

MATHEMATICS

Class-VII

Topic-02

FRACTIONS & DECIMALS



INDEX

S. No.	Topic	Page No.
1.	Theory	1 –15
2.	Exercise-1	16– 21
3.	Exercise-2	21– 23
4.	Exercise-3	23–27
5.	Answer Key	28 – 29

TERMINOLOGIES

Fraction, decimals fraction, vulgar fraction , proper fraction, improper fraction, mixed fraction, equivalent fractions, like fractions, unlike fractions, lowest term, decimals, like decimals, unlike decimals, non terminating decimals, mixed recurring decimals, pure recurring decimals.

INTRODUCTION

Lets understand this topic while sitting at pizza outlet.

Here is one whole pizza. But you can have half pizza, Right? Now how many halves will make one whole pizza ? Answer is 2. How about one quarter of a pizza? How many quarters will make one whole pizza? again answer is 4! So mainly the question is, what is that quantity that when multiply by 4 will give the whole one. Thats $\frac{1}{4}$, or what is the

quantity that when multiply by 2 will give one whole pizza? Its $\frac{1}{2}$. Now let's increase the number of friends for the share of pizza. Let there be 10 friends. Now each one will get $\frac{1}{10}$ th part of pizza. May be if you are having a big party and you have 5 pizzas and 17

friends, each one will get $\frac{5}{17}$ of a pizza. So we can say that,

A fraction is a part of whole. It is represented by a/b , where a and b are whole numbers and b is not equal to zero .Basically fraction describes how many part of a certain size there are. For e.g. one half ,eight-fifths, three quarters. The numerator represents a number of equal parts, and the denominator indicates how many of those parts make up a unit or a whole.

2.1 FRACTIONS

(a) Types and Comparison of Fractions

Decimal fraction : A fraction whose denominator is any of the numbers 10, 100, 1000, etc., is called a **decimal fraction**.

For example, each of the fractions $\frac{3}{10}$, $\frac{27}{100}$, $\frac{31}{1000}$ etc., is a decimal fraction.

Vulgar fraction : A fraction whose denominator is a whole number, other than 10, 100, 1000, etc., is called a **vulgar fraction**.

For example, $\frac{2}{9}$, $\frac{4}{13}$, $\frac{13}{20}$, $\frac{27}{109}$, etc., are all vulgar fractions.

Proper Fraction : A fraction whose numerator is less than the denominator is called a proper fraction.

For example, $\frac{7}{9}$, $\frac{3}{11}$, $\frac{2}{5}$ etc. are proper fractions.

Improper Fraction : A fraction whose numerator is more than or equal to the denominator is called an improper fraction.

For example, $\frac{17}{5}$, $\frac{47}{31}$, $\frac{195}{111}$ etc. are improper fractions.

Mixed Fraction : A combination of a whole number and a proper fraction is called a mixed fraction.

For example, $2\frac{3}{5}$, $7\frac{4}{15}$, $21\frac{6}{29}$ etc. are mixed fractions.

An important Property

If the numerator and denominator of a fraction are both multiplied by the same nonzero number, then its value is not changed.

Thus, $\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{3 \times 3}{4 \times 3} = \frac{3 \times 4}{4 \times 4}$, etc.

Equivalent Fractions : To get a fraction equivalent to a given fraction, we multiply (or divide) its numerator and denominator by the same non-zero number.

For example, $\frac{3 \times 2}{4 \times 2} = \frac{6}{8}$, $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$, $\frac{3 \times 4}{4 \times 4} = \frac{12}{16}$ etc. are equivalent fractions equivalent to the

fraction $\frac{3}{4}$.

If $\frac{a}{b}$ and $\frac{c}{d}$ are two equivalent fractions, then $a \times d = b \times c$ i.e., $\frac{a}{b} = \frac{c}{d} \Leftrightarrow a \times d = b \times c$.

Like Fractions : Fractions having the same denominators are called **like fractions**. Otherwise, they are called **unlike fractions**.

For example : $\frac{2}{15}$, $\frac{7}{15}$, $\frac{11}{15}$ etc. are like fractions.

For example : $\frac{2}{13}$, $\frac{7}{24}$, $\frac{9}{125}$ etc. are unlike fractions.

Lowest Term : A fraction is said to be in its lowest terms if its numerator and denominator have no common factor other than 1.

For example lowest term of $\frac{3}{9}$ is $\frac{1}{3}$.

(b) Conversion of Unlike fractions to Like fractions

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.

Illustration 2.1

Convert the unlike fractions $\frac{7}{6}$, $\frac{5}{9}$ and $\frac{5}{12}$ into like fractions.

Sol. We have,

LCM of (6, 9, 12) = $(3 \times 2 \times 3 \times 2) = 36$

Now, $\frac{7}{6} = \frac{7 \times 6}{6 \times 6} = \frac{42}{36}$, $\frac{5}{9} = \frac{5 \times 4}{9 \times 4} = \frac{20}{36}$ and $\frac{5}{12} = \frac{5 \times 3}{12 \times 3} = \frac{15}{36}$

Clearly $\frac{42}{36}$, $\frac{20}{36}$ and $\frac{15}{36}$ are like fractions.

(c) Comparison of 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.

Illustration 2.2

Which is larger $\frac{3}{4}$ or $\frac{5}{12}$?

Sol. Let us first find the LCM of 4 and 12.

We have,

$$\begin{array}{r|l} 2 & 4, 12 \\ \hline 2 & 2, 6 \\ 3 & 1, 3 \\ \hline & 1, 1 \end{array}$$

\therefore LCM of 4 and 12 is $2 \times 2 \times 3 = 12$

Now we convert the given fractions to equivalent fractions with denominator 12.

We have,

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$$

We know that $9 > 5$

$$\therefore \frac{9}{12} > \frac{5}{12} \Rightarrow \frac{3}{4} > \frac{5}{12}$$

Illustration 2.3

Out of $\frac{7}{15}, \frac{1}{6}, \frac{2}{3}, \frac{5}{6}$ which fraction is greater than $\frac{4}{15}$ and less than $\frac{7}{12}$?

Sol. On equalising the denominators we get $\frac{4}{15} = \frac{16}{60}$ and $\frac{7}{12} = \frac{35}{60}$.

$$\frac{7}{15} = \frac{28}{60}, \frac{1}{6} = \frac{10}{60}, \frac{2}{3} = \frac{40}{60} \text{ and } \frac{5}{6} = \frac{50}{60} .$$

So, it is clear that $\frac{7}{15}$ greater than $\frac{4}{15}$ and less than $\frac{7}{12}$.

Illustration 2.4

A fraction added to $\frac{3}{4}$ gives $\frac{4}{3}$. Find the fraction.

Sol. We have to subtract $\frac{3}{4}$ from $\frac{4}{3}$

$$\therefore \frac{4}{3} - \frac{3}{4} = \frac{16-9}{12} = \frac{7}{12} .$$



Ask yourself

- Convert $4\frac{5}{7}$ into an improper fraction.
- Write three equivalent fractions of $\frac{3}{4}$.
- Convert $\frac{91}{169}$ into lowest form.
- Compare the fraction $\frac{5}{8}$ and $\frac{7}{12}$.
- Arrange the fraction in ascending order: $\frac{3}{4}, \frac{5}{6}, \frac{7}{9}, \frac{11}{12}$.

Answers

- $\frac{33}{7}$
- $\frac{6}{8}, \frac{9}{12}, \frac{12}{16}$
- $\frac{7}{13}$
- $\frac{5}{8} > \frac{7}{12}$
- $\frac{3}{4} < \frac{7}{9} < \frac{5}{6} < \frac{11}{12}$

2.2 OPERATION ON FRACTIONS

(a) Addition and Subtraction of Fractions :

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.

Illustration 2.5

Simplify : (i) $\frac{15}{16} + \frac{11}{12}$ (ii) $\frac{11}{15} - \frac{7}{20}$

Sol. (i) LCM of 16 and 12 = $(4 \times 4 \times 3) = 48$

$$\therefore \frac{15}{16} + \frac{11}{12} = \frac{15 \times 3}{16 \times 3} + \frac{11 \times 4}{12 \times 4}$$

[Converting each fraction to an equivalent fraction with denominator 48]

$$= \frac{45}{48} + \frac{44}{48} = \frac{45+44}{48} = \frac{89}{48}$$

(ii) We have, (LCM of 15 and 20) = $(5 \times 3 \times 4) = 60$

$$\therefore \frac{11}{15} - \frac{7}{20} = \frac{11 \times 4}{15 \times 4} - \frac{7 \times 3}{20 \times 3}$$

[Converting each fraction to an equivalent fraction with denominator 60]

$$= \frac{44}{60} - \frac{21}{60} = \frac{44-21}{60} = \frac{23}{60}$$

(b) Multiplication of Fractions

$$\text{Product of two fraction} = \frac{\text{Product of their numerators}}{\text{Product of their denominators}}$$

Illustration 2.6

Multiply and reduce to lowest form (if possible).

(i) $\frac{4}{5} \times \frac{12}{7}$

(ii) $\frac{15}{16} \times \frac{10}{12}$

Sol. (i) $\frac{4}{5} \times \frac{12}{7} = \frac{4 \times 12}{5 \times 7} = \frac{48}{35}$ (ii) $\frac{15}{16} \times \frac{10}{12} = \frac{15 \times 10}{16 \times 12} = \frac{5 \times 5}{8 \times 4} = \frac{25}{32}$

(c) Division of fractions :

Reciprocal of a Fraction : 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 $\frac{b}{a}$.

For example, $\frac{3}{4}$ and $\frac{4}{3}$ are the reciprocals of each other, because $\frac{3}{4} \times \frac{4}{3} = 1$.

Division of fractions : 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 $\frac{c}{d}$.

i.e., $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$

For example, $\frac{3}{5} \div \frac{5}{9} = \frac{3}{5} \times \frac{9}{5} = \frac{3 \times 9}{5 \times 5} = \frac{27}{25}$

Illustration 2.7

If the cost of $5\frac{2}{5}$ litres of milk is Rs. $101\frac{1}{4}$, find its cost per litre.

Sol. Cost of $5\frac{2}{5}$ litres of milk = Rs $101\frac{1}{4}$ = Rs $\frac{405}{4}$

\Rightarrow Cost of $\frac{27}{5}$ litres of milk = $\frac{405}{4}$

\Rightarrow Cost of 1 litre of milk = Rs $\left(\frac{405}{4} \div \frac{27}{5}\right)$ = Rs $\left(\frac{405}{4} \times \frac{5}{27}\right)$
 = Rs $\left(\frac{405 \times 5}{4 \times 27}\right)$ = Rs $\left(\frac{75}{4}\right)$ = Rs $18\frac{3}{4}$.

Hence, the cost of milk is Rs $18\frac{3}{4}$ per litre.

Illustration 2.8

A tin contains 18 kg ghee. After consuming $\frac{2}{3}$ of it, how much ghee is left in the tin ?

Sol. Total quantity of ghee in the tin = 18 kg.

Quantity of ghee consumed = $\frac{2}{3}$ of 18 kg. = $\left(18 \times \frac{2}{3}\right)$ kg = 12 kg.

Quantity of ghee left in the tin = $(18 - 12)$ kg = 6 kg.

Ask yourself



- In a class of 40 students, $\frac{1}{5}$ of the total number of students like to eat rice only, $\frac{2}{5}$ of the total number of students like to eat chapati only and the remaining students like to eat both. What fractions of the total number of students like to eat both.
- The product of two fractions is 19. If one of them is $15\frac{5}{6}$, find the other.
- Simplify : $\frac{3}{19}$ of $\left[\frac{7}{9} + \left\{ \frac{3}{4} \div \left(\frac{1}{2} - \frac{1}{3} \right) \right\} \right]$.
- Length of rectangular field is $5\frac{1}{4}$ m and breadth is $1\frac{1}{7}$ m. Find the area of the rectangular field.
- A ribbon of length $5\frac{1}{4}$ m is cut into small pieces each of length $\frac{3}{4}$ m. Find the number of pieces.

Answers

1. $\frac{2}{5}$ 2. $\frac{6}{5}$ 3. $\frac{5}{6}$ 4. $40/7 \text{ m}^2$ 5. 7

2.3 DECIMALS

Decimals : Decimals are an extension of our number system. Decimals are fractions whose denominators are 10, 100, 1000 etc. A decimal has two parts, namely, the whole number part and decimal part.

Decimal Places : The number of digits contained in the decimal part of a decimal number is known as the number of **decimal places**.

For example :

3.75 has two decimal places and 85.325 has three decimal places.

Like and unlike decimals : Decimals having the same number of places are called like decimals, otherwise they are known as unlike decimals.

For example :

5.25, 15.04, 273.89 are like decimals and 9.5, 18.235, 20.0254 etc. are unlike decimals.

NOTE:

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. 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.

(a) Comparison of decimals

Decimal numbers may be compared by using the following steps :

Step I Obtain the decimal numbers.

Step II Compare the whole number parts of the numbers. The number with greater whole number part will be greater. If the whole number 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.

Illustration 2.9

Which is greater of 48.23 and 39.35 ?

Sol. The given decimals have distinct whole number parts, so we compare whole number parts only.

In 48.23, the whole number part is 48.

In 39.35, the whole number part is 39.

$$\therefore 48 > 39$$

$$\therefore 48.23 > 39.35$$

Illustration 2.10

Which is greater of 69.7 and 69.68 ?

Sol. The given decimals have same whole number parts, so we will compare the decimal parts.

In 69.7 decimal parts is 0.7

In 69.68 decimal part is 0.68

\therefore Extreme left digit of 0.7 is 7 and that of 0.68 is 6.

$$\therefore 69.7 > 69.68$$

Illustration 2.11

Write the following decimals in ascending order :

5.64, 2.54, 3.05, 0.259 and 8.32

Sol. Converting the given decimals into like decimals, we get :

5.640, 2.540, 3.050, 0.259 and 8.320

Clearly, $0.259 < 2.540 < 3.050 < 5.640 < 8.320$

Hence, the given decimals in the ascending order are

0.259, 2.54, 3.05, 5.64 and 8.32

(b) Conversion of decimal into fraction

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.

Illustration 2.12

Express the following decimals as fractions in lowest form :

(i) 3.75

(ii) 0.004.

Sol. (i) $3.75 = \frac{375}{100} = \frac{15}{4}$

(ii) $0.004 = \frac{4}{1000} = \frac{1}{250}$

(c) Conversion of Fraction into Decimal

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.

Illustration 2.13

Express the following fractions as decimals :

(i) $\frac{1359}{1000}$ (ii) $9\frac{1}{4}$.

Sol. (i) $\frac{1359}{1000} = 1.359$ (ii) $9\frac{1}{4} = 9 + \frac{1}{4} = 9 + \frac{25 \times 1}{25 \times 4} = 9 + \frac{25}{100} = 9 + 0.25 = 9.25$

Ask yourself _____



1. 2.13 and 3.15 are like decimal or not.
2. Which is greater of 103.2 and 103.17 ?
3. Write the following decimals in ascending order : 3.02 , 3.2 , 3.27 , 3.127 , 3.021
4. Express the decimal 2.12 as fractions in lowest form
5. Express the fraction $\frac{1234}{1000}$ as decimals

Answers

1. Yes 2. $103.2 > 103.17$ 3. $3.02 < 3.021 < 3.127 < 3.2 < 3.27$
4. $53/25$ 5. 1.234

2.4 OPERATION ON DECIMALS

(a) Addition and Subtraction of Decimals :

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.

Illustration 2.14

Add 15.44, 7.524 and 25.

Sol. Converting the given decimals to like decimals, we have 15.440, 7.524 and 25.000.
Now,

$$\begin{array}{r} 15.440 \\ + 7.524 \\ + 25.000 \\ \hline 47.964 \end{array}$$

Illustration 2.15

Aakash bought vegetables weighing 10 kg. Out of this 3 kg 500 g is onion, 2 kg 75 g is tomato and the rest is potato. What is the weight of potato ?

Sol. We have,
Weight of onion = 3 kg 500g = 3.500 kg
Weight of tomato = 2 kg 75g = 2.075 kg
∴ Total weight of onion and tomato is :

$$\begin{array}{r} 3.500 \text{ kg} \\ + 2.075 \text{ kg} \\ \hline 5.575 \text{ kg} \end{array}$$

Total weight of vegetables = 10 kg

Weight of potato is = 10 kg – 5.575 kg = 4.425 kg

(b) Multiplication of Decimals

(i) Multiplication of Decimals by 10, 100, 1000 etc. :

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.

Illustration 2.16

Find the following products :

(i) 27.05×10 (ii) 429.7×100

Sol. We have,

(i) $27.05 \times 10 = 270.5$ [Shifting the decimal point by one place to the right]

(ii) $429.7 \times 100 = 429.70 \times 100 = 42970$
[Shifting the decimal point by two places to the right]

(ii) Multiplication of a decimal by a whole number :

A decimal can be multiplied by a whole number by using the 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 there are in the given decimal.

Illustration 2.17

Find the product of 0.0275×17 .

Sol. We have,

$$275 \times 17 = 4675$$

$$\therefore 0.0275 \times 17 = 0.4675$$

(iii) Multiplication of a decimal by another decimal :

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.

Illustration 2.18

Find the product of 9.2 and 6.07.

Sol. We have,

$$\begin{array}{r}
 92 \\
 \times 607 \\
 \hline
 644 \\
 000 \\
 + 55200 \\
 \hline
 55844
 \end{array}$$

$$\therefore 92 \times 607 = 55844$$

Since the sum of the decimal places in the given decimals is $1 + 2 = 3$.

So, the product must contain 3 places of decimals. Hence $9.2 \times 6.07 = 55.844$

Illustration 2.19

Multiply 0.0345 by 0.0237

Sol. We have,

$$\begin{array}{r}
 345 \\
 \times 237 \\
 \hline
 2415 \\
 10350 \\
 + 69000 \\
 \hline
 81765
 \end{array}$$

$$\therefore 345 \times 237 = 81765$$

We observe that the sum of the decimals in the given decimals is $4 + 4 = 8$

So, the product must contain 8 places of decimals.

Hence, $0.0345 \times 0.0237 = 0.00081765$

(c) Dividing a decimal

(i) Dividing a decimal by 10, 100, 1000 etc. :

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.

Illustration 2.20

Divide

(i) 12.75 by 10 (ii) 1275.7 by 1000

Sol. (i) $12.75 \div 10 = \frac{12.75}{10} = 1.275$

[Shifting decimal point to the left by 1 place]

(ii) $1275.7 \div 1000 = \frac{1275.7}{1000} = 1.2757$

[Shifting decimal point to the left by 3 place]

(ii) Dividing a decimal by a whole number :

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, other wise, 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.

Illustration 2.21

Divide 93.45 by 15.

Sol. We have,

$$\begin{array}{r}
 15 \overline{) 93.45} \quad 6.23 \\
 \underline{-90} \\
 34 \\
 \underline{-30} \\
 45 \\
 \underline{-45} \\
 0
 \end{array}$$

$\therefore 93.45 \div 15 = 6.23$

Illustration 2.22

Divide 0.6204 by 5

Sol. We have,

$$\begin{array}{r}
 5 \overline{) 0.62040} \quad 0.12408 \\
 \underline{0} \\
 6 \\
 \underline{-5} \\
 12 \\
 \underline{-10} \\
 20 \\
 \underline{-20} \\
 40 \\
 \underline{-40} \\
 0
 \end{array}$$

Thus, $0.6204 \div 5 = 0.12408$.

(iii) Dividing a decimal by a decimal :

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

Step I Multiply 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.

Illustration 2.23

Divide 42.8 by 0.02

Sol. We have,

$$\frac{42.8}{0.02} = \frac{42.8 \times 100}{0.02 \times 100} = \frac{4280}{2} = 2140$$

Hence, $42.8 \div 0.02 = 2140$.

Illustration 2.24

Divide 0.00942 by 0.314

Sol. We have,

$$\begin{array}{r}
 314 \overline{) 9.42} \quad (0.03 \\
 \underline{0} \\
 942 \\
 \underline{-942} \\
 0 \\
 \hline
 \frac{0.00942}{0.314} = \frac{0.00942 \times 1000}{0.314 \times 1000} = \frac{9.42}{314}
 \end{array}$$

 Hence, $0.00942 \div 0.314 = 0.03$
Illustration 2.25

Divide 0.0024 by 0.04

Sol. We have,

$$\begin{array}{r}
 \frac{0.0024}{0.04} = \frac{0.0024 \times 100}{0.04 \times 100} = \frac{0.24}{4} \\
 \begin{array}{r}
 4 \overline{) 0.24} \quad (0.06 \\
 \underline{0} \\
 24 \\
 \underline{-24} \\
 0
 \end{array}
 \end{array}$$

 Hence, $0.0024 \div 0.04 = 0.06$.

Illustration 2.26

The cost of 28 toys of the same kind is Rs 3462.20. Find the cost of each toy.

Sol. Cost of 28 toys = Rs 3462.20.

$$\text{Cost of 1 toy} = \text{Rs } (3462.20 \div 28) = \text{Rs } \left(\frac{3462.20}{28} \right) = \text{Rs } 123.65$$

Hence, the cost of each toy is Rs 123.65.

Ask yourself


1. A rule for finding the approximate length of diagonal of a square is to multiply the length of a side of the square by 1.414. Find the length of diagonal when length of the side of the square is 8.3 cm.
2. The time taken by Rohan in five different races to run a distance of 500 m was 3.20 minutes, 3.37 minutes, 3.29 minutes, 3.17 minutes, and 3.32 minutes. Find the average time taken by him in the races.
3. When 0.02964 is divided by 0.004, what will be the quotient?
4. Simplify: $\frac{(0.2 \times 0.14) + (0.5 \times 0.91)}{(0.1 \times 0.2)}$
5. A vehicle covers a distance of 89.1 km in 2.2 hours. What is the average distance covered by it in 1 hour?

Answers

1. 11.7362 cm 2. 3.27 3. 7.41 4. 24.15 5. 40.5 kg



Add your knowledge _____

In this chapter we have learnt how to represent fractions into decimal. For eg. $\frac{5}{2}$ can be written as 2.5 in decimal form ; but what if one wants to represent $\frac{1}{3}$ in decimal form, it will be 0.333333.....it is known as non terminating decimal form. Lets discuss more about it.

(A) Non terminating decimal :

While expressing a fraction in the decimal form , when we perform division we get some remainder . If the division process does not end i.e we do not get the remainder equal to zero; then such decimals is known as non terminating decimal.

NOTE :

In some cases a digit or a block of digits repeats itself in the decimal part . such decimals are called non terminating repeating decimals or pure recurring decimals. These decimal numbers are represented by putting a bar on the repeated part.

Example: 0.666 is a non terminating repeating decimal and can be expressed as $0.\overline{6}$

Now lets learn how to convert pure recurring decimal and mixed recurring decimal in fraction form.

(a) Method for pure recurring decimal in fraction form: Write the repeated digit or digits only once in the numerator and take as many nines in the denominator as there are repeating digits in the given number

Example: Change $0.\overline{8}$ in the form of p/q.

Sol. $0.\overline{8} = \frac{8}{9}$

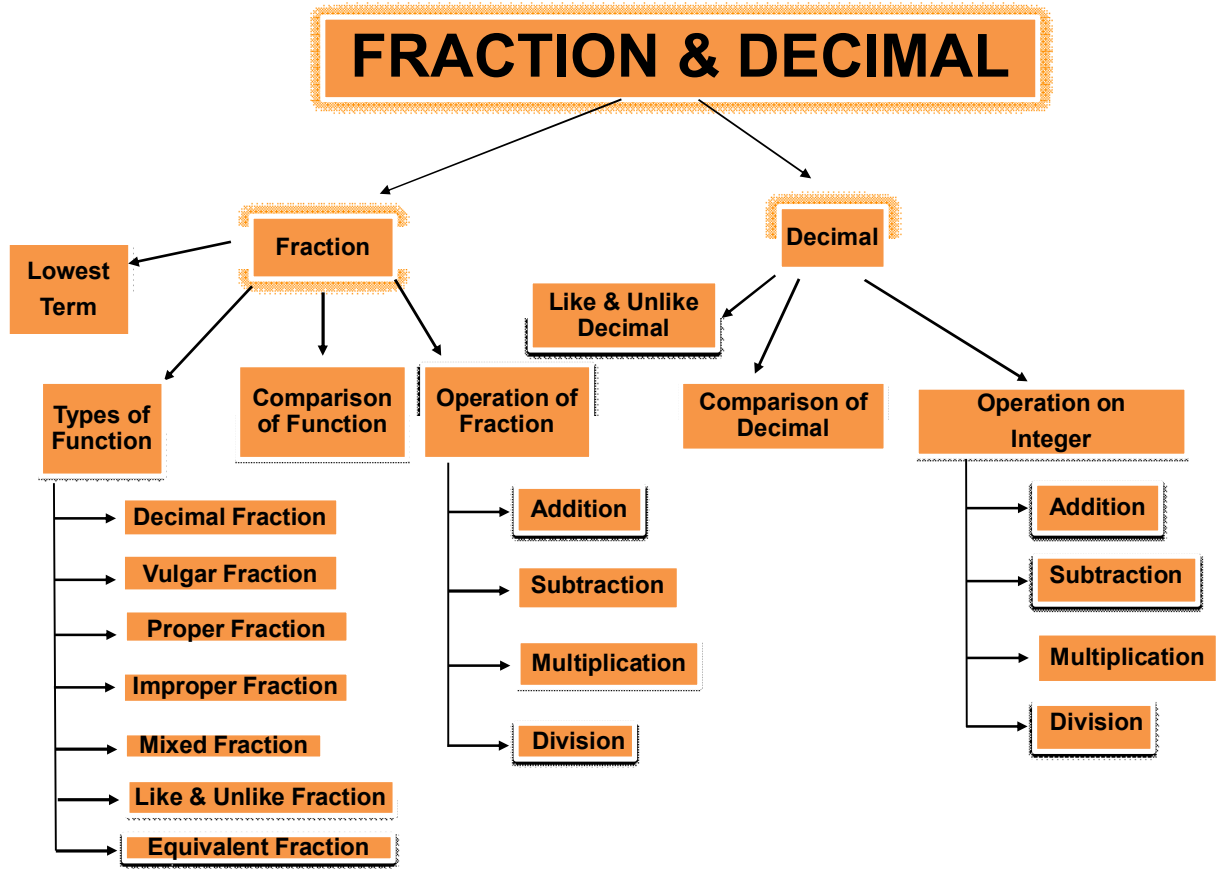
(b) Mixed recurring decimal: A decimal is said to be a mixed recurring decimal if there is at least one digit after the decimal point, which is not repeated.

Short cut method for mixed recurring decimal : Form a fraction in which numerator is the difference between the number formed by all the digits after the decimal point taking the repeated digits only once and that formed by the digits which are not repeated and the denominator is the number formed by as many nines as there are repeated digits followed by as many zeros as the number of non-repeated digits.

Example: Change $2.7\overline{645}$ in the form of p/q.

Sol. $2.7\overline{645} = \frac{27645 - 276}{9900} = \frac{27369}{9900} = \frac{3041}{1100}$

Concept Map



Summary

1. The fractions whose denominators are 10, 100, 1000 etc are called decimal fractions.
2. A fraction whose denominator is a whole number, other than 10, 100, 1000, etc., is called a **vulgar fraction**.
3. A fraction whose numerator is less than the denominator is called a **proper fraction**.
4. A fraction whose numerator is more than or equal to the denominator is called an **improper fraction**.
5. A combination of a whole number and a proper fraction is called a **mixed fraction**.
6. All positive integers are fractions
7. A given fraction and the fraction obtained by multiplying (or dividing) its numerator and denominator by the same nonzero number, are called equivalent fraction
8. Fractions having same denominator are called like fraction. Otherwise, they are called unlike fractions.
9. In order to convert some given fraction into like fraction, we convert each one of them into an equivalent fraction having a denominator equal to the LCM of all the denominator of the given fractions.
10. A fraction in its lowest form has H.C.F equals to 1 of numerator and denominator
11. Sum of like fraction = $\frac{\text{sum of their numerator}}{\text{common denominator}}$
12. Let $\frac{a}{b}$ and $\frac{c}{d}$ be two given fractions we can do cross multiply
 - (i) if $ad > bc$, then $\left(\frac{a}{b} > \frac{c}{d}\right)$ (ii) if $ad < bc$, then $\left(\frac{a}{b} < \frac{c}{d}\right)$ (iii) if $ad = bc$, then $\left(\frac{a}{b} = \frac{c}{d}\right)$
13. For adding unlike fraction change them into equivalent fraction and the add.
14. Difference of like fraction = $\frac{\text{difference of their numerator}}{\text{common denominator}}$
15. For subtracting unlike fraction, change them into equivalent like fraction and then subtract.
16. $\left(\frac{a}{b} \times \frac{c}{d}\right) = \frac{a \times c}{b \times d}$
17. Reciprocal of a nonzero fraction $\frac{a}{b}$ is $\frac{b}{a}$.
18. $\left(\frac{a}{b} \div \frac{c}{d}\right) = \frac{a}{b} \times \frac{d}{c}$
20. A decimal number has two parts, the whole number part and the decimal part.
21. Decimals having the same number of places are called like decimals, otherwise they are known as unlike decimals.
22. **Multiplication of Decimals by 10, 100, 1000 etc. :**
 - (a) On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
 - (b) On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
 - (c) On multiplying a decimal by 1000, the decimal point is shifted to the right by three places and so on
23. **Dividing a decimal by 10, 100, 1000 etc.**
 - (a) When a decimal is divided by 10, the decimal point is shifted to the left by one place.
 - (b) When a decimal is divided by 100, the decimal point is shifted to the left by two places.
 - (c) When a decimal is divided by 1000, the decimal point is shifted to the left by three places.

EXERCISE

01

SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS

- Which of the following is a vulgar fraction?
 (A) $\frac{5}{7}$ (B) $\frac{7}{10}$ (C) $\frac{3}{100}$ (D) none of these
- Which of the following is a reducible fraction?
 (A) $\frac{46}{63}$ (B) $\frac{104}{121}$ (C) $\frac{78}{23}$ (D) $\frac{105}{112}$
- Which of the following is the smallest : $\frac{14}{25}, \frac{57}{100}, \frac{49}{86}, \frac{3}{5}$.
 (A) $\frac{14}{25}$ (B) $\frac{57}{100}$ (C) $\frac{49}{86}$ (D) $\frac{3}{5}$
- Which parts contain the fractions in ascending order ?
 (A) $\frac{11}{14}, \frac{16}{19}, \frac{19}{21}$ (B) $\frac{16}{19}, \frac{11}{14}, \frac{19}{21}$ (C) $\frac{11}{14}, \frac{19}{21}, \frac{16}{19}$ (D) $\frac{16}{19}, \frac{19}{21}, \frac{11}{14}$
- Descending order of fractions $\frac{1}{5}, \frac{3}{7}, \frac{7}{10}, \frac{13}{28}$.
 (A) $\frac{13}{28} > \frac{7}{10} > \frac{3}{7} > \frac{1}{5}$ (B) $\frac{13}{8} < \frac{7}{10} < \frac{3}{7} < \frac{1}{5}$
 (C) $\frac{7}{10} > \frac{13}{28} > \frac{3}{7} > \frac{1}{5}$ (D) None of these
- Find the value. $4\frac{5}{6} - 2\frac{3}{8} + 3\frac{7}{12}$
 (A) $\frac{145}{24}$ (B) $\frac{145}{12}$ (C) $\frac{92}{21}$ (D) $\frac{145}{4}$
- By what number should $2\frac{3}{5}$ be multiplied to get $1\frac{6}{7}$?
 (A) $1\frac{5}{7}$ (B) $\frac{5}{7}$ (C) $1\frac{1}{7}$ (D) $\frac{1}{7}$
- By what number should $1\frac{1}{2}$ be divided to get $\frac{2}{3}$?
 (A) $2\frac{2}{3}$ (B) $1\frac{2}{3}$ (C) $\frac{4}{9}$ (D) $2\frac{1}{4}$
- $\frac{1}{2} + \frac{3}{4} \times \frac{5}{6} \div \frac{5}{7} =$
 (A) $\frac{11}{8}$ (B) $\frac{8}{11}$ (C) $\frac{7}{9}$ (D) $\frac{11}{10}$

10. $\left[\frac{9}{4} \times \frac{3}{5} \div \frac{12}{5} + \frac{7}{8} \div \frac{5}{4} + \frac{3}{5} \right]$ is equal to :
- (A) $1 \frac{69}{80}$ (B) $1 \frac{41}{80}$ (C) $2 \frac{2}{9}$ (D) $20 \frac{7}{9}$
11. Due to virus problems, Bill Gates computer changes one fraction into another in a particular pattern. It changes $\frac{1}{3}$ into $\frac{7}{3}$, $\frac{1}{7}$ into 1 and $\frac{2}{5}$ into $\frac{14}{5}$. What fraction will the computer change into $\frac{3}{2}$?
- (A) $\frac{1}{3}$ (B) $\frac{3}{14}$ (C) $\frac{2}{3}$ (D) $\frac{3}{98}$
12. What value of 'P' makes the statement ' $P \div 3 \frac{5}{2} = P$ ' true ?
- (A) $\frac{17}{5}$ (B) $3 \frac{5}{2}$ (C) 0 (D) 1
13. How many one sixth are there in $3 \frac{1}{3}$?
- (A) 20 (B) 19 (C) 10 (D) 5
14. Which of the following is a true statement ?
- (A) $1.14 > 1.2$ (B) $1.143 > 1.15$ (C) $1.14 < 1.2$ (D) $1.14 < 1.040$
15. Convert 0.45 & 0.0075 decimal numbers into the form p/q. They are respectively :
- (A) $\frac{9}{20}, \frac{3}{400}$ (B) $\frac{3}{400}, \frac{3}{20}$ (C) $\frac{3}{20}, \frac{9}{20}$ (D) $\frac{9}{400}, \frac{3}{20}$
16. $.06 = ?$
- (A) $\frac{3}{5}$ (B) $\frac{3}{50}$ (C) $\frac{3}{500}$ (D) None of these
17. $1.04 = ?$
- (A) $1 \frac{1}{5}$ (B) $1 \frac{2}{5}$ (C) $1 \frac{1}{25}$ (D) None of these
18. What should be added to 3.07 to get 3.5 ?
- (A) 0.57 (B) 0.34 (C) 0.43 (D) 0.02
19. What should be subtracted from 0.1 to get 0.03 ?
- (A) 0.7 (B) .07 (C) .007 (D) None of these
20. $1.1 \times .1 \times 0.01 = ?$
- (A) 0.011 (B) 0.0011 (C) 0.11 (D) None of these
21. $0.4 \times 0.4 \times 0.4 = ?$
- (A) 6.4 (B) 0.64 (C) 0.064 (D) None of these

22. $\frac{44.456}{0.25}$ can also be expressed as :
- (A) $\frac{444.56}{25}$ (B) $\frac{4445.6}{25}$ (C) $\frac{44456}{25}$ (D) None of these
23. $2.08 \div (0.16) = ?$
- (A) 13 (B) 0.13 (C) 1.3 (D) None of these
24. $[7.2 \div 0.8 - 1.2 \times 0.9 + 0.08]$ is equal to :
- (A) 8 (B) 10 (C) 13 (D) 14
25. $0.64 \times 0.64 + 0.64 \times 0.72 + 0.36 \times 0.36 = \dots$
- (A) 0.5392 (B) 0.9682 (C) 1 (D) 0.8962

FILL IN THE BLANKS

- A fraction whose denominator is any of the numbers 10, 100, 1000, etc., is called a _____
- A fraction whose denominator is a whole number, other than 10, 100, 1000, etc., is called a _____
- Fraction $\frac{a}{b}$ in which $a > 0$ and $a < b$. For example $\frac{4}{9}$ is called _____
- Fractions having the same denominators but different numerators are called _____
- The value of $\frac{1}{2}$ of $\left(\frac{3}{4} \div \frac{2}{3}\right)$ is _____
- In a class of 40 students, $\frac{3}{5}$ of the total number of students are girls. How many students of the class are boys ?
- 2.75 and 3.14 are _____ decimals
- 2.7 is _____ than 2.65
- $0.03 \times 0.2 =$ _____
- $0.04 + \frac{404}{1000} =$ _____

TRUE / FALSE

- $\frac{63}{800}$ is a decimal fraction.
- A Fraction $\frac{a}{b}$ is said to be in its lowest form if the H.C.F of a and b is 1

3. Reciprocal of $\frac{8}{9}$ is $\frac{-8}{9}$.
4. Product of two proper fractions is greater than or equal to 1.
5. 3.123 and 5.456 are like decimal
6. $20.17 > 20.8$
7. If $1392 \div 24 = 58$, then $13.92 \div 24 = 0.58$
8. $25.658 \div 0.01 = 2565.8$

MATCH THE COLUMN

1.

Column – I	Column – II
(A) $\frac{2}{3} + \frac{5}{6} - \frac{2}{9}$	(p) $\frac{37}{3}$
(B) $\frac{5}{6} \times 6\frac{3}{5}$	(q) $\frac{3}{2}$
(C) $12 \div \frac{36}{37}$	(r) $\frac{33}{6}$
(D) $3 \times \frac{1}{5} \div \frac{2}{3}$	(s) $\frac{23}{18}$
(E) 6 of $\frac{3}{12}$	(t) $\frac{9}{10}$

2.

Column – I	Column – II
(A) 2.3×4.2	(p) 7.08
(B) $2.16 + 4.92$	(q) 7
(C) 60.009×100	(r) 9.66
(D) $0.49 \div 0.07$	(s) 97.993
(E) $99.623 - 1.63$	(t) 6000.9

SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE

1. Compare $\frac{16}{21}$ and $\frac{20}{31}$. Which is greater ?
2. Arrange the following fractions in ascending order $\frac{3}{7}, \frac{4}{5}, \frac{7}{9}, \frac{1}{2}$
3. Ramesh solved $\frac{2}{7}$ part of an exercise while Seema solved $\frac{4}{5}$ of it. Who solved less ?

4. One side of a square $2/a$, then find its perimeter.
5. Express 536 paise as rupees using decimals.
6. Convert $2\frac{5}{8}$ into a decimal fraction.
7. A bowler took 15 wickets for 321 runs. What is his average score per wicket ?
8. **Add :**
 (a) $56.69 + 21.37$ (b) $356.053 + 4.3$
9. **Multiply :**
 (i) 0.045×10 (ii) 0.00028×1000
10. The product of two decimals is 1.8576 . If one of the decimals is 0.54, find the other.

SHORT ANSWER TYPE

11. Convert the fraction $\frac{5}{6}, \frac{7}{9}, \frac{11}{12}$ into like fractions.
12. Arrange the fractions in $\frac{2}{3}, \frac{6}{7}, \frac{13}{21}$ ascending order
13. If the cost of a pen is Rs $8\frac{3}{4}$, how many pens can be purchased for Rs. $131\frac{1}{4}$?
14. Sugar is sold at Rs $17\frac{3}{4}$ per kg. Find the cost of $8\frac{1}{2}$ kg of a sugar.
15. Arrange the following decimal in ascending order: 0.5,5.5,5.05,0.05,5.55
16. Express 45mm in cm,m and km
17. Find the weight of 16 bags of sugar, each weighing 48.450 kg.
18. A car can cover a distance of 8.6 km on one litre of petrol. How far can it go on 36.5 litres of petrol ?
19. Find the cost of one pen if the cost of 24 pens is Rs. 2986.80
20. Mr. Soni bought some bags of cement, each weighing 49.8 kg. If the total weight of all the bags is 1792.8 kg, how many bags did he buy ?

LONG ANSWER TYPE

21. Simplify : $\frac{1}{1 + \frac{\frac{2}{3}}{1 + \frac{\frac{8}{3}}{1 + \frac{2}{3} + \frac{9}{1 - \frac{2}{3}}}}}$
22. Seema purchased $3\frac{1}{2}$ kg apples and $4\frac{3}{4}$ kg oranges and she throw away $\frac{1}{11}$ part of total then fruits remaining will be ?
23. Subtract the sum of $\frac{45}{66}$ and $\frac{31}{33}$ from the difference of $3\frac{4}{11}$ and $\frac{3}{22}$.
24. Mr. A spends $\frac{3}{5}$ of his income on house hold expenses and $\frac{1}{7}$ of his income on personal expenses. If the monthly income is Rs. 35000. Find his monthly savings.
25. Simplify : $3.5 + [9.5 - \{4.5 + (6.5 - 2.5)\}]$.
26. Find the value of : $\frac{(0.2 \times 0.14) + (0.5 \times 0.91)}{(0.1 \times 0.2)}$.

EXERCISE
02
SECTION -A (COMPETITIVE EXAMINATION QUESTION)
MULTIPLE CHOICE QUESTIONS

1. Mohit needs to work 45 hours per week . He has worked $38\frac{7}{9}$ hours so far this week . How many does he need to work on friday to meet 45 hours requirement ?
 (A) 7 hours (B) $6\frac{2}{9}$ hours (C) $6\frac{1}{9}$ hours (D) $6\frac{7}{9}$ hours
2. How much more is $\frac{1}{2}$ of $\frac{2}{3}$ than $\frac{3}{4}$ of $\frac{1}{3}$?
 (A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{12}$ (D) $\frac{7}{12}$
3. Archna wants to frame a picture . The picture is $4\frac{3}{5}$ cm wide. To fit the picture in the fame, it should not be more than $4\frac{1}{2}$ cm wide. How much the picture should be trimmed ?
 (A) $\frac{1}{10}$ (B) $\frac{3}{10}$ (C) $\frac{7}{10}$ (D) $\frac{9}{10}$

4. Simplify $3\frac{1}{4} + \frac{1}{2} \div \frac{3}{4} - \frac{1}{2} \times 3\frac{1}{2}$
 (A) $\frac{13}{6}$ (B) $\frac{31}{6}$ (C) $\frac{21}{5}$ (D) $\frac{31}{5}$
5. Find the average of 0.3 , 3 , 0.03 and 0.002 is
 (A) 0.833 (B) 0.803 (C) 83.3 (D) 833
6. $\frac{3.6 \times 0.48 \times 2.50}{0.12 \times 0.09 \times 0.5}$ is equal to
 (A) 80 (B) 800 (C) 8000 (D) 80,000
7. A party of 20 people went to a restaurant . They ordered a meal of Rs 36.60 each , but 5 of them had forgotten to bring money. In order to settle the bill , how much more did the other 15 people have to pay?
 (A) 181 (B) 182 (C) 183 (D) 184
8. When simplified the product $\left(2 - \frac{1}{3}\right)\left(2 - \frac{3}{5}\right)\left(2 - \frac{5}{7}\right)\left(2 - \frac{17}{19}\right)$
 (A) $\frac{21}{9}$ (B) $\frac{23}{3}$ (C) $\frac{19}{17}$ (D) None
9. $\frac{3}{4}\left(1 + \frac{1}{3}\right)\left(1 + \frac{2}{3}\right)\left(1 - \frac{2}{5}\right)\left(1 + \frac{6}{7}\right)\left(1 - \frac{12}{13}\right)$ is equal to
 (A) $\frac{1}{5}$ (B) $\frac{1}{6}$ (C) $\frac{1}{7}$ (D) $\frac{1}{9}$
10. An auditorium has 636 students There are 20 rows each fulfilled except the last row. Find the fraction of students in the last row to the number of students in each row.
 (A) $\frac{7}{8}$ (B) $\frac{8}{7}$ (C) $\frac{3}{4}$ (D) none of these
11. Out of 48 students, $\frac{1}{3}$ play cricket and basketball; $\frac{1}{4}$ play cricket and football; $\frac{1}{6}$ play football and basketball. No student play only basketball and all three games. Number of students playing only cricket is double of students playing only football. Find fraction of students playing cricket.
 (A) $\frac{3}{4}$ (B) $\frac{1}{4}$ (C) $\frac{4}{3}$ (D) $\frac{1}{3}$
12. A tailor stitched $\frac{1}{9}$ of the cloth on first day, $\frac{5}{8}$ of remaining on the second day. He is still left with 1m cloth . Find the total length of cloth.
 (A) 1 m (B) 2 m (C) 3 m (D) $\frac{1}{3}$ m.
13. Of the 2700 employees of company X, $\frac{1}{3}$ belong to academic sector and $\frac{1}{12}$ of non-academic sector are peons. Find the total fraction of remaining non-academic employees.
 (A) $\frac{11}{27}$ (B) $\frac{11}{18}$ (C) $\frac{27}{11}$ (D) $\frac{18}{11}$

14. If $x = \frac{1}{2}$, then find the value of $x + \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}}$
- (A) $\frac{5}{4}$ (B) $\frac{4}{5}$ (C) $\frac{3}{4}$ (D) $\frac{4}{3}$

SECTION -B (TECHIE STUFF)

15. The value of $0.\overline{536}$ is :
- (A) $\frac{536}{1000}$ (B) $\frac{536}{999}$ (C) $\frac{536}{990}$ (D) $\frac{161}{300}$
16. The value of $0.\overline{63} + 0.\overline{37}$ is :
- (A) 1 (B) $\frac{100}{99}$ (C) $\frac{100}{90}$ (D) none of these
17. If u, v and w are the digits of decimal system, then the rational number represented by $0.\overline{uwvuwvuwv\dots}$ is
- (A) $(100uw + 99uv)/99$ (B) $(99uw + uv)/980$
 (C) $(99uw + uv)/9900$ (D) $(9uw + 99uv)/900$

EXERCISE

03

(PREVIOUS YEAR EXAMINATION QUESTIONS)

1. Madan picks three different digits from the set $\{1,2,3,4,5\}$ and forms a mixed number by placing the digits in the space of $\square \frac{\square}{\square}$. The fractional part of the mixed number must be less than 1. (for eg, $4\frac{2}{3}$). What is the difference between the largest and the smallest possible mixed number that can be formed? **[NSTSE 2009]**
- (A) $4\frac{7}{20}$ (B) $4\frac{3}{10}$ (C) $4\frac{9}{20}$ (D) $4\frac{3}{5}$
2. Find the total value of P and Q
 $2.9 + P + Q = 9 - 1.8 - 1.32$ **[NSTSE 2009]**
- (A) 2.18 (B) 2.98 (C) 3.42 (D) 3.62
3. Find m if $\frac{7}{10} + \frac{3}{1000} + \frac{9}{m} = 0.712$ is **[NSTSE 2010]**
- (A) 10 (B) 100 (C) 1000 (D) 10000
4. $6\frac{3}{4} \times 1.2 = 1.2 + 0.9 + 1.2 + 1.2 \times y$. Find y? **[NSTSE 2010]**
- (A) 4 (B) 3 (C) 2 (D) 6

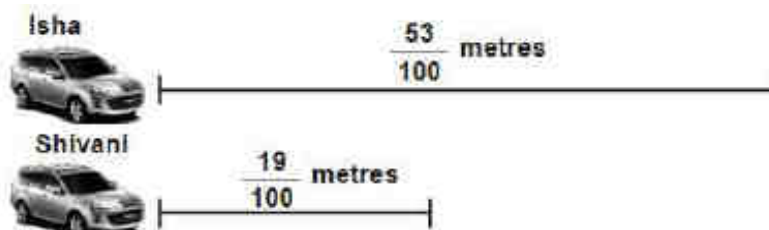
5. Sonal needed to make 2 costumes for a school play. The larger costume required $4\frac{1}{4}$ metres of material, and the smaller costume required $\frac{3}{4}$ metres less than larger one. Which of the following equations can be used to find n, the number of metres of material needed for the smaller costume? **[IMO-2010]**

(A) $n = 4\frac{1}{4} + \frac{3}{4}$ (B) $n = 4\frac{1}{4} \cdot \frac{3}{4}$ (C) $n = 4\frac{1}{4} \div \frac{3}{4}$ (D) $n = 4\frac{1}{4} - \frac{3}{4}$

6. If $\frac{A}{15} = \frac{B}{10}$, $\frac{B+7}{36} = \frac{5}{12}$ then what fraction of A is B? **[NSTSE 2010]**

(A) $\frac{2}{3}$ (B) $\frac{8}{20}$ (C) $\frac{3}{2}$ (D) $\frac{12}{20}$

7. Isha and Shivani raced their toy cars. The given diagram shows the distance the cars travelled during the race. How much farther did Isha's car travel than Shivani's car? **[IMO-2010]**



(A) $\frac{34}{100}$ m (B) $\frac{44}{100}$ m (C) $\frac{72}{100}$ m (D) $\frac{62}{100}$ m

8. A drum of kerosene oil is $\frac{3}{4}$ full. When 15 litres of oil is drawn from it, it is $\frac{7}{12}$ full. The capacity of the drum is ____ **[IMO-2011]**

(A) 45 (B) 90 (C) 60 (D) Can't be determined

9. In how many parts can a rod of length 19.5 m be broken into equal length of 65 cm? **[IMO-2011]**

(A) 20 (B) 30 (C) 3 (D) 130

10. Mohan has certain amount in his account. He gives half of this to his eldest son and one third of the remaining to his youngest son. The amount left with him now is **[IMO-2011]**

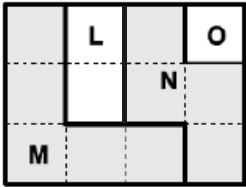
(A) $\frac{1}{3}$ of the original (B) $\frac{2}{3}$ of the original
(C) $\frac{3}{4}$ of the original (D) $\frac{1}{6}$ of the original

11. What should be added to $\frac{-7}{10}$ to $\frac{5}{16}$ get? **[NSTSE 2011]**

(A) $-\frac{31}{80}$ (B) $\frac{13}{80}$ (C) $\frac{131}{80}$ (D) $\frac{81}{80}$

12. The product when simplified will give $\left(2 - \frac{1}{3}\right)\left(2 - \frac{3}{5}\right)\left(2 - \frac{5}{7}\right) \dots \dots \left(2 - \frac{997}{999}\right)$ **[NSTSE 2011]**

(A) $\frac{5}{999}$ (B) $\frac{1001}{999}$ (C) $\frac{1001}{3}$ (D) $\frac{5}{3}$

13. If $\frac{9}{5}$ of a number is 45, what is $\frac{1}{5}$ of the same number? [IMO-2012]
 (A) 5 (B) 25 (C) 30 (D) 81
14. The descending order of the given fractions is [IMO-2012]
 $4/3, 4/7, 7/10$
 (A) $7/10 > 4/7 > 4/3$ (B) $4/7 > 4/3 > 7/10$
 (C) $4/3 > 7/10 > 4/7$ (D) $4/3 > 4/7 > 7/10$
15. Find the value of x. [IMO-2012]
 $3889 + 12.952 - x = 3854.002$
 (A) 47.095 (B) 47.752 (C) 47.932 (D) 47.95
16. Express 25 seconds as a fraction of 1 hour. [IMO-2012]
 (A) $\frac{5}{12}$ (B) $\frac{1}{4}$ (C) $\frac{1}{144}$ (D) $\frac{1}{24}$
17. A jar is $\frac{3}{5}$ full of orange juice. This amount is equal to 6 full glasses. When 1 full glass is drunk, what fraction of the jar is still left with orange juice? [IMO-2012]
 (A) $\frac{1}{10}$ (B) $\frac{1}{6}$ (C) $\frac{2}{5}$ (D) $\frac{1}{2}$
18. Monika mixed orange syrup and water in the ratio 4 : 9. How many litres of orange syrup were required to mix with 324 L of water? [IMO-2012]
 (A) 36 L (B) 144 L (C) 167 L (D) 198 L
19. A milkman sells 42 litres of milk at Rs.19.75 per litre to a hostel. How much money should he get from the hostel? [IMO-2012]
 (A) Rs.1892 (B) Rs.829.50 (C) Rs.165.85 (D) Rs.122.50
20. Dhruv earned some money. He spent $\frac{1}{3}$ of the money on magazines and $\frac{1}{4}$ of the money on a snack. Which of the following fractions represents the part of money he did not spend? [IMO-2012]
 (A) $\frac{5}{12}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{5}{7}$
21. The rectangle is made of 12 identical squares. It is divided into 4 parts. Which of the following 2 parts will be removed to form $\frac{3}{12}$ of the rectangle? [IMO-2012]
- 
- (A) L and N (B) M and O (C) L and M (D) M and N
22. 1 litre of water weighs 1 kg. How many cubic millimetres of water will weigh 0.1 g? [IMO-2012]
 (A) 0.1 (B) 1 (C) 10 (D) 100

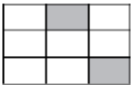
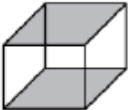
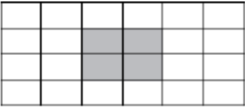
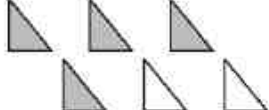
23. Jack and Jill went up the hill to fetch a pail of water. Having filled the pail to the full Jack fell down, spilling $\frac{2}{3}$ of water, before Jill caught the pail. She then tumbled down the hill, Spilling $\frac{1}{5}$ of the remainder. What fraction of the water fills the pail ? **[NSTSE 2013]**

- (A) $\frac{4}{15}$ (B) $\frac{1}{3}$ (C) $\frac{11}{15}$ (D) $\frac{1}{15}$

24. Rajesh had a packet of 20 sketch pens. He gave 12 to Kartik and 6 to Meena. What fractions of the packet did he give to Kartik and Meena? **[IMO-2013]**

- (A) $\frac{3}{10}$ (B) $\frac{4}{5}$ (C) $\frac{9}{10}$ (D) $\frac{1}{5}$

25. Select the correct match. **[IMO-2013]**

Figure	Fraction of unshaded part
(A) 	$\frac{2}{9}$
(B) 	$\frac{2}{3}$
(C) 	$\frac{1}{6}$
(D) 	$\frac{2}{3}$

26. $\frac{1}{2}$ is subtracted from a number and the difference is multiplied by 4. If 25 is added to the product and the sum is divided by 3 , the result is equal to 10. find the number **[NSTSE 2014]**

- (A) $\frac{3}{5}$ (B) $\frac{3}{4}$ (C) $\frac{7}{4}$ (D) $\frac{2}{3}$

27. A man travelled two fifth of his journey by train, one third by bus, one-fourth by car and the remaining 3 km on foot. What is the length of his journey travelled by train? **[IMO-2014]**

- (A) 75 km (B) 72 km (C) 80 km (D) 85 km

28. Evaluate : $\frac{2\frac{5}{4} - 4\frac{7}{6} + 3\frac{1}{3}}{0.087 + 0.3717 \div 0.9}$ **[IMO-2014]**

- (A) 2.833 (B) 0.28 (C) 0.000028 (D) 0.00028

29. A 5 kg bag of rice cost Rs.8 per kg. Mr. Mohit bought Rs.120 worth of rice. If he repacked the rice into smaller packets each weighing $\frac{3}{5}$ kg. How many packets would he get? **[IMO-2014]**

- (A) 15 (B) 12 (C) 9 (D) 25

30. It takes 17 full specific type of trees to make one tonne of paper. If there are 221 such trees in a forest then to save $\frac{7}{13}$ part of the forest. How much of paper we have to save? [IMO-2014]
- (A) 6 tonnes (B) 8 tonnes (C) 7 tonnes (D) 4 tonnes
31. Amit purchased 2 kg 200 g potatoes, 250 g rice, 15 kg 300 g wheat. 500 g apples and 2 kg 600 g tomatoes. Find the total weight of his purchases (in kilograms). [IMO-2014]
- (A) 25.75 kg (B) 18.65 kg (C) 20.85 kg (D) 15.95 kg
32. Shivam purchased $42\frac{1}{2}$ litres of juice on Monday and $24\frac{3}{4}$ litres of juice on Tuesday. How many litres of juice did he purchase together in two days? [IMO-2014]
- (A) $66\frac{2}{3}$ litres (B) $72\frac{3}{4}$ litres (C) $76\frac{1}{4}$ litres (D) $67\frac{1}{4}$ litres
33. Which of the following statements is correct? [IMO-2014]
- (A) The reciprocal of a proper fraction is a proper fraction.
 (B) The product of two improper fractions is less than both the fractions.
 (C) To multiply a decimal number by 1000. We move the decimal in the number to the right by three places.
 (D) Product of two fractions = $\frac{\text{Product of their denominators}}{\text{Product of their numerators}}$
34. It takes $12\frac{1}{3}$ m of cloth to make a pattern. How many patterns can Latika make from a piece of cloth $49\frac{1}{3}$ m long? [IMO-2014]
- (A) 4 (B) 5 (C) 3 (D) 6
35. Find the values of P, Q and R in the given division. [IMO-2014]
- $$\begin{array}{r}
 12 \overline{)39.168} \quad (P.2Q)4 \\
 \underline{-P}6 \\
 31 \\
 \underline{-24} \\
 7Q \\
 \underline{-72} \\
 4R \\
 \underline{-48} \\
 0
 \end{array}$$
- (A) P Q R
 (A) 6 3 4
 (B) 3 6 8
 (C) 3 6 4
 (D) 6 3 8
36. How many minutes are there in $1\frac{3}{4}$ hr ? [IMO-2014]
- (A) 75 minutes (B) 105 minutes (C) 115 minutes (D) 95 minutes
37. Diameter of Earth is 12756000 m. Few years ago, a new planet was discovered whose diameter is $\frac{5}{43}$ of the diameter of Earth. Find the radius of this planet (in km). [IMO-2014]
- (A) 925.33 (B) 428.92 (C) 741.63 (D) 892.99

ANSWER KEY
EXERCISE 01

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	A	D	A	A	C	A	B	D	A	A	B	C	A	C	A
Ques.	16	17	18	19	20	21	22	23	24	25					
Ans.	B	C	C	B	B	C	B	A	A	C					

FILL IN THE BLANKS

- Decimal fraction
- Vulgar fraction
- Proper
- Like fractions
- $\frac{9}{16}$
- 16
- Like
- Greater
- 0.006
- 0.444

TRUE / FALSE

- False
- True
- False
- False
- True
- False
- True
- True

MATCH THE COLUMN

- (A) → s, (B) → r, (C) → p, (D) → t, (E) → q
- (A) → r, (B) → p, (C) → t (D) → q, (D) → s

SECTION -B (FREE RESPONSE TYPE)
VERY SHORT ANSWER TYPE

- $\frac{16}{21} > \frac{20}{31}$
- $\frac{3}{7} < \frac{1}{2} < \frac{7}{9} < \frac{4}{5}$
- Ramesh solved the lesser part than Seema
- $\frac{8}{a}$
- Rs. 5.36
- 2.625
- 21.4 runs per wicket
- (a) 78.06 (b) 360.353
- (i) 0.45 (ii) 0.28
- 3.44

SHORT ANSWER TYPE

- $\frac{30}{36}, \frac{28}{36}, \frac{33}{36}$
- $\frac{13}{21}, \frac{2}{3}, \frac{6}{7}$
- 15
- Rs. $150\frac{7}{8}$
- $0.05 < 0.5 < 5.05 < 5.5 < 5.55$
- 4.5cm, 0.045m, 0.000045km

LONG ANSWER TYPE

21. $\frac{13}{15}$ 22. $7\frac{1}{2}$ kg 23. $\frac{53}{33}$ 24. 9000
 25. 4.5 26. 24.15

EXERCISE >> 02

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	B	C	A	A	A	B	C	D	C	A	A	C	B	A

SECTION -B (TECHIE STUFF)

Ques.	15	16	17
Ans.	D	B	C

EXERCISE >> 03

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	A	B	C	A	D	A	A	B	B	A	D	C	A	C	D
Ques.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	C	D	B	B	A	D	D	C	C	B	C	B	A	D	C
Ques.	31	32	33	34	35	36	37								
Ans.	C	D	C	A	B	B	C								