MATHEMATICS

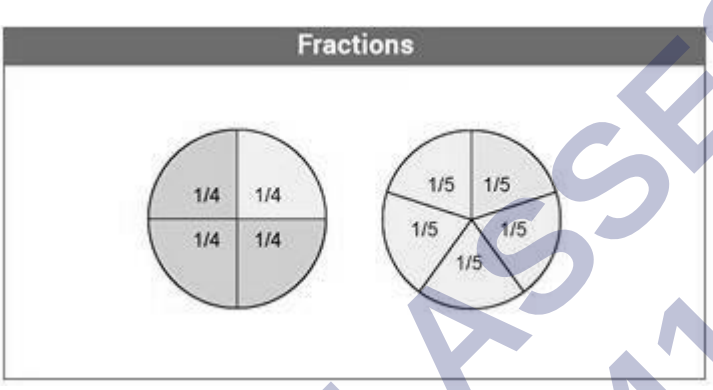
Chapter 2: Fractions and Decimals

Fractions and Decimals

Introduction: Fractions

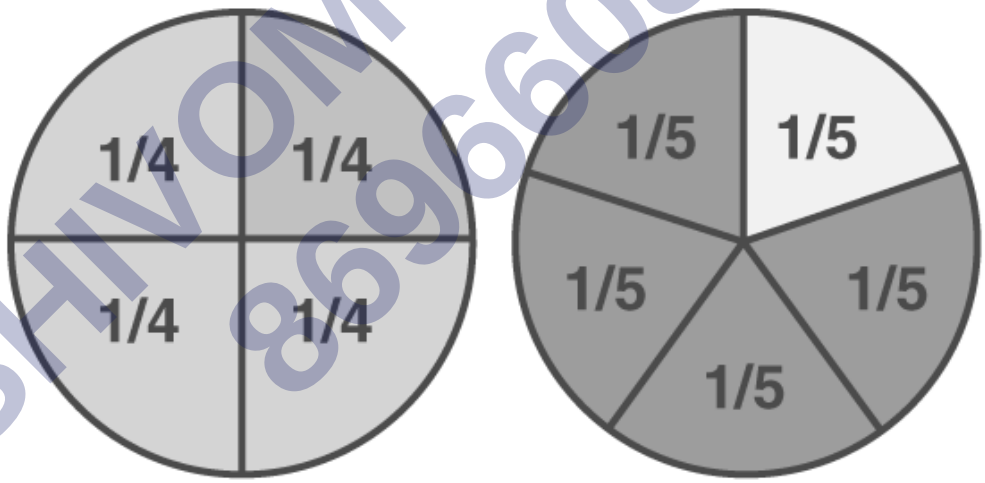
The word fraction derives from the Latin word “Fractus” meaning broken. It represents a part of a whole, consisting of a number of equal parts out of a whole.

E.g. : slices of a pizza.



10, 39, 389

To know more about Fractions, visit here.



Fractions play an important part in our daily lives. There are many examples of fractions you will come across in real life. We have to willingly or unwillingly share that yummy pizza amongst our friends and families. Three people, four slices. If you learn and visualize fractions in an easy way, it will be more fun and exciting. For example, slice an apple into two parts, then each part of the sliced apple will represent a fraction (equal to 1/2).

Parts of Fractions

The fractions include two parts, numerator and denominator.

- **Numerator:** It is the upper part of the fraction, that represents the sections of the fraction
- **Denominator:** It is the lower or bottom part that represents the total parts in which the fraction is divided.

Example: If $\frac{3}{4}$ is a fraction, then 3 is the numerator and 4 is the denominator.

Properties of Fractions

Similar to real numbers and whole numbers, a fractional number also holds some of the important properties. They are:

- Commutative and associative properties hold true for fractional addition and multiplication
- The identity element of fractional addition is 0, and fractional multiplication is 1
- The multiplicative inverse of a/b is b/a, where a and b should be non zero elements
- Fractional numbers obey the distributive property of multiplication over addition

Types of Fractions

Based on the properties of numerator and denominator, fractions are sub-divided into different types. They are:

- Proper fractions
- Improper fractions
- Mixed fractions
- Like fractions
- Unlike fractions
- Equivalent fractions

Proper Fractions

The proper fractions are those where the numerator is less than the denominator. For example, $\frac{8}{9}$ will be a proper fraction since “numerator < denominator”.

Improper Fractions

The improper fraction is a fraction where the numerator happens to be greater than the denominator. For example, $\frac{9}{8}$ will be an improper fraction since "numerator > denominator".

Mixed Fractions

A mixed fraction is a combination of the integer part and a proper fraction. These are also called mixed numbers or mixed numerals. For example:

$$3\frac{2}{3} = \frac{[(3 \times 3) + 2]}{3} = \frac{11}{3}$$

Like Fractions

Like fractions are those fractions, as the name suggests, that are alike or same.

For example, take $\frac{1}{2}$ and $\frac{2}{4}$; they are alike since if you simplify it mathematically, you will get the same fraction.

Unlike Fractions

Unlike fractions, are those that are dissimilar.

For example, $\frac{1}{2}$ and $\frac{1}{3}$ are unlike fractions.

Equivalent Fractions

Two fractions are equivalent to each other if after simplification either of two fractions is equal to the other one.

For example, $\frac{2}{3}$ and $\frac{4}{6}$ are equivalent fractions.

Since, $\frac{4}{6} = \frac{(2\times2)}{(2\times3)} = \frac{2}{3}$

Unit Fractions

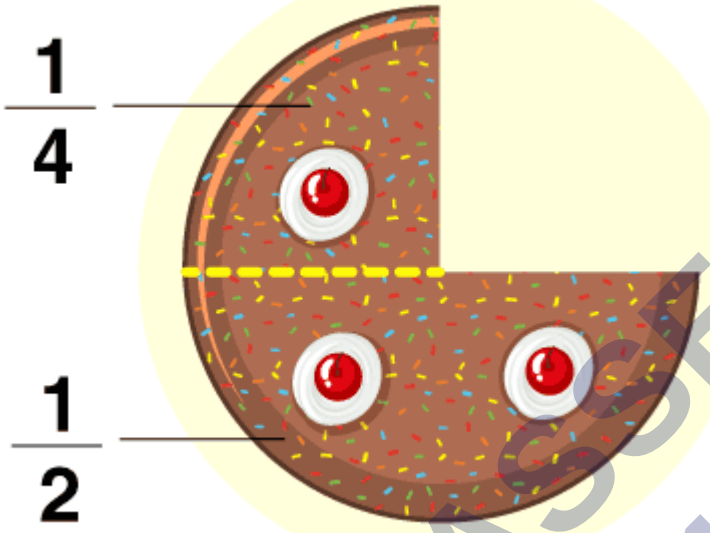
A fraction is known as a unit fraction when the numerator is equal to 1.

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

One-third of whole $= \frac{1}{3}$

One-fourth of whole $= \frac{1}{4}$

One-fifth of whole $= \frac{1}{5}$



Representation of Fractions

A fraction is represented by 2 numbers on top of each other, separated by a line. The number on top is the numerator and the number below is the denominator. Example: 34 which basically means 3 parts out of 4 equal divisions.

2,89,285

Fraction on a Number Line

We have already learned to represent the integers, such as 0, 1, 2, -1, -2, on a number line. In the same way, we can represent fractions on a number line.

For example, if we have to represent 1/5 and 3/5 parts of a whole, then it can be represented as shown in the below figure.

Since the denominator is equal to 5, thus 1 is divided into 5 equal parts, on the number line. Now the first section is $\frac{1}{5}$ and the third section is $\frac{3}{5}$.

Similarly, you can practice marking more of the fractions on the number line, such as $\frac{1}{2}, \frac{1}{4}, \frac{2}{11}, \frac{3}{7}$, etc.

Multiplication of Fractions

Multiplication of a fraction by a whole number:

Example 1: $7 \times \left(\frac{1}{3}\right) = \frac{7}{3}$

Example 2: $5 \times \left(\frac{7}{45}\right) = \frac{35}{45}$, Dividing numerator and denominator by 5, we get $\frac{7}{9}$

Multiplication of a fraction by a fraction is basically product of numerators/product of denominators

Example 1: $\left(\frac{3}{5}\right) \times \left(\frac{12}{13}\right) = \left(\frac{36}{65}\right)$

Example 2: Multiplication of mixed fractions

$$4\frac{2}{3} \times 1\frac{1}{7}$$

First convert mixed fractions to improper fractions and then multiply

$$\frac{14}{3} \times \frac{8}{7}$$

Fraction as an Operator 'Of'

The 'of' operator basically implies multiplication.

Example: $\frac{1}{6}$ of $18 = \left(\frac{1}{6}\right) \times 18 = \frac{18}{6} = 3$

Or, $\frac{1}{2}$ of $11 = \left(\frac{1}{2}\right) \times 11 = \frac{11}{2}$

To know more about Multiplication of Fractions, visit here.

Division of Fractions

Reciprocal of a Fraction

Reciprocal of any number n is written as 1n

Reciprocal of a fraction is obtained by interchanging the numerator and denominator.

Example: Reciprocal of $\frac{2}{5}$ is $\frac{5}{2}$

Although zero divided by any number means zero itself, we cannot find reciprocals for them, as a

number divided by 0 is undefined.

Example: Reciprocal of $\frac{0}{7} \neq \frac{7}{0}$

Division of Fractions

Division of a whole number by a fraction: we multiply the whole number with the reciprocal of the fraction.

Example: $63 \div \left(\frac{7}{5}\right) = 63 \times \left(\frac{5}{7}\right) = \frac{9}{5} = 45$

Division of a fraction by a whole number: we multiply the fraction with the reciprocal of the whole number.

Example: $\left(\frac{8}{11}\right) \div 4 = \left(\frac{8}{11}\right) \times \left(\frac{1}{4}\right) = \frac{2}{11}$

Division of a fraction by another fraction: We multiply the dividend with the reciprocal of the divisor.

Example: $\left(\frac{2}{7}\right) \div \left(\frac{5}{21}\right) = \left(\frac{2}{7}\right) \times \left(\frac{21}{5}\right) = \frac{6}{5}$

To know more about Reciprocal and Division of Fractions, visit here.

Decimals

Introduction: Decimal

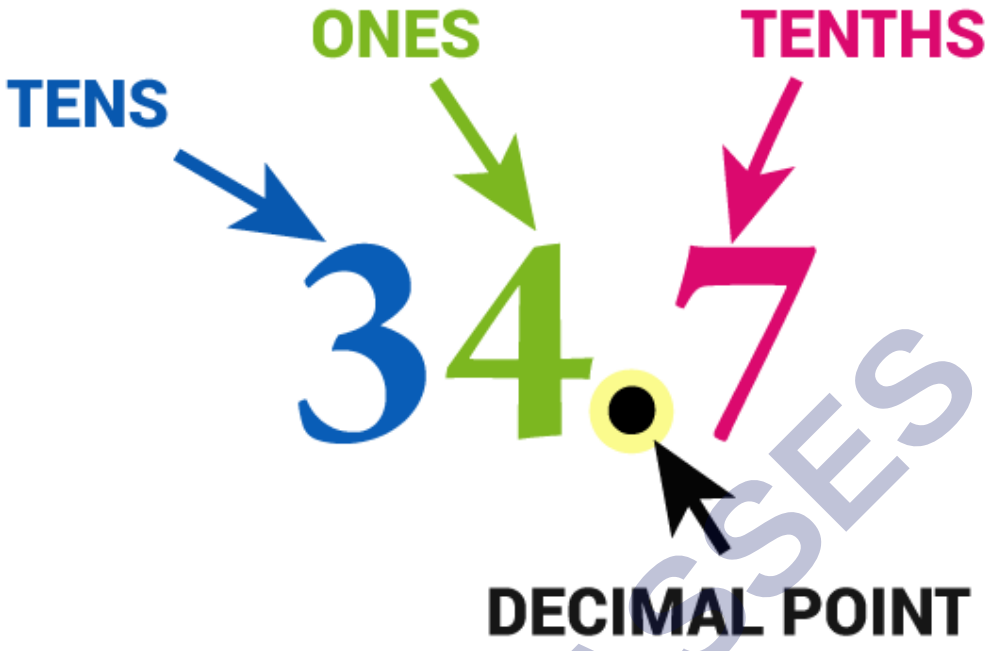
In Algebra, decimals are one of the types of numbers, which has a whole number and the fractional part separated by a decimal point. The dot present between the whole number and fractions part is called the decimal point. For example, 34.5 is a decimal number.

Here, 34 is a whole number part and 5 is the fractional part.

"." is the decimal point.

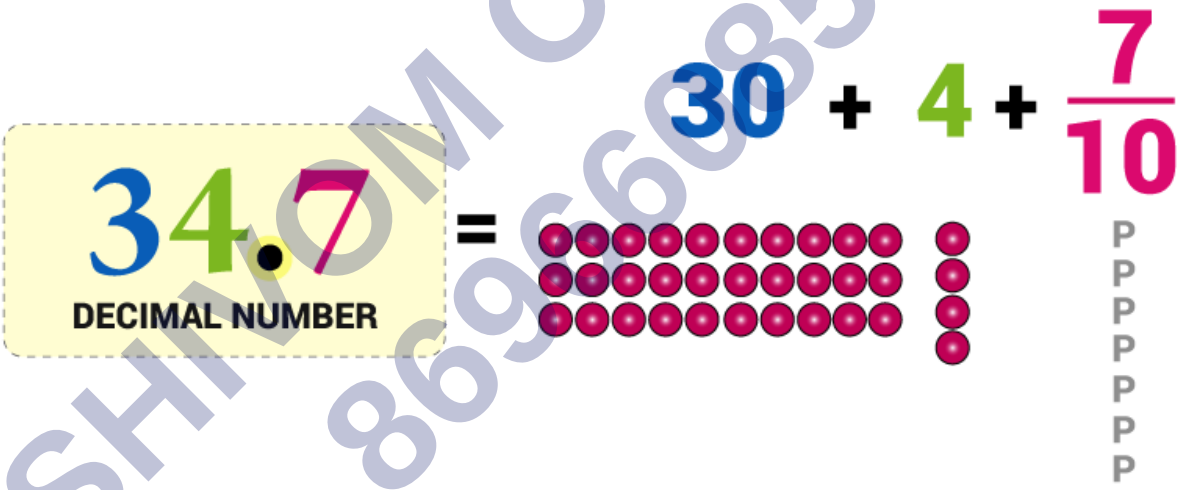
Let us discuss some other examples.

Here is the number "thirty-four and seven-tenths" written as a decimal number:

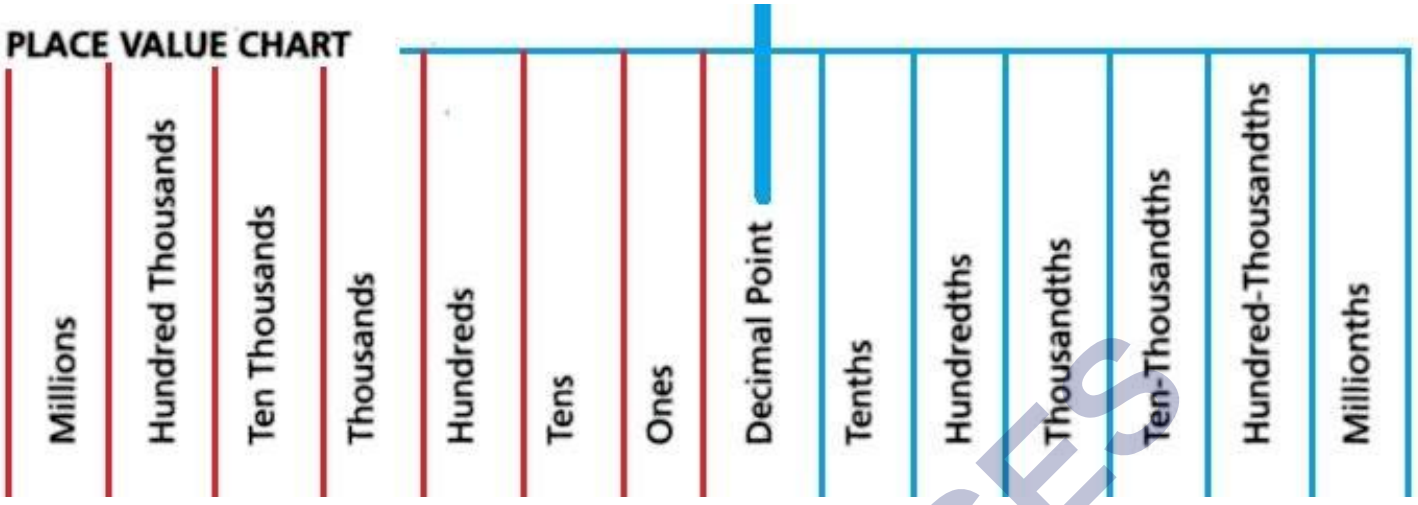


The decimal point goes between Ones and Tenths

34.7 has 3 Tens, 4 Ones and 7 Tenths



Decimal numbers are used to represent numbers that are smaller than the unit 1. Decimal number system is also known as base 10 system since each place value is denoted by a power of 10.



Decimals

A decimal number refers to a number consisting of the following two parts:

(i) Integral part (before the decimal point)

(ii) Fractional Part (after the decimal point).

These both are separated by a decimal separator(.) called the decimal point.

A decimal number is written as follows: Example 564.8 or 23.97.

The numbers to the left of the decimal point increase with the order of 10, while the numbers to the right of the point increase with the decrease order of 10.

The above example 564.8 can be read as 'five hundred and sixty four and eight tenths'

$\Rightarrow 5 \times 100 + 6 \times 10 + 4 \times 1 + 8 \times \left(\frac{1}{10}\right)$

A fraction can be written as a decimal and vice-versa. Example: $\frac{3}{2}$ 1.5 or $1.5 = \frac{15}{10} = \frac{3}{2}$

Multiplication of Decimals

Multiplication of decimal numbers with whole numbers:

Multiply them as whole numbers. The product will contain the same number of digits after the decimal point as that of the decimal number.

E.g : 11.3 × 4 = 45.2

Multiplication of decimals with powers of 10:

If a decimal is multiplied by a power of 10, then the decimal point shifts to the right by the number of zeros in its power.

E.g : 45.678 × 10 = 456.78 (decimal point shifts by 1 place to the right) or, 45.678 × 1000 = 45678 (decimal point shifts by 3 places to the right)

Multiplication of decimals with decimals:

Multiply the decimal numbers without decimal points and then give decimal point in the answer as many places same as the total number of places right to the decimal points in both numbers.

E.g:

	23.053
x	6.65
	153.30245

Division of Decimals

Dividing a decimal number by a whole number:

Example: $\frac{45.2}{55}$

Step 1. Convert the Decimal number into Fraction: $45.25 = \frac{4525}{100}$

Step 2. Divide the fraction by the whole number: $\left(\frac{4525}{100}\right) \div 5 = \left(\frac{4525}{100}\right) \times \left(\frac{1}{5}\right) = 9.5$

Dividing a decimal number by a decimal number:

Example 1: $\frac{45.25}{0.5}$

Step 1. Convert both the decimal numbers into fractions: $45.25 = \frac{4525}{100}$ and $0.5 = \frac{5}{10}$

Step 2. Divide the fractions: $\left(\frac{4525}{100}\right) \div \left(\frac{5}{10}\right) = \left(\frac{4525}{100}\right) \times \left(\frac{10}{5}\right) = 90.5$

Example 2:

2.02	208.666
It can be written as :	__103.3
202	20866.6
	202
	__666
	__606
	___606
	___606
	____0

Dividing a decimal number by a decimal number

Dividing a decimal number by powers of 10 :

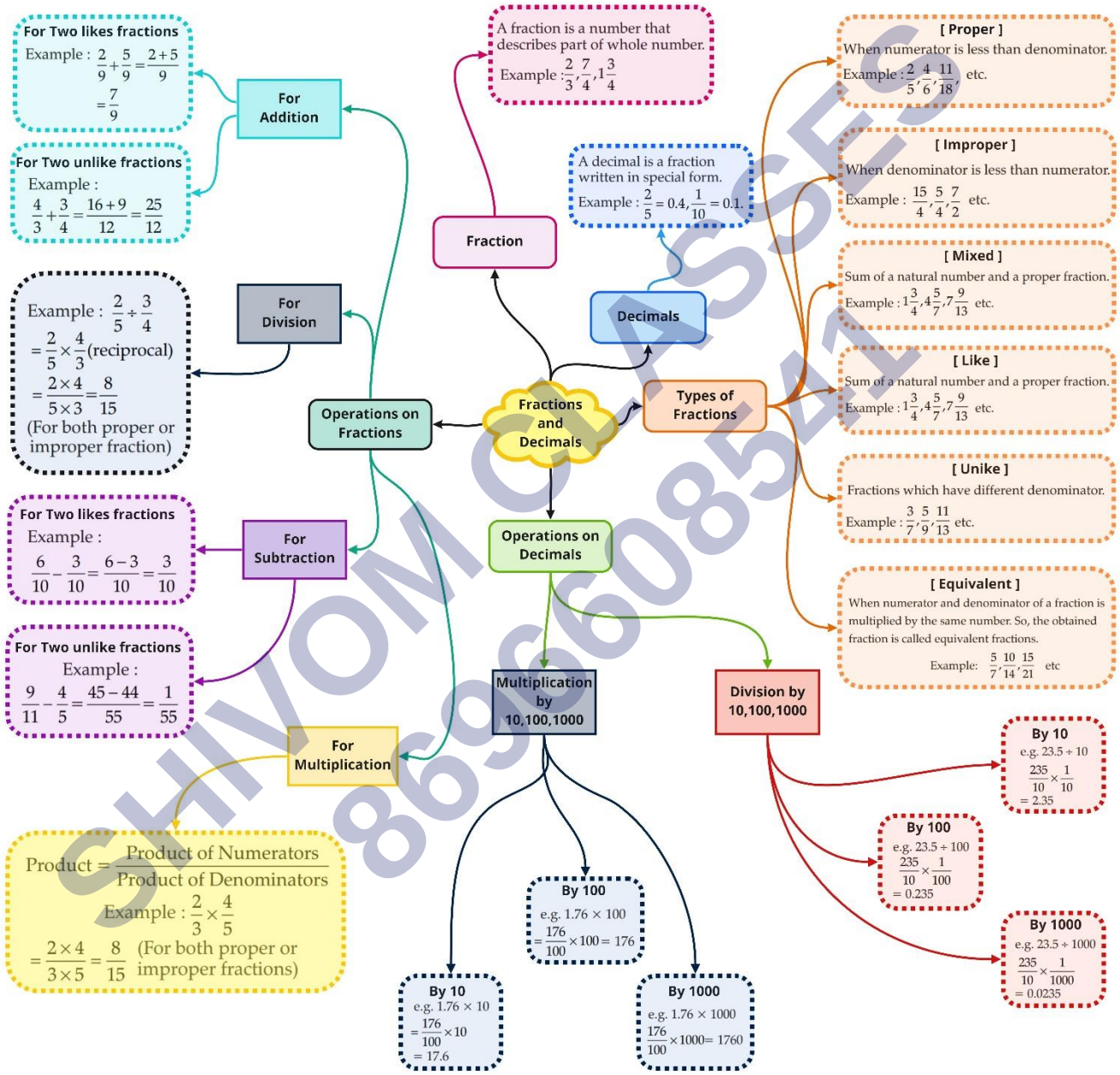
If a decimal is divided by a power of 10, then the decimal point shifts to the left by the number of zeros present in the power of 10.

Example: 98.765 ÷ 100 = 0.98765 Infinity

When the denominator in a fraction is very very small (almost tending to 0), then the value of the fraction tends towards infinity.

E.g: 999999/0.000001 = 999999000001 ≈ a very large number, which is considered to be ∞

Class : 7th mathematics
Chapter-2 : Fractions and Decimals



Important Questions

Multiple Choice Questions:

Question 1. What is $\frac{1}{7}$ of 49 litres?

a) 11

b) 51

c) 71

d) 61

Question 2. Find $\frac{2}{7} \times 3$.

a) $\frac{5}{7}$

b) $\frac{6}{7}$

c) $\frac{1}{7}$

d) none of these

Question 3. If 43m =0.086 then m has the value

a) 0.002

b) 0.02

c) 2

d) 0.2

Question 4. Write the place value of 2 in the following decimal numbers : 2.56

a) 5

b) .06

c) 2

d) None of these

Question 5. 0.01 × 0.01 = _____

a) 0.0001

b) 0.001

c) 1

d) 0.1

Question 6. Find 0.2 x 0.3

a) 0.6

b) 0.06

c) 6

d) None of these

Question 7. Which of the following is an improper fraction?

a) $\frac{20}{70}$

b) $\frac{30}{40}$

c) $\frac{50}{20}$

d) $\frac{70}{80}$

Question 8. What is $\frac{1}{2}$ of 10.

a) 6

b) 4

c) 3

d) 5

Question 9. Find the area of rectangle whose length is 6.7 cm and breadth is 2 cm.

a) 13 cm^2

b) 13.4 cm^2

c) 13.8 cm^2

d) 14 cm^2

Question 10. Express 5 cm in metre.

a) .05

b) .5

c) .005

d) None of these

Question 11. Which amongst the following is the largest?

|-89|, -89, -21, |-21|

a) -89

b) -21

c) |-89|

d) |-21|

Question 12. The side of an equilateral triangle is 3.5 cm. Find its perimeter.

a) 10.5 cm

b) 1.05 cm

c) 105 cm

d) None of these

Question 13. Provide the number in the box ≅ such that $\frac{3}{5} \times \cong = \frac{24}{75}$.

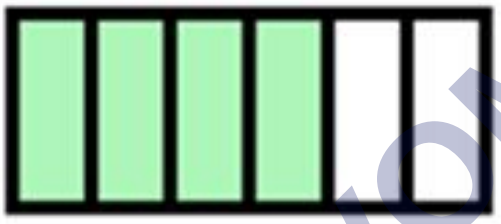
a) $\frac{7}{15}$

b) $\frac{8}{15}$

c) $\frac{5}{3}$

d) none of these

Question 14. What is the fraction of the shaded area?



a) $\frac{2}{3}$

b) $\frac{1}{3}$

c) $\frac{1}{4}$

d) None of these

Question 15. Which of the following is a proper fraction?

a) $\frac{28}{15}$

b) $\frac{21}{23}$

c) $\frac{16}{7}$

d) $\frac{34}{3}$

Very Short Questions:

1. If $\frac{2}{3}$ of a number is 6, find the number.
2. Find the product of $\frac{6}{7}$ and $2\frac{2}{3}$.
3. Solve the following:

   $\frac{2}{3}+\frac{4}{5}\div\frac{2}{5}-3$
4. Multiply 2.05 and 1.3.
5. Solve:

   (i) $2-\frac{3}{5}$ (ii) $4+\frac{7}{8}$ (iii) $\frac{3}{5}+\frac{2}{7}$
6. Solve the following:

   (a) $3-\frac{2}{3}$

   (b) $4+\frac{2}{5}$
7. Arrange the following in descending order:

   (i) $\frac{2}{9},\frac{2}{3},\frac{8}{21}$ (ii) $\frac{1}{5},\frac{3}{7},\frac{7}{10}$

Short Questions:

1. Arrange the following in ascending order:

   (i) $\frac{2}{7},\frac{3}{5},\frac{5}{6}$ (ii) $\frac{1}{5},\frac{3}{7},\frac{7}{10},\frac{1}{6}$
2. Find the products:

   (i) 2.4 × 100

   (ii) 0.24 × 1000

   (iii) 0.024 × 10000
3. Arnav spends $1\frac{3}{4}$ hours in studies, $2\frac{1}{2}$ hours in playing cricket. How much time did he spend in all?
4. A square paper sheet has $10\frac{2}{5}$ cm long side. Find its perimeter and area.

5. Find the value of $\frac{1}{3\frac{3}{5}} + \frac{1}{4\frac{8}{9}} + \frac{1}{\frac{3}{5}}$

6. The product of two numbers is 2.0016. If one of them is 0.72, find the other number.

7. Reemu reads 15th pages of a book. If she reads further 40 pages, she would have read $\frac{7}{10}$th page of the book. How many pages are left to be read?

8. $\frac{1}{8}$ of a number equals $\frac{2}{5} \div \frac{1}{20}$. What is the number?

Long Questions:

1. Simplify the following:

$(i)\ \frac{2\frac{1}{2}+\frac{1}{5}}{2\frac{1}{2}\div\frac{1}{5}}$ $(ii)\ \frac{\frac{1}{4}+\frac{1}{5}}{1-\frac{3}{8}\times\frac{3}{5}}$

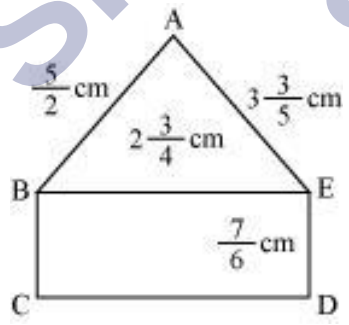
2. The weight of an object on the Moon is $\frac{1}{6}$ its weight on the Earth. If an object weight $5\frac{3}{5}$ kg on the Earth. How much would it weight on the Moon?

3. A picture hall has seats for 820 persons. At a recent film show, one usher guessed it was $\frac{3}{4}$ full, another that it was $\frac{2}{3}$ full. The ticket office reported 648 sales. Which usher (first or second) made the better guess?

4. A rectangular sheet of paper is $12\frac{1}{2}$ cm long and $10\frac{2}{3}$ cm wide.

   Find its perimeter.

5. Find the perimeters of (i) ΔABE (ii) the rectangle BCDE in this figure. Whose perimeter is greater?



Assertion and Reason Questions:

1) **Assertion:** fraction is a number expressed as a quotient, in which a numerator is divided by a denominator.

Reason: 4/11 is a fraction.

a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c.) assertion is true but the reason is false.

d.) both assertion and reason are false.

2) **Assertion:** 2/7 is an improper fraction.

Reason: in improper fraction numerator is greater than denominator.

a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c.) assertion is true but the reason is false.

d.) both assertion and reason are false.

ANSWER KEY -

Multiple Choice Questions:

1. (c) 71
2. (b) $\frac{6}{7}$
3. (a) 0.002
4. (c) 2
5. (a) 0.0001
6. (b) 0.06
7. (c) $\frac{50}{20}$
8. (d) 5
9. (b) 13.4 cm^2
10. (a) .05
11. (c) |-89|
12. (a) 10.5 cm
13. (b) $\frac{8}{15}$
14. (a) $\frac{2}{3}$
15. (b) $\frac{21}{23}$

Very Short Answer:

1. Let x be the required number.

$\therefore \frac{2}{3} of\ x = 6$

$\Rightarrow \frac{2}{3} \times x = 6$

$\Longrightarrow x = 6 \div \frac{2}{3} = 6 \times \frac{3}{2} = 3 \times 3 = 9$

Hence, the required number is 9.

2. $\frac{6}{7} \times 2\frac{2}{3} = \frac{6}{7} \times \frac{8}{3} = \frac{2 \times 8}{7 \times 1}$

$$= \frac{16}{7} = 2\frac{2}{7}$$

3.

$$= \frac{2}{3} + \frac{4}{5} + \frac{2}{5} - 3 = \frac{2}{3} + \frac{4}{5} \times \frac{5}{2} - 3$$

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

4.

$$2.05 \times 1.3 = \frac{205}{100} \times \frac{13}{10} = \frac{2665}{1000} = 2.665$$

5.

$$(i)\ 2 - \frac{3}{5} = \frac{2 \times 5}{5} - \frac{3}{5} = \frac{10-3}{5} = \frac{7}{5}$$

$$(ii)\ 4 + \frac{7}{8} = \frac{4 \times 8}{8} + \frac{7}{8} = \frac{(4 \times 8) + 7}{8} = \frac{39}{8} = 4\frac{7}{8}$$

$$(iii)\ \frac{3}{5} + \frac{2}{7} = \frac{3 \times 7}{5 \times 7} + \frac{2 \times 5}{7 \times 5} = \frac{21 + 10}{35} = \frac{31}{35}$$

6.

$$(a)\ 3 - \frac{2}{3} = \frac{3}{1} - \frac{2}{3} = \frac{3 \times 3 - 2 \times 1}{3}$$

$$= \frac{9-2}{3} = \frac{7}{3} = 2\frac{1}{3}$$

$$(b)\ 4 + \frac{2}{5} = \frac{4}{1} + \frac{2}{5} = \frac{4 \times 5 + 2 \times 1}{5}$$

$$= \frac{20+2}{5} = \frac{22}{5} = 4\frac{2}{5}$$

7.

$$(i)\ \frac{2}{9}, \frac{2}{3}, \frac{8}{21}$$

Changing them to like fractions, we obtain

$$\frac{2}{9} = \frac{2 \times 7}{9 \times 7} = \frac{14}{63}$$

$$\frac{2}{3}=\frac{2\times 21}{3\times 21}=\frac{42}{63}$$

$$\frac{8}{21}=\frac{8\times 3}{21\times 3}=\frac{24}{63}$$

Since 42 > 24 > 14,

$$\therefore \frac{2}{3}>\frac{8}{21}>\frac{2}{9}$$

(ii) $\frac{1}{5},\frac{3}{7},\frac{7}{10}$

Changing them to like fractions, we obtain

$$\frac{1}{5}=\frac{1\times 14}{5\times 14}=\frac{14}{70}$$

$$\frac{3}{7}=\frac{3\times 10}{7\times 10}=\frac{30}{70}$$

$$\frac{7}{10}=\frac{7\times 7}{10\times 7}=\frac{49}{70}$$

$As\ 49>30>14,$

$$\therefore \frac{7}{10}>\frac{3}{7}>\frac{1}{5}$$

Short Answer:

1.

(*i*) We have $\frac{2}{7}, \frac{3}{5}$ and $\frac{5}{6}$

LCM of 7, 5 and 6 = 210

$\therefore \quad \frac{2}{7} \times \frac{30}{30} = \frac{60}{210}$

$\frac{3}{5} \times \frac{42}{42} = \frac{126}{210}$

$\frac{5}{6} \times \frac{35}{35} = \frac{175}{210}$

2	7, 5, 6
3	7, 5, 3
5	7, 5, 1
7	7, 1, 1
	1, 1, 1

LCM = 2 × 3 × 5 × 7
= 210

Since, the denominators are same.

$\therefore$ 175 > 126 > 60

Hence, the required order is

$$\frac{5}{6} > \frac{3}{5} > \frac{2}{7}$$

(*ii*) We have $\frac{1}{5}, \frac{3}{7}, \frac{7}{10}$ and $\frac{1}{6}$

LCM of 5, 7, 10 and 6 = 210

$\frac{1}{5} \times \frac{42}{42} = \frac{42}{210}$

$\frac{3}{7} \times \frac{30}{30} = \frac{90}{210}$

$\frac{7}{10} \times \frac{21}{21} = \frac{147}{210}$

2	5, 7, 10, 6
3	5, 7, 5, 3
5	5, 7, 5, 1
7	1, 7, 1, 1
	1, 1, 1, 1

LCM = 2 × 3 × 5 × 7
= 210

$\frac{1}{6} \times \frac{35}{35} = \frac{35}{210}$

Since, the denominator are same.

$\therefore$ 147 > 90 > 42 > 35

Hence, the required order is $\frac{7}{10} > \frac{3}{7} > \frac{1}{5} > \frac{1}{6}$.

2.

(*i*) $2.4 \times 100 = \frac{24}{1\cancel{0}} \times 10\cancel{0} = 24 \times 10 = 240$

(*ii*) $0.24 \times 1000 = \frac{24}{1\cancel{00}} \times 10\cancel{00} = 24 \times 10 = 240$

(*iii*) $0.024 \times 10000 = \frac{24}{1\cancel{000}} \times 10\cancel{000}$

$= 24 \times 10 = 240$

3. Time spent by Arnav in studies = $1\frac{3}{4}$ hours

Time spent by Arnav in playing cricket = $2\frac{1}{2}$ hours

Total time spent by Arnav = $1\frac{3}{4}$ hours + $2\frac{1}{2}$ hours

$$= \left(\frac{7}{4} + \frac{5}{2}\right) \text{ hours} = \left(\frac{7 \times 1 + 5 \times 2}{4}\right) \text{hours}$$

$$= \left(\frac{7 + 10}{4}\right) \text{ hours} = \frac{17}{4} \text{ hours or } 4\frac{1}{4} \text{ hours}$$

4.

Length of the side of the square sheet

$$= 10\frac{2}{5} \text{ cm} = \frac{52}{5} \text{ cm}$$

$$\text{Perimeter} = 4 \times \text{side} = 4 \times \frac{52}{5}$$

$$= \frac{208}{5} \text{ cm} = 41\frac{3}{5} \text{ cm}$$

$$\text{Area} = \text{Side} \times \text{Side} = 10\frac{2}{5} \times 10\frac{2}{5}$$

$$= \frac{52}{5} \times \frac{52}{5} = \frac{2704}{25}$$

$$= 108\frac{4}{25} \text{ cm}^2$$

```
5) 208 (41
  -20
   ---
    8
   -5
   ---
    3
```

```
25) 2704 (108
  -25
   ---
   204
  -204
   ---
     4
```

5.

$$\frac{1}{3\frac{3}{5}}+\frac{1}{4\frac{8}{9}}+\frac{1}{\frac{3}{5}}=\frac{1}{\left(\frac{18}{5}\right)}+\frac{1}{\left(\frac{44}{9}\right)}+\frac{1}{\left(\frac{3}{5}\right)}$$

$$=\frac{5}{18}+\frac{9}{44}+\frac{5}{3}$$

2	18, 44, 3
2	9, 22, 3
3	9, 11, 3
3	3, 11, 1
11	1, 11, 1
	1, 1, 1

$\therefore$ LCM $= 2 \times 2 \times 3 \times 3 \times 11 = 396$

$$=\frac{5\times 22+9\times 9+5\times 132}{396}$$

$$=\frac{110+81+660}{396}$$

$$=\frac{851}{396}=2\frac{59}{396}$$

$$396\overline{)851}\,(2$$
$$-792$$
$$59$$

Hence, the required value is $2\frac{59}{396}$.

6. Product of two numbers = 2.0016

One number = 0.72

Other number = 2.0016 ÷ 0.72

$$=\frac{2.0016}{0.72}=\frac{20016}{10000}\times\frac{100}{72}$$

$$=\frac{139}{50}=\frac{139\times 2}{50\times 2}=\frac{278}{100}=2.78$$

Hence, the required number = 2.78.

7. Let the total number of pages be x.

Number of pages read by Reemu $= \frac{1}{5x}$

If she reads 40 more pages,

Total number of pages read by her $= \frac{1}{5}x + 40$

$$\frac{7}{10}x = \frac{1}{5}x + 40 \Rightarrow \frac{7}{10}x - \frac{1}{5}x = 40$$

$$\Rightarrow \frac{7x - 2x}{10} = 40 \Rightarrow \frac{5x}{10} = 40$$

$$\Rightarrow x = 40 \div \frac{5}{10} = 40 \times \frac{\cancel{10}^{2}}{\cancel{5}} = 80$$

Hence, the required number of pages = 80.

8. Let the number be x.

$$\therefore \frac{1}{8} \text{ of } x = \frac{2}{5} \div \frac{1}{20}$$

$$\Rightarrow \frac{1}{8} \times x = \frac{2}{\cancel{5}} \times \frac{\cancel{20}^{4}}{1}$$

$$\Rightarrow \frac{1}{8}x = 2 \times 4 \Rightarrow \frac{1}{8}x = 8$$

$$\Rightarrow x = 8 \times 8 = 64$$

Hence, the required number = 64.

Long Answer:

1.

$$(i)\ \frac{2\frac{1}{2} + \frac{1}{5}}{2\frac{1}{2} \div \frac{1}{5}} = \frac{\frac{5}{2} + \frac{1}{5}}{\frac{5}{2} \div \frac{1}{5}} = \frac{\frac{5 \times 5 + 1 \times 2}{10}}{\frac{5}{2} \times \frac{5}{1}}$$

$$= \frac{\frac{25 + 2}{10}}{\frac{25}{2}} = \frac{27}{\cancel{10}_{5}} \times \frac{\cancel{2}}{25} = \frac{27}{125}$$

$$(ii)\ \frac{\frac{1}{4} + \frac{1}{5}}{1 - \frac{3}{8} \times \frac{3}{5}} = \frac{\frac{5 + 4}{20}}{1 - \frac{9}{40}} = \frac{\frac{9}{20}}{\frac{40 - 9}{40}} = \frac{\frac{9}{20}}{\frac{31}{40}}$$

$$= \frac{9}{\cancel{20}} \times \frac{\cancel{40}^{2}}{31} = \frac{9 \times 2}{31} = \frac{18}{31}$$

2. Weight of the object on the Earth

$$= 5\frac{3}{5} \text{ kg} = \frac{28}{5} \text{ kg}$$

∴ Weight of the object on the Earth

$$= \frac{1}{\cancel{6}_{3}} \times \frac{\cancel{28}^{14}}{5} \text{ kg} = \frac{14}{15} \text{ kg}$$

Hence, the required weight $= \frac{14}{15}$ kg.

3. Total number of seats = 820

Number of ticket sold = 648

For first usher $= \frac{3}{4} \times 648 = 3 \times 162 = 486$

For second usher $= \frac{2}{3} \times 648 = 2 \times 216 = 432$

Since 432 < 486

Hence, the first usher guessed better.

4. Length $= 12\frac{1}{2}\text{cm} = \frac{25}{2}\text{cm}$

Breadth $= 10\frac{2}{3}\text{cm} = \frac{32}{2}\text{cm}$

Perimeter = 2 × (Length + Breadth)

$$= 2\times\left[\frac{25}{2}+\frac{32}{3}\right] = 2\times\left[\frac{(25\times3)+(32\times2)}{6}\right] = 2\times\left[\frac{75+64}{6}\right]$$
$$= 2\times\frac{139}{6} = \frac{139}{3} = 46\frac{1}{3}\text{cm}$$

5. (i) Perimeter of ΔABE = AB + BE + EA

$$= \left(\frac{5}{2}+2\frac{3}{4}+3\frac{3}{5}\right) = \left(\frac{5}{2}+\frac{11}{4}+\frac{18}{5}\right)$$
$$= \left(\frac{5\times10}{2\times10}+\frac{11\times5}{4\times5}+\frac{18\times4}{5\times4}\right)$$
$$= \frac{50+55+72}{20} = \frac{177}{20} = 8\frac{17}{20}\text{cm}$$

(ii) Perimeter of rectangle = 2 (Length + Breadth)

$$\text{Perimeter of rectangle} = 2\left[\frac{11}{4}+\frac{7}{6}\right]$$
$$= 2\left[\frac{11\times3}{4\times3}+\frac{7\times2}{6\times2}\right] = 2\left[\frac{33+14}{12}\right]$$
$$= 2\times\frac{47}{12} = \frac{47}{6} = 7\frac{5}{6}\text{cm}$$

Perimeter of ΔABE $= \frac{177}{20}\text{cm}$

Changing them to like fractions, we obtain

$$\frac{177}{20} = \frac{177\times3}{20\times3} = \frac{531}{60}$$
$$\frac{47}{6} = \frac{47\times10}{6\times10} = \frac{470}{60}$$

As 531 > 470,

$$\Rightarrow \frac{177}{20} > \frac{47}{6}$$

Perimeter (ΔABE) > Perimeter (BCDE)

Assertion and Reason Questions:

1) a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.

2) d) both assertion and reason are false.