

## Fractions and Decimals

### Fractions:

1. A fraction is a number representing a part of a whole.
2. A fraction can be expressed in the form  $\frac{a}{b}$ , where a, b are whole numbers and  $b \neq 0$ .
3. In a fraction  $\frac{a}{b}$  we call 'a' as numerator and 'b' as denominator.
4. A fraction whose numerator is less than the denominator is called a proper fraction.
5. A fraction whose numerator is more than or equal to the denominator is called an improper fraction.
6. A combination of a whole number and a proper fraction is called a mixed fraction.
7. To get a fraction equivalent to a given fraction, we multiply (or divide) its numerator and denominator by the same non-zero number.
8. Fractions having the same denominators are called like fractions. Otherwise, they are called unlike fractions.
9. A fraction is said to be in its lowest terms if its numerator and denominator have no common factor other than 1.
10. To compare fractions, we use the following steps:  
Step I Find the LCM of the denominators of the given fractions.  
Step II Convert each fraction to its equivalent fraction with denominator equal to the LCM obtained in step I.  
Step III Arrange the fractions in ascending or descending order by arranging numerators in ascending or descending order.
11. To convert unlike fractions into like fractions, we use the following steps:  
Step I Find the LCM of the denominators of the given fractions.  
Step II Convert each of the given fractions into an equivalent fraction having denominator equal to the LCM obtained in step I.
12. To add (or subtract) fractions, we may use the following steps:  
Step I Obtain the fractions and their denominators.  
Step II Find the LCM of the denominators.

Step III Convert each fraction into an equivalent fraction having its denominator equal to the LCM obtained in step II.

Step IV Add (or subtract) like fractions obtained in Step III.

13. Product of two fraction =  $\frac{\text{Product of their numerator}}{\text{Product of their denominators}}$

14. Two fractions are said to be reciprocal of each other, if their product is 1. The reciprocal of a non-zero fraction  $\frac{a}{b}$  is equal to  $\frac{b}{a}$

15. The division of a fraction  $\frac{a}{b}$  by a non-zero fraction  $\frac{c}{d}$  is the product of  $\frac{a}{b}$  with the reciprocal of  $\frac{c}{d}$

### **Decimals:**

1. Decimals are an extension of our number system.
2. Decimals are fractions whose denominators are 10, 100, 1000 etc.
3. A decimal has two parts, namely, the whole number part and decimal part.
4. The number of digits contained in the decimal part of a decimal number is known as the number of decimal places.
5. Decimals having the same number of places are called like decimals, otherwise they are known as unlike decimals.
6. We have,  $0.1 = 0.10 = 0.100$  etc,  $0.5 = 0.50 = 0.500$  etc and so on. That is by annexing zeros on the right side of the extreme right digit of the decimal part of a number does not alter the value of the number.
7. Unlike decimals may be converted into like decimals by annexing the requisite number of zeros on the right side of the extreme right digit in the decimal part.
8. Decimal numbers may be converted by using the following steps.

Step I Obtain the decimal numbers

Step II Compare the whole parts of the numbers. The number with greater whole part will be greater. If the whole parts are equal, go to next step.

Step III Compare the extreme left digits of the decimal parts of two numbers. The number with greater extreme left digit will be greater. If the extreme left digits of decimal parts are equal, then compare the next digits and so on.

9. A decimal can be converted into a fraction by using the following steps:

Step I: Obtain the decimal.

Step II: Take the numerator as the number obtained by removing the decimal point from the given decimal.

Step III: Take the denominator as the number obtained by inserting as many zeros with 1 (e.g. 10, 100 or 1000 etc.) as there are number of places in the decimal part.

10. Fractions can be converted into decimals by using the following steps:

Step I: Obtain the fraction and convert it into an equivalent fraction with denominator 10 or 100 or 1000 if it is not so.

Step II: Write its numerator and mark decimal point after one place or two places or three places from right towards left if the denominator is 10 or 100 or 1000 respectively. If the numerator is short of digits, insert zeros at the left of the numerator.

11. Decimals can be added or subtracted by using the following steps:

Step I: Convert the given decimals to like decimals.

Step II: Write the decimals in columns with their decimal points directly below each other so that tenths come under tenths, hundredths come under hundredths and so on.

Step III: Add or subtract as we add or subtract whole numbers.

Step IV: Place the decimal point, in the answer, directly below the other decimal points.

12. In order to multiply a decimal by 10, 100, 1000 etc., we use the following rules:

Rule I: On multiplying a decimal by 10, the decimal point is shifted to the right by one place.

Rule II: On multiplying a decimal by 100, the decimal point is shifted to the right by two places.

Rule III: On multiplying a decimal by 1000, the decimal point is shifted to the right by three places, and so on.

13. A decimal can be multiplied by a whole number by using following steps:

Step I: Multiply the decimal without the decimal point by the given whole number.

Step II: Mark the decimal point in the product to have as many places of decimal as are there in the given decimal.

14. To multiply a decimal by another decimal, we follow following steps:

Step I: Multiply the two decimals without decimal point just like whole numbers.

Step II: Insert the decimal point in the product by counting as many places from the right to left as the sum of the number of decimal places of the given decimals.

15. A decimal can be divided by 10, 100, 1000 etc by using the following rules:

Rule I When a decimal is divided by 10, the decimal point is shifted to the left by one place.

Rule II When a decimal is divided by 100, the decimal point is shifted to the left by two places.

Rule III When a decimal is divided by 1000, the decimal point is shifted to the left by three places.

16. A decimal can be divided by a whole number by using the following steps:

Step I: Check the whole number part of the dividend.

Step II: If the whole number part of the dividend is less than the divisor, then place a 0 in the ones place in the quotient. Otherwise, go to step III.

Step III: Divide the whole number part of the dividend.

Step IV: Place the decimal point to the right of ones place in the quotient obtained in step I.

Step V: Divide the decimal part of the dividend by the divisor. If the digits of the dividend are exhausted, then place zeros to the right of dividend and remainder each time and continue the process.

17. A decimal can be divided by a decimal by using the following steps:

Step 1 Multiple the dividend and divisor by 10 or 100 or 1000 etc. to convert the divisor into a whole number.

Step II Divide the new dividend by the whole number obtained in step I.