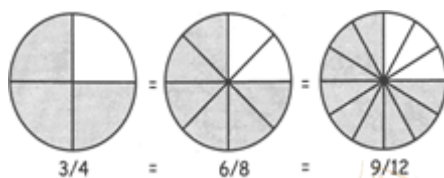
The fractions three-fourths, six-eighths, and nine- twelfths are equivalent.

Estimating the degree of closeness of a fraction

- A fraction is closest to 1/ 2 when the denominator is about twice the numerator.

    Example: 2/5, 5/26, 8/15 etc.

- A fraction is closest to 1/ 4 when the denominator is about four times the numerator.

    Example: 3/14, 4/17, 7/26 etc.

Decimal Fractions

Decimal fraction is a fraction with denominator 10,100, 1000 etc. For example fractions 1/10, 1/100, 1/1000 can be written as 0.1, 0.01, 0.001 respectively. 0.1, 0.01, 0.001 are decimal fractions.

Each decimal fraction has two parts- a whole number and a decimal. The point or dot that separates both the parts is called a decimal point. The number of digits in the decimal part gives the number of decimal places.

Example: 234.5623

In this number 234 is a whole number and 5623 is a decimal number.

This number has 4 decimal places.

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- Decimal fractions are very useful in the context of units of length and money.

Example 1: A log of wood of length 5 m is given below. It is to be cut into 10 equal parts.

The length of each part represents 1/10 of the length of the whole wood.

So, the length of each part of a 5m long log of wood is 5m x 1/10 = 5/10 m. 5/l0 m can also be written as 0.5.

Misconcept/ concept

Misconcept: The common misconception is that decimals and fractio9ns are defferent types of numbers. Hence there is no equivalent fraction for any decimal.

Concept: Taking an example of a decimal 4.422 which is to be converted to its equivalent fraction. Now this decimal can be expressed as 4 and the fraction 422/1000 or 4422/1000. These are fraction equivalent. These can be simplified by dividing both numerator and deno 0 minator by 2 to give 4.422 = 2211/500 or 4(211/500).

Misconnect: The value of A ÷ 1/B is equivalent to A ÷ B and hence has value A/B. Taking an example, the value of 3 ÷ ¼ is equivalent to 3 ÷ 4 and hence has ¾ or 0.75.

Example 2: Rs. 5 is to distributed equally among 10 students.

So, Rs. 5 is to be divided into 10 equal parts i.e. each student gets Rs. 5/10 or Rs. 0.50.

Expressing a decimal as a fraction and vice-versa

Decimal into Fraction

Write the decimal as the numerator without the decimal point and then write the denominator as 1 followed by as many zeroes as there are decimal places in the decimal.

Example: 0.8 = 8/10, 0.25 = 25/100, 0.2147 = 2147/10000 etc.

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Fraction into Decimal

The fractions having denominators 10, 100 or 1000 can easily be converted into decimals. Place the decimal point from right to left in the numerator after as many digits as there are zeroes in the denominator.

Example: 5/100 = 0.05, 4/1000 = 0.004, 3/10 = 0.3 etc.

The fractions with denominators other than 10,100 or 1000 can also be converted to decimals by first converting 1 their denominators to 10,100 or 1000 and then following the same steps as above.

Example: 1/5 = 1/5 x 2/2 = 2/10 = 0.2.

More about Fractions:

Equivalent Fractions: Fractions having the same value, 1 even though they may look different.

Example: 1/2 and 2/4 both has the same value because they both are "half" Like Fractions: Fractions having the same denominator.

Example: 1/2 and 3/2 are like fractions having the same denominator as 2.

While comparing the fractions, if the fractions are like fractions, the fraction with bigger numerator is greater.

If the fractions are not like fractions, convert fractions into like fraction using the LCM of the denominator and then compare.
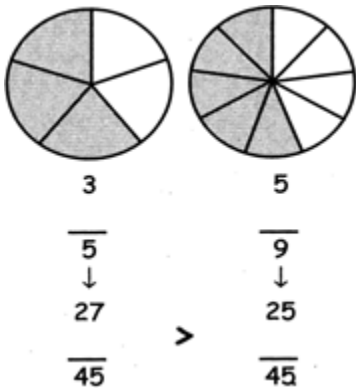
Important points

These conversions must be kept in mind when dealing with decimal fractions.

1 meter= 100 centimeter

1 kilometer= 1000 meter

1 rupee= 100 paise

$$\frac{3}{5} \downarrow \frac{27}{45} > \frac{5}{9} \downarrow \frac{25}{45}$$

Like Fraction

The fractions which have the same denominator are called like fractions. For example,

57,97,57 are like fractions as they have the same denominator.

Write the like fraction of 821whose numerator is 4.

Answer:

According to the question numerator should be 4 and like fractions have same denominator thus the required fraction will be 421.
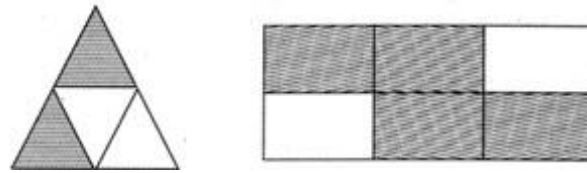
Unlike Fraction

The fractions which have different denominators are called unlike fractions. For example,

5887,5275,4588 are unlike fractions as they have different denominators.

Example:

Represent the shaded part in the following figures into fractional form and check are they unlike fractions?

Fractional representation for the shaded part in first figure is 24 and for the second figure is 46.

 The fractions have different denominators. Therefore, they are unlike fractions.

Unit Fraction

The fractions which have the numerator 1 are called unit fractions. For example, 15,18,112 are the unit fractions as each of them has the numerator 1.

Example:

The following picture has been divided into 5 equal parts. How many parts of the figure should be shaded so that fractional representation of the shaded part of the figure is a unit fraction.

Solution:

A unit fraction has the numerator 1, therefore, only 1 part should be shaded.

Proper Fraction

If the numerator of a fraction is smaller than denominator, the fraction is called proper fraction. For example, 57 is a proper fraction as 5 is smaller than 7.

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