Chapter - 2
Fraction and Decimal

Y4T7B4

2.1 You have learnt about fractions and decimal in Class VI. You have learnt about addition and subraction of fractions. Here we will discuss about the multiplication and division of fractions.

Review of fraction :

Observe the fractions and arrange them in the table –

$\frac{2}{3}, \frac{5}{7}, \frac{7}{4}, \frac{1}{10}, 1\frac{1}{2}, 6\frac{4}{5}, \frac{13}{20}, \frac{23}{18}, 13\frac{3}{4}, \frac{5}{9}, \frac{29}{17}$

Proper	Improper	Mixed

Recall :

A fraction with denominator greater than numerator is a proper fraction, a fraction with numerator greater than denominator is a improper fraction a natural number along with a proper fraction is a mixed fraction.

Similarly a new fraction obtained through multiplicaltion or division of the numerator and denominator of a fraction by some non zero number is called equivalent fraction of the original fraction.

For example : $\frac{2}{3}\left(=\frac{2\times2}{3\times2}\right)=\frac{4}{6}=\frac{6}{9}=\frac{8}{12}=\frac{14}{21}$ etc Similarly $\frac{4}{7}\left(=\frac{4\times3}{7\times3}\right)=\frac{12}{21}=\frac{20}{35}=\frac{24}{42}=\frac{40}{70}$ etc

Concept of equivalent fraction can be applied for comparison of unlike fraction.

Example 1 : Which is greater of $\frac{1}{3}$ and $\frac{2}{5}$?

Solution : To find the greater, first we have to find the LCM of two denominators of the given fractions. Here, since 3 and 5 are prime number; therefore product of 3 and 5 is the required LCM. That is LCM of 3 and 5 = 3 × 5 = 15.

Now we have to find equivalent fractions of the given fractions denominators equal to this LCM. When the denominators are equal, by comparing the numerators one can find greater or smaller fraction.

That is $\frac{1}{3}=\frac{1\times5}{3\times5}=\frac{5}{15}$ and $\frac{2}{5}=\frac{2\times3}{5\times3}=\frac{6}{15}$

Since $6>5$ $\therefore \frac{6}{15}>\frac{5}{15}$ or $\frac{2}{5}>\frac{1}{3}$

Example 2 : One day Pinku went $\frac{3}{5}$ part of total distance to school on foot. He went remaining distance by bicycle with Haren. Find whether he covered more distance on foot or by Bicycle.

Solution :

Let the distance of school from Pinku's home = 1

Pinku went to school on foot $=\frac{3}{5}$ part

$\therefore$ Pinku went to school by bicycle $=\left(1-\frac{3}{5}\right)$part $=\left(\frac{5-3}{5}\right)$part $=\frac{2}{5}$ part

Here $\frac{3}{5}$ and $\frac{2}{5}$ both have equal denominator. Therefore depending on numerator we can find which is greater or smaller. Since $3>2$, $\therefore \frac{3}{5}>\frac{2}{5}$.

Thus Pinku covered more distance on foot while going to school.

2.2 Multiplication of fractions :

You are already aware that multiplication is repeated addition of a whole number. For example $7+7+7$ and 3×7 are same. Now let us observe in case of fraction.

You have got in case of addition of fractions that $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{3}{4}$.

It is clear from the following figure that if we divide an object into four equal parts and take three parts one by one, then it is exactly same as if we have taken the three part together out of the four parts.

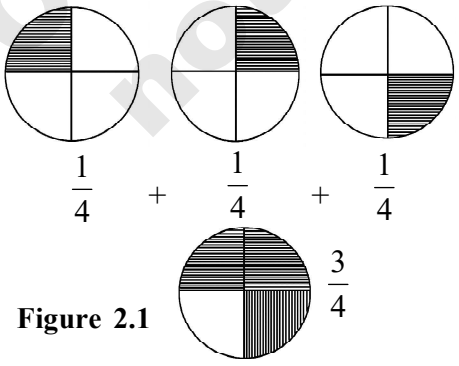


Figure 2.1

Now $3\times\frac{1}{4}=\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$

$=\frac{1+1+1}{4}$ (Addition of fraction)

$=\frac{3\times1}{4}$ (adding 1 three times equal to 3×1)

Thus $3\times\frac{1}{4}=\frac{3\times1}{4}$

Similarly $5\times\frac{1}{3}=\frac{5\times1}{3}$ $8\times\frac{3}{5}=\frac{8\times3}{5}$ etc.

Therefore, when a fraction is multiplied by a whole number, then the numerator of the fraction is multiplied by the whole number. Then if the fraction is to be reduced to its lowest form. Otherwise it may be expressed necessary as mixed fraction.

Example 3 : Follow some illustrations –

(i) $10\times\frac{3}{4}=\frac{10\times3}{4}=\frac{30}{4}=\frac{15}{2}=7\frac{1}{2}$ (ii) $6\times\frac{7}{9}=\frac{6\times7}{9}=\frac{14}{3}=4\frac{2}{3}$

(iii) $\frac{2}{5}\times7=\frac{2\times7}{5}=\frac{14}{5}=2\frac{4}{5}$ (iv) $4\times5\frac{1}{6}=4\times\frac{31}{6}=\frac{4\times31}{6}=\frac{62}{3}=20\frac{2}{3}$

Example 3 (iv) Alternative method :

$$4\times5\frac{1}{6}=4\times\left(5+\frac{1}{6}\right)=(4\times5)+\left(4\times\frac{1}{6}\right)\text{ (distributive property)}$$

$$=20+\frac{4\times1}{6}=20+\frac{2}{3}=20\frac{2}{3}$$

Note :

(a) Student should remember that $3\times\frac{5}{6}$ and $3\frac{5}{6}$ are not the same.

Because, meaning of $3\times\frac{5}{6}=\frac{5}{6}+\frac{5}{6}+\frac{5}{6}=\frac{5+5+5}{6}=\frac{3\times5}{6}=\frac{3\times5}{3\times2}=\frac{5}{2}$ (lowest form)

But $3\frac{5}{6}=3+\frac{5}{6}=\frac{18}{6}+\frac{5}{6}=\frac{18+5}{6}=\frac{23}{6}$

Try yourself :

1. Evalute :

(a) $3\times5\frac{4}{9}$ (b) $9\times\frac{15}{4}$ (c) $\frac{5}{9}\times12$ (d) $3\times5\frac{4}{9}$ (e) $9\frac{2}{5}\times2$

2. Can you show $2\times\frac{3}{7}=\frac{6}{7}$ with the help of diagram?

2.3 Operations on fraction :

We often use two sentences as given below –

(i) Mother said to her son 'Bablu give half of the chocolate to your sister'

(ii) The teacher asked students 'How much is one fourth of an object'?

You can frame such sentences of your own. You observe the point upon which we want to emphasise –

First sentence ‘half of a chocolate’

Second sentence ‘one foruth of an object’

We try to interpret the use of the word ‘of’ in both sentences,

Whatever we have understand by ‘half of an object’ or ‘half of a chocolate’ has been highlighted by the shadded portion in the diagram below –

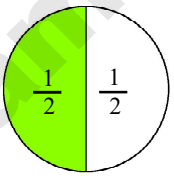


Figure 2.2

If in the following way as well, we can express –

(a) Half of one $= \frac{1}{2}\text{ of } 1 = \frac{1}{2}\times 1 = \frac{1}{2}$ or $1\times\frac{1}{2} = \frac{1}{2}$

Therefore $\frac{1}{2}\times 1 = \frac{1}{2} = 1\times\frac{1}{2}$ Here ‘of’ means multiplication

(b) Half of two $= \frac{1}{2}\text{ of } 2 = 2\times\frac{1}{2} = \frac{2\times 1}{2} = \frac{2}{2} = 1$

or $\frac{1}{2}\times 2 = \frac{1\times 2}{2} = \frac{2}{2} = 1$

Therefore $\frac{1}{2}\times 2 = 1 = 2\times\frac{1}{2}$

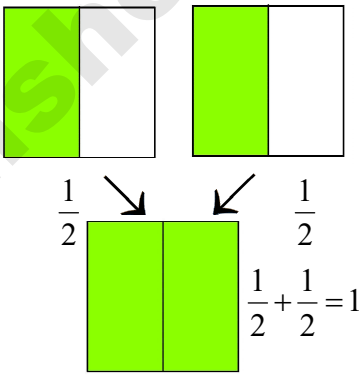


Figure - 2.3

Now you take another example

$\frac{1}{2}$ (half) from each of is combined and is combined together ad 5 objects shown below by shaded figures

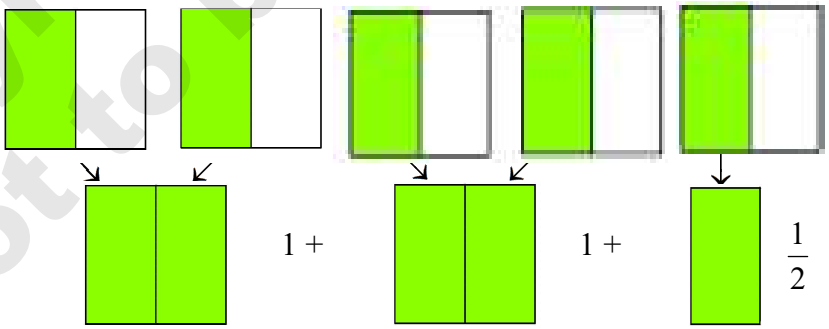


Figure-2.4

Taking $\frac{1}{2}$ (half) from 5 objects means taking $\frac{1}{2}$ from each 5 objects.

Which is equal to, $5\times\frac{1}{2} = \frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2} = 1+1+\frac{1}{2} = 2+\frac{1}{2} = 2\frac{1}{2} = \frac{5}{2}$

Again we know that, $5 \times \frac{1}{2} = \frac{5 \times 1}{2} = \frac{5}{2}$

Therefore we say that 5 of $\frac{1}{2} = \frac{1}{2} \times 5 = \frac{5}{2}$, So, we can now say that 'of' means multiplication.

Example 3 : 25 of $\frac{1}{5} = 25 \times \frac{1}{5} = \frac{25 \times 1}{5} = \frac{25}{5} = 5$

Try these : (1) What is $\frac{2}{5}$ of 5 ? Show this with the help of diagram.

(2) Evaluate: (i) $\frac{1}{3}$ of 18 (ii) $\frac{2}{3}$ of 18 (iii) $\frac{5}{6}$ of 30

Example 4 : Population of a village is 200. $\frac{2}{5}$ of the population is women. What is the total number of women in the village?

Solution : Total population of the village = 200

Number of women = $\frac{2}{5}$ part of the population

$\therefore$ Number of women = $\frac{2}{5}$ of $200 = \frac{2}{5} \times 200 = \frac{2 \times 200}{5} = 40 \times 2 = 80$

$\therefore$ Women population of village = 80

2.3.1 Multiplication of a fraction by a fraction :

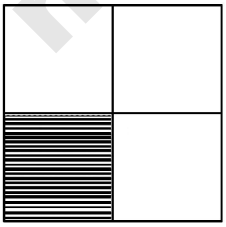
Let us supose that $\frac{1}{4}$ is to be multiplied by $\frac{1}{2}$.

We take an example.

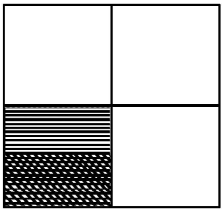
In the figure below, a square is divided equally into four parts and out of the four parts one part is considered. This is shown in shaded portion representing $\frac{1}{4}$.

What shall we do now if we have to divide this shaded portion into two equal parts? Look at the figures below [figure (ii) and (iii).In one $\frac{1}{2}$ of $\frac{1}{4}$ and in the other $\frac{1}{8}$ are shown.

(i) $\frac{1}{4}$



(ii) $\frac{1}{2}$ of $\frac{1}{4}$



(iii) $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$

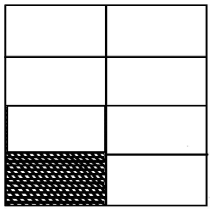


Figure -2.5

Now you tell, whether the shaded portions are equal ? You may take a two square size paper and perform the following test.

Divide one square paper into four equal parts and by choosing one of them, make two equal parts and take one part. The part you will get will be $\frac{1}{2}$ of $\frac{1}{4}$. Secondly divide the second square paper into 8 equal parts and take one part. This part will be $\frac{1}{8}$. Now you compare the two parts which you have got as $\frac{1}{2}$ of $\frac{1}{4}$ part and the $\frac{1}{8}$ part. Do they coincide with each other?

So we have observed that $\frac{1}{2}$ of $\frac{1}{4}$ that is $\frac{1}{2}\times\frac{1}{4}$ and $\frac{1}{8}$ are equal. That is $\frac{1}{2}\times\frac{1}{4}=\frac{1}{8}$

Therefore $\frac{1}{2}\times\frac{1}{4}=\frac{1}{8}=\frac{1\times1}{2\times4}$

Now we will find $\frac{1}{4}\times\frac{1}{2}$ that is will be find $\frac{1}{4}$ of $\frac{1}{2}$?

In a similar manner, we take two paper sheets of equal size. One of the two sheets of is divided into two equal parts. We have got $\frac{1}{2}$ in figure No. (i). Now divide this part into four equal parts and take one part, so that this part is one fourth of $\frac{1}{2}$ that is $\frac{1}{4}$ of $\frac{1}{2}$ [figure (ii)]. Again the other paper is divided into 8 equal parts and if one part is taken then this part is $\frac{1}{8}$ [figure (iii)].

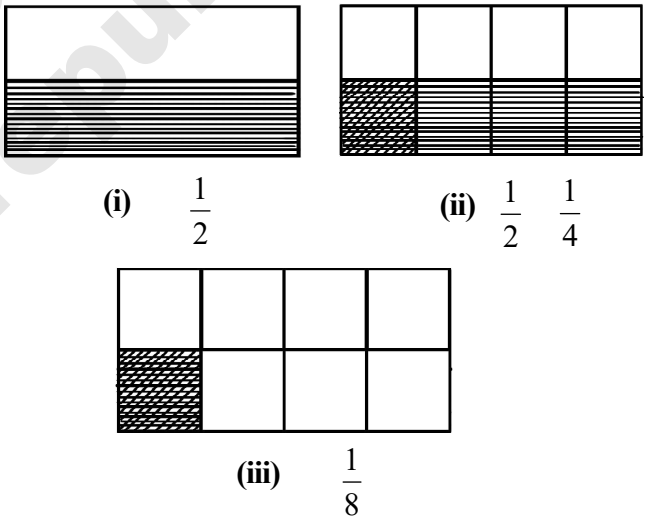


Figure - 2.6

Therefore $\frac{1}{4}$ of $\frac{1}{2}=\frac{1}{4}\times\frac{1}{2}=\frac{1}{8}$ Also, $\frac{1}{8}=\frac{1\times1}{4\times2}$ Thus $\frac{1}{4}$ of $\frac{1}{2}=\frac{1}{4}\times\frac{1}{2}=\frac{1}{8}=\frac{1\times1}{4\times2}$

Now we can conclude accordingly from the above activity.

$$\frac{1}{4}\times\frac{1}{2}=\frac{1\times1}{4\times2}=\frac{1}{8}=\frac{1\times1}{2\times4}=\frac{1}{2}\times\frac{1}{4}$$

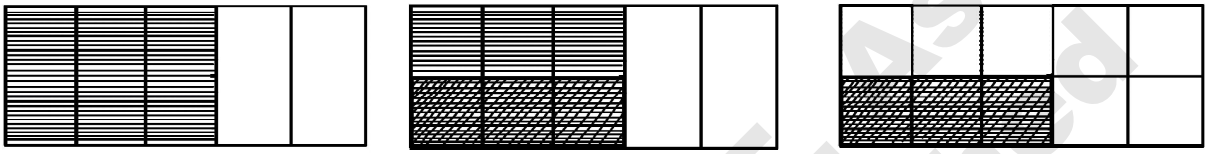
Remember, $\frac{1}{4}\times\frac{1}{2}=\frac{1}{2}\times\frac{1}{4}=\frac{1}{8}$

Try yourself : Multiply the following fractions (where numerators of two fractions is 1) as shown in the figure 2.6, drawing figure (or by paper cutting)

(a) $\frac{1}{2}\times\frac{1}{3}=\frac{1}{3}\times\frac{1}{2}=\frac{1}{6}$ (b) $\frac{1}{5}\times\frac{1}{2}=\frac{1}{2}\times\frac{1}{5}=\frac{1}{10}$

Pay Special attention :

(a) We will consider two fractions where numberator of one fraction is other than 1. Let us evaluate $\frac{3}{5}\times\frac{1}{2}$. We will evaluate with the help of figures instead of illustrations. Try to understand with the help of figure.



$\frac{3}{5}$ $\frac{1}{2}$ of $\frac{3}{5}$ $\frac{3}{10}$

Figure - 2.7

Drawing figures for $\frac{1}{2}\times\frac{3}{5}$ you may try to show that $\frac{1}{2}\times\frac{3}{5}=\frac{1\times3}{2\times5}=\frac{3}{10}$

Thus we have $\frac{3}{5}\times\frac{1}{2}=\frac{1}{2}\times\frac{3}{5}=\frac{3}{10}$

(b) Now we consider two fractions none of whose numerators is equal to 1.

Let us evaluate $\frac{4}{5}\times\frac{2}{3}$. Looking at the figures below you will understand that

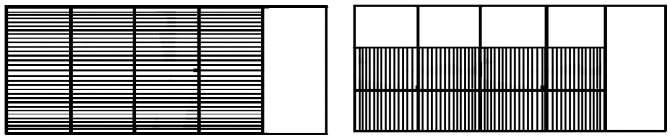
$\frac{4}{5}\times\frac{2}{3}=\frac{4\times2}{5\times3}=\frac{8}{15}$

Now show yourself by drawing the figure that $\frac{2}{3}\times\frac{4}{5}=\frac{4\times2}{3\times5}=\frac{8}{15}$

Thus we have come to know that

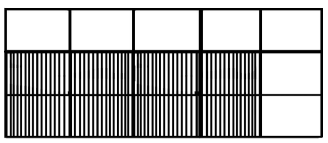
$\frac{4}{5}\times\frac{2}{3}=\frac{2}{3}\times\frac{4}{5}=\frac{8}{15}$

This can be generally expressed as below



$\frac{4}{5}$ $\frac{4}{5}$ of $\frac{2}{3}$

On the other hand



$\frac{8}{15}$ **of complete object.**

Figure - 2.8

Conclusion : For any two fraction $\frac{a}{b}$ and $\frac{c}{d}$, $\frac{a}{b}\times\frac{c}{d}=\frac{a\times c}{b\times d}$, Also note that $\frac{a}{b}\times\frac{c}{d}=\frac{c}{d}\times\frac{a}{b}$

That is, the product of two fractions $= \frac{\text{product of the numerators}}{\text{product of the denominators}}$

$= \frac{\text{numerator} \times \text{numerator}}{\text{denominator} \times \text{denominator}}$

Example 6 : Find the products –

(i) $\frac{6}{7} \times \frac{2}{5} = \frac{6 \times 2}{7 \times 5} = \frac{12}{35}$

(ii) $\frac{3}{11} \times \frac{5}{4} = \frac{3 \times 5}{11 \times 4} = \frac{15}{44}$

(iii) $\frac{8}{21} \times \frac{9}{10} = \frac{8 \times 9}{21 \times 10} = \frac{4 \times 3}{7 \times 5} = \frac{12}{35}$

(iv) $4\frac{2}{5} \times \frac{3}{4} = \frac{22}{5} \times \frac{3}{4} = \frac{22 \times 3}{5 \times 4} = \frac{11 \times 3}{5 \times 2} = \frac{33}{10} = 3\frac{3}{10}$

(v) $2\frac{4}{7} \times 2\frac{5}{8} = \frac{18}{7} \times \frac{21}{8} = \frac{18 \times 21}{7 \times 8} = \frac{9 \times 3}{4} = \frac{27}{4} = 6\frac{3}{4}$

Try yourself : Find the product–

(i) $\frac{11}{14} \times \frac{7}{22}$ (ii) $\frac{9}{16} \times \frac{2}{3}$ (iii) $6\frac{3}{7} \times 4\frac{2}{5}$

2.3.2 Observe the multiplication of two fractions and mention what you Understand.

Take any two positive integers. Say, 5 and 8. Now, $5 \times 8 = 40$ and $40 > 5, 40 > 8$; that is product of the numbers in this case is greater than each of the two numbers. Now look at following examples–

(i) $\frac{1}{3}$ and $\frac{1}{4}$ are two fractions, and $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$. Here $\frac{1}{12} < \frac{1}{3}$ and $\frac{1}{12} < \frac{1}{4}$. Take to other fractions (each with numerator 1) and see if the product of the fractions is smaller than the fractions or not.

(ii) Take another two fractions say, $\frac{2}{5}$ and $\frac{3}{7}$, in this case $\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$. Here also $\frac{6}{35} < \frac{2}{5}$ and $\frac{6}{35} < \frac{3}{7}$. Examine yourself this is true or false.

Class work : You take two proper fractions and examine whether you get such results or not. It follows from the example that the product of two proper fraction is less than its of the fractions.

(iii) Now, let us take two improper fractions. Let the fractions be $\frac{7}{5}$ and $\frac{4}{3}$.

Now $\frac{7}{5} \times \frac{4}{3} = \frac{28}{15}$. If you compare them you will get $\frac{28}{15} > \frac{7}{5}$ and $\frac{28}{15} > \frac{4}{3}$.

That is, we come to know that the product of two improper fractions is greater

than each of the two improper fractions. To verify the truth of the statement, by taking two improper fractions.

(iv) Now let us consider the product of two fraction one of which is proper and the other improper

Let the fractions be $\frac{3}{4}$ and $\frac{7}{5}$ (observe carefully).

Now comparing $\frac{3}{4}\times\frac{7}{5}=\frac{21}{20}$ we get $\frac{3}{4}<\frac{21}{20}$, but $\frac{7}{5}>\frac{21}{20}$.

That is, **product of a proper fraction and an improper fraction is greater than the proper fraction but smaller than the improper fraction.**

Exercise - 2.1

1. Find the product –

   A. (i) $6\times\frac{2}{3}$ (ii) $7\times\frac{1}{5}$ (iii) $5\times2\frac{3}{4}$ (iv) $3\frac{5}{7}\times28$ (v) $2\frac{3}{4}\times5$

   B. (i) $\frac{1}{7}\times\frac{1}{9}$ (ii) $\frac{1}{45}\times\frac{9}{39}$ (iii) $\frac{4}{15}\times\frac{9}{10}$ (iv) $\frac{51}{40}\times\frac{64}{34}$ (v) $\frac{4}{5}\times\frac{12}{7}$

   C. (i) $4\frac{2}{7}\times11\frac{2}{3}$ (ii) $9\frac{2}{3}\times4\frac{4}{5}$ (iii) $5\frac{5}{6}\times6\frac{3}{7}$ (iv) $4\frac{1}{8}\times2\frac{10}{11}$ (v) $2\frac{2}{17}\times7\frac{2}{9}\times1\frac{33}{52}$

2. Evaluate –

   (i) $\frac{1}{5}$ of $\frac{1}{7}$ (ii) $\frac{4}{5}$ of $\frac{2}{3}$ (iii) $\frac{15}{14}$ of $\frac{7}{5}$ (iv) $\frac{3}{22}$ of $2\frac{3}{4}$ (v) $\frac{7}{30}$ of 15

3. What is $\frac{3}{5}$ of $\frac{5}{6}\times\frac{4}{5}$?

4. (i) Evaluating $\frac{3}{8}$ of $\frac{4}{5}$ and (ii) $\frac{3}{10}$ of $\frac{5}{9}$, determine which one is smaller.

5. Bijit's has spent $\frac{3}{5}$ part on purchasing copy and pen and $\frac{2}{7}$ parts for geometry instrument box from the amount of money his mother gave him as pocket money and kept the rest in hand. Find the part of money left with Bijit and arrange the three parts in descending order.

6. Shyamalee reads $5\frac{3}{4}$ hours everyday. Out of it she spends $\frac{2}{5}$ part in studying Mathematics and English, $\frac{1}{6}$ part for in Science and rest in studying other subjects.

Find out her different study times and arrange them in ascending order.

7. In school competition of 'Model Reading' Utpal completed $\frac{5}{6}$ parts of the allotted portion in 3 minutes and Runjun completed $\frac{10}{11}$ parts of the allotted page in the same time. Who read more?
8. Rita read $\frac{3}{5}$ part of a short story book of 75 pages. How many pages of the book are left to read.
9. A man has ₹ 200 within. He paid one fifth of the amount as bus fare. How much amount was left with him ?
10. Each of the two water tanks in Ranjus house, contain 500 litres of water in the morning. $\frac{3}{5}$ parts of water of one tank was used for bathing and washing and $\frac{1}{4}$ parts of water of the other tank was used for cooking. What was the total water remaining in the two tanks ?
11. Bobita took $\frac{1}{4}$ part of a cake for eating. In the mean time her brother came and snatched away $\frac{2}{5}$ from her part. what part of the cake colud Bobita eat ?
12. Out of ready made shirt in a shop $\frac{1}{9}$ part are white. $\frac{5}{9}$ part are blue and the rest are yellow. If the number of yellow shirts is 72. What are the numbers shirts of other varities. What is the total number of shirts in shop ?

13. Fill in the blanks

(i) $\frac{3}{4}\times\frac{\square}{\square}=\frac{9}{20}$ (ii) $\frac{6}{\square}\times\frac{\square}{5}=\frac{12}{35}$ (iii) $\frac{2}{3}\times\frac{\square}{\square}=1$ (iv) $\frac{5}{\square}\times\frac{7}{\square}=1$

2.4 Reciprocal of Fraction :

You have already seen in the chapter on whole number that, $9\div9=1$, or $5\div5=1$. This is because if we distribute 9 objects among 9 persons equally then each will get 1 object. Similarly if 5 objects are distributed among 5 persons equally then each will get 1 object. But note carefully that $0\div0\neq1$, because it is meaningless to distribute zero objects among '0' persons and this can not be determind. You will be able to learn more in upper classes in this regard.

Therefore, you remember that, if 'a' is a non-zero number then $a\div a=1$

Now observe that $9 \div 9 = \frac{9}{9} = \frac{9 \times 1}{9} = 9 \times \frac{1}{9}$ (discussed earlier)

Again $9 \times \frac{1}{9} = \frac{9 \times 1}{9} = \frac{9}{9} = 1$ Similarly $5 \times \frac{1}{5} = 1$, $7 \times \frac{1}{7} = 1$ etc.

Also $\frac{1}{9} \times 9 = \frac{1 \times 9}{9} = \frac{9}{9} = 1$. and $\frac{1}{5} \times 5 = 1$ etc. Therefore the product of $\frac{1}{9}$ and 9 is 1.

In mathematical language 9 and $\frac{1}{9}$, are called reciprocals or multiplicative inverses of each other. That is, **if the product of two numbers is equal to 1, then one of these is said to be reciprocal or multiplicative inverse of the other.**

Now we will see how the product of two fractions is equal to 1.

Let us consider the fraction $\frac{2}{3}$ and supose you are asked to fill up blanks in $\frac{2}{3} \times \frac{\square}{\square} = 1$

You already know that $\frac{2}{3} \times \frac{3}{2} = \frac{2 \times 3}{3 \times 2} \left(= \frac{6}{6} \right) = 1$

Then by what should we put in the above blanks ? Certainly $\frac{2}{3} \times \frac{3}{2} = 1$. Similarly $\frac{9}{17} \times \frac{17}{9} = 1$ etc. In this case also $\frac{2}{3}$ is reciprocal of $\frac{3}{2}$. Similarly $\frac{9}{17}$ is reciprocal of $\frac{17}{9}$.

Remember

(i) if $a \times b = b \times a = 1$, a and b are reciprocals of each other.

(ii) if $\frac{c}{d}$ is a fraction, then reciprocal of $\frac{c}{d}$ is $\frac{d}{c}$.

Similarly reciprocal of $\frac{d}{c}$ is $\frac{c}{d}$. Since $\frac{c}{d} \times \frac{d}{c} = \frac{d}{c} \times \frac{c}{d} = 1$

(iii) '0' (zero) does not have any reciprocal.

Let us do the following : Find the reciprocal of the following–

(i) $\frac{1}{6}$ (ii) 8 (iii) $\frac{3}{7}$ (iv) $\frac{31}{5}$

2.5 Division of fractions :

2.5.1 Division of a whole number by a fraction :

By $10 \div 2 = 5$ you know that, if we divide 10 objects between 2 persons equally then they will get 5 objects each. Look, how this can be expressed in another way. How many persons can be given 10 objects if they get 5 objects each? The answer will be 2. We express this as $10 \div 5 = 2$. Now take another example. Supose that 10 apples are to be

divided equally among 4 persons. Then we get $10 \div 4 = \frac{10}{4} = \frac{5}{2} = 2\frac{1}{2}$. That is, each person gets $2\frac{1}{2}$ numbers of apples (2 whole and $\frac{1}{2}$ of an apple). This can be said in another way also. If 10 apples are divided into parts each of which is equal to $\frac{5}{2}$ of the whole lot then how many persons will get these parts ? You can easily see that the answer is 4 persons. So, you can follow that, $10 \div \frac{5}{2} = 4$. That is, a number (here it is 10) can be divided by a fraction (here it is $\frac{5}{2}$). Here $10 \div \frac{5}{2} = \frac{10}{\frac{5}{2}} = 10 \times \frac{2}{5} = 2 \times 2 = 4$

Conclusion : $a \div b = a \times (\text{reciprocal of } b) = a \times \frac{1}{b}$ $(b \neq 0)$.

Thus, **the division of a whole number by another whole number is same as the multiplication if the first whole number by the reciprocal of the second whole number.**

Activity : Drawing figures let us see how many $\frac{1}{2}$ are there in 2.

'How many $\frac{1}{2}$ are there in 2' means $2 \div \frac{1}{2}$. Here two objects are taken and each one is divided into two equal halves. So we got 4 parts of $\frac{1}{2}$.

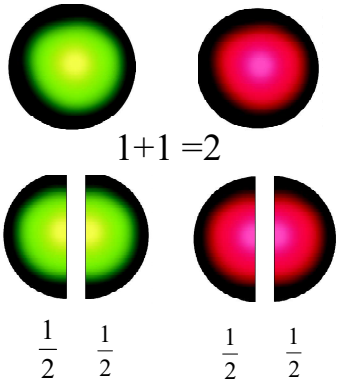


Figure - 2.9

Thus, $2 \div \frac{1}{2} = 4$. Note that 4 means, four times $\frac{1}{2}$ parts. It does not mean 4 whole objects. Now let us work out the division sum $8 \div \frac{4}{3}$.

$8 \div \frac{4}{3} = 8 \times \frac{3}{4} = \frac{8 \times 3}{4} = \frac{2 \times 3}{1} = 6$ and it is true by above explantation.

So, we can say that, **to divide a whole number by a fraction,we have to multiply it by the reciprocal of the fraction.**

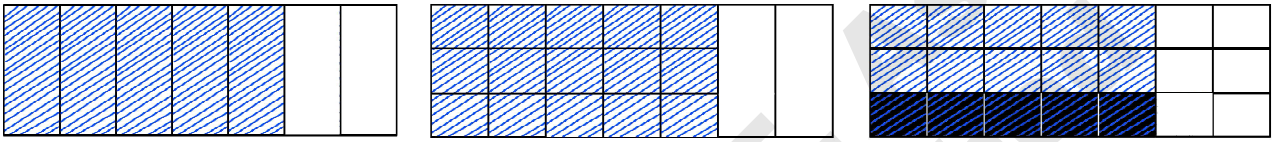
Example 7 : (a) $5 \div \frac{3}{4} = 5 \times \frac{4}{3} = \frac{5 \times 4}{3} = \frac{20}{3} = 6\frac{2}{3}$ (b) $7 \div 3\frac{2}{5} = 7 \div \frac{17}{5} = 7 \times \frac{5}{17} = \frac{35}{17} = 2\frac{1}{17}$

2.5.2 Dividing a fraction by a whole number :

Let $\frac{5}{7}$ be divided by 3. Observe this

$\frac{5}{7} \div 3 = \frac{5}{7} \div \frac{3}{1} = \frac{5}{7} \times \frac{1}{3} = \frac{5 \times 1}{7 \times 3} = \frac{5}{21}$ (Reciprocal is used in the third step)

On the other hand, $\frac{5}{7} \div 3$ means the number of parts obtained when 5 parts are taken out of 7 equal parts and it is again divided by 3. Observe the following figures –



$\frac{5}{7}$ **(i)** $\frac{5}{7} \div 3$ **(ii)** $\frac{5}{7} \div 3 = \frac{5}{21}$ **(iii)**

Figure - 2.10

Illustrations of figure : In the figure (i) 5 parts are taken from 7 equal parts of a whole object. In the second figure (ii) these $\frac{5}{7}$ part is divided into three equal parts. In the third figure (iii) $\frac{5}{7} \div 3 = \frac{5}{21}$ part is shown.

Example 8 : Evaluate

(a) $\frac{9}{10} \div 6$ (b) $4\frac{2}{5} \div 11$

Solution : (a) $\frac{9}{10} \div 6 = \frac{9}{10} \times \frac{1}{6} = \frac{3}{10 \times 2} = \frac{3}{20}$ (b) $4\frac{2}{5} \div 11 = \frac{22}{5} \div 11 = \frac{22}{5} \times \frac{1}{11} = \frac{2}{5}$

2.5.3 Dividing a fraction by another fraction :

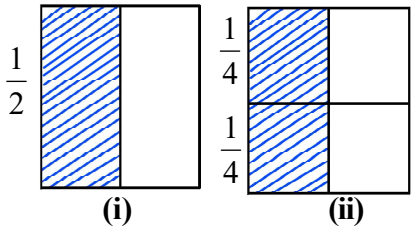
Let $\frac{14}{15}$ be divided by $\frac{7}{10}$.

Here, $\frac{14}{15} \div \frac{7}{10} = \frac{14}{15} \times \frac{10}{7} = \frac{2 \times 2}{3} = \frac{4}{3} = 1\frac{1}{3}$ (in the second step we have used reciprocal)

Therefore, to divide $\frac{14}{15}$ by $\frac{7}{10}$ we multiply $\frac{14}{15}$ by the reciprocal of $\frac{7}{10}$

Example 9 : $\frac{1}{2} \div \frac{1}{4} = \frac{1}{2} \times \frac{4}{1} = 2$.

on the other hand $\frac{1}{2} \div \frac{1}{4}$ means – the number of parts equal to $\frac{1}{4}$ contained in $(\frac{1}{2})$ of a whole object. Look at the figure 2.11.



(In $\frac{1}{2}$, no of $\frac{1}{4}$ is 2)

Figure - 2.11

In the first figure an object is divided into two equal parts and one part $(\frac{1}{2})$ is taken. In the second the same figure is divided into 4 parts and we have got 2 nos. of $\frac{1}{4}$ parts the whole object.

Exercise-2.2

1. Find the reciprocal–

   (a) 6 (b) $\frac{1}{2}$ (c) $\frac{8}{17}$ (d) 1 (e) $2\frac{3}{5}$

2. Evaluate

   A. (i) $6 \div \frac{3}{8}$ (ii) $31 \div \frac{2}{3}$ (iii) $51 \div \frac{17}{3}$ (iv) $4 \div \frac{3}{4}$ (v) $3 \div 2\frac{1}{4}$

   B. (i) $2\frac{1}{4} \div 3$ (ii) $\frac{60}{7} \div 15$ (iii) $5\frac{1}{3} \div 4$ (iv) $4\frac{1}{3} \div 3$ (v) $4\frac{3}{7} \div 7$

   C. (i) $3\frac{1}{6} \div 2\frac{1}{3}$ (ii) $5\frac{2}{3} \div 4\frac{1}{4}$ (iii) $11\frac{7}{13} \div 4\frac{2}{13}$ (iv) $3\frac{5}{6} \div 2\frac{4}{5}$

3. (i) Divide $(\frac{8}{15}$ of $\frac{3}{4})$ by $2\frac{3}{4}$.

   (ii) Divide $1\frac{13}{22}$ by the reciprocal of $\frac{6}{11}$

   (iii) Divide the product of $\frac{1}{3}$ and $\frac{2}{5}$ by the product of $\frac{3}{7}$ and $\frac{2}{5}$.

   (iv) Product of two numbers is $1\frac{1}{2}$. If one of them is $\frac{9}{14}$ then find the other number.

(v) A car covers 240 km in $3\frac{1}{3}$ hours. How much distance will the car cover in 1 hour?

4. Area of a rectangle is 24 cm^2. If the length of the rectangle is $6\frac{2}{3}$ cm then what is its breadth ?

5. A ribbon of $12\frac{1}{2}$ m long is divided into 10 equal parts. What is the length of its parts?

6. $\frac{3}{4}$ parts of a container is filled with water. If this volume of water then is divided equally into $\frac{1}{8}$ parts, how many containers will be required to keep the whole volume of it?

7. How many $\frac{1}{2}$ are there in $\frac{6}{4}$? Illustrate with help of diagram.

8. An aeroplane covers 200 km in $\frac{1}{5}$ hours. How far will it fly in 5 hours?

9. A boy covers $5\frac{1}{8}$ km in $1\frac{1}{4}$ hours on a bicycle. If the boy maintains the same speed how far will he cover in 1 hour?

10. Four options are given to the question below. Choose the correct answer–

If A + B = 1 and A – B = $\frac{2}{3}$, then the fractions A and B are –

(i) $A=\frac{5}{6}, B=\frac{3}{6}$ (ii) $A=\frac{2}{3}, B=\frac{1}{3}$ (iii) $A=\frac{5}{6}, B=\frac{1}{6}$ (iv) $A=\frac{3}{5}, B=\frac{1}{5}$

2.6 Concept of Decimal number :

You must be aware of decimal number from your earlier class. Fill up the table by using your earlier knowledge

Thousand (1000)	Hundred (100)	Ten (10)	One (1)	Decimal	Tenth $\frac{1}{10}$	Hundredth $\frac{1}{100}$	Thousandth $\frac{1}{1000}$	Number
			3	·	7	5		3.750
2	5	8	0	·	2	4	6	
	7	4	2	·	0			
				·	0	5	0	

You have filled the table by using expanded form of numbers on the basis of place value of the digits. We can express them in reverse direction also. That is, we can write the general form of decimal in expanded form as well.

For example $5342{\cdot}25 = 5\times1000 + 3\times100 + 4\times10 + 2\times1 + 2\times\frac{1}{10} + 5\times\frac{1}{100}$

Remember it :

Decimal point always lies in between unit's and tenth's place. In fact, the decimal point is a separator of the whole and the fractional parts. To the left of decimal point is whole number while to its right is fractional part.

Just like common fractions, in our daily life we have to compare decimal numbers also. For example– Weight of the Rohim's bag is 5.5 kg and that of the John's bag is 5.05 kg. Whose bag is haviour ? Unit places of weight of Rohim's and John's bags are same. But tenth place of weight of John's bag is '0'. Other way tenth place of weight of Rohim's bag is 5. We know that $5 > 0$ therefore $5{\cdot}5 > 5{\cdot}05$. That is the weight of Rohim's bag is more than weight of John's bag.

In this way when we compare decimal numbers we should compare digit from left hand side.

Also, in our daily life we have to change the units of quantity from one to another. We have already discussed about it in our earlier classes. When we change the units of length, mass and money from smaller to greater we take the help of decimals.

Recall : (a) In case of length :

1000 mm = 1 metre Therefore 1 mm = $\frac{1}{1000}$ metre = $0{\cdot}001$m

100 cm = 1 metre Therefore 1 cm = $\frac{1}{100}$ metre = $0{\cdot}01$m

1000 m = 1 kilometre Therefore 1 m = $\frac{1}{1000}$ km = $0{\cdot}001$ km

(b) In case of mass :

1000 mg = 1 gram Therefore 1 mg = $\frac{1}{1000}$ gm = $0{\cdot}001$ gm

100 cgm = 1 gram Therefore 1 cgm = $\frac{1}{100}$ gm = $0{\cdot}01$ gm

1000 gm = 1 kilogram Therefore 1 gm = $\frac{1}{1000}$ kg = $0{\cdot}001$ kg

100 kg = 1 quintal Therefore 1 kg = $\frac{1}{100}$ quintal = 0·01 quintal

10 quintal = 1 metric ton Therefore 1 quintal = $\frac{1}{10}$ metric ton = 0·1 metric ton.

(Sometimes 'metric ton' is expressed shortly as 'ton')

(c) In case of Area :

1 square metre = 1 centiare

100 square metre = 100 centiare = 1 are

100 are = 1 hectare

(d) In case of area of land :

1 lecha = 144 square feet

20 lecha = 1 kotha = 2880 square feet

5 katha = 1 bigha = 14400 square feet

4 bigha = 1 pura

1 acre = 3·025 bighas

1 hectare = 2·471 acre = 7·47 bighas (approximately)

Exercise-2.3

1. Write the decimal in expanded form :

(i) 3·05 (ii) 30·5 (iii) 235·005 (iv) 23005·005

2. Use decimal to express in metre and kilometre :

(i) 20 cm (ii) 267 cm (iii) 25732 mm (iv) 3540 cm

3. Use decimal to express in kilogram :

(i) 520 kg (ii) 4273 gm (iii) 692050 cgm (iv) 2 kg 5 gm

4. Express in Rupees :

(i) 5 paise (ii) 5 rupees 5 paise (iii) 55 rupees 55 paise (iv) 50 rupees 50 paise

5. Which one is greater? Answer orally.

(i) 0·2 and 0·02 (ii) 3·03 and 3·30

(iii) 5 and 0·5 (iv) 0·4 and 0·44

6. In an annual sports competition, in boy's long jump Roktim jumped 3.3 m and Pranjal jumped 333 cm. Who jumped more and by how much?

2.6.1 Multiplication of decimal numbers :

Sneha's father filled 2.5 litres of petrol in his motor cycle at the rate of ₹ 72·59 litre while going to school. Sneha was trying to guess the amount her father had to pay? The amount must be ₹ (72·59×2·5). Sneha found it difficult since both the numbers contain decimal point. Therefore we also need to know how to find the product of decimal fraction in our daily life. Now we shall discuss about multiplication of decimal numbers.

Example 10 : Find the product of 0·1 and 0·2. That is

$0{\cdot}1 \times 0{\cdot}2 = ?$

We know that, $0{\cdot}1 = \frac{1}{10}$ and $0{\cdot}2 = \frac{2}{10}$

Therefore $0{\cdot}1 \times 0{\cdot}2 = \frac{1}{10} \times \frac{2}{10} = \frac{1 \times 2}{10 \times 10} = \frac{2}{100} = 0{\cdot}02$

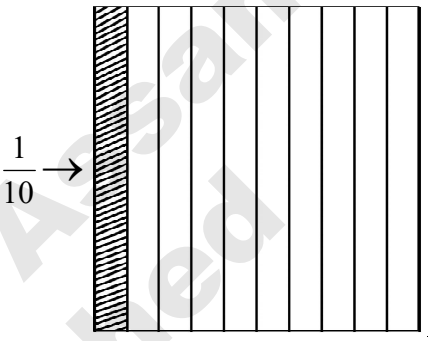
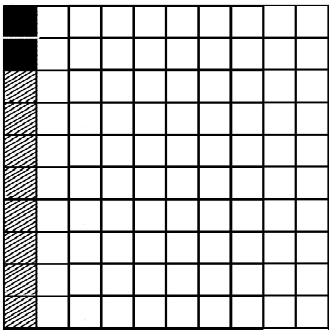


Figure -2.12(i)

Let us illustrate this example with the help of figure the fraction $\frac{1}{10}$ means 1 of 10 equal parts of a whole. The shaded portion in above figure is $\frac{1}{10}$.

We know that $\frac{1}{10} \times \frac{2}{10}$ means $\frac{2}{10}$ of $\frac{1}{10}$, That is the shaded portion $\frac{1}{10}$ is again divided into 10 equal parts and two parts are taken from it. This portion is $\frac{2}{100}$ [figure (ii)].

Darken portion is $\frac{2}{100}$.



$\frac{1}{10} \times \frac{2}{10} = \frac{2}{100}$

Figure -2.12 (ii)

That is $0{\cdot}1 \times 0{\cdot}2 = \frac{2}{100} = 0{\cdot}02$. It is to be noted that, both the multiplying numbers have decimal point before one digit. Where as the product has decimal point before 2 digit.

Example 11 : Find the product of 0·5 by 0·3.

That is $0{\cdot}5 \times 0{\cdot}3 = ?$

Solution : We know that $0{\cdot}5 \times 0{\cdot}3 = \frac{5}{10} \times \frac{3}{10} = \frac{15}{100} = 0{\cdot}15$

Let us illustrate this with the help of figure the fraction $\frac{5}{10}$

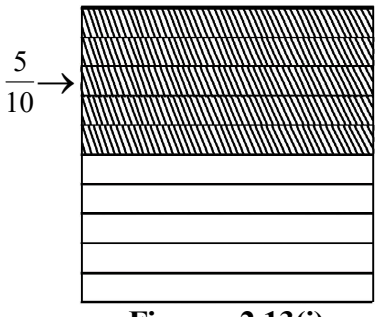


Figure - 2.13(i)

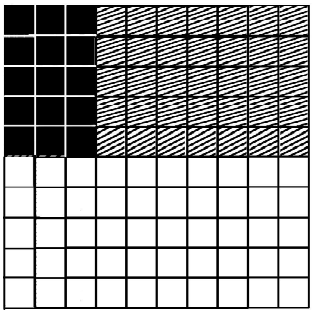


Figure -2.13(ii)

means 5 of 10 equal parts of a whole. In figure 2.13(i) shaded portion is $\frac{5}{10}$.

The shaded portion $\frac{5}{10}$ as well as the whole figure is again divided into 10 equal parts and three parts of the shaded portion are taken. Now three parts of the shaded portion are again shaded in dark. Than the dark portion is $\frac{15}{100}$ (Fig 2.13 (ii))

Since 15 parts out 100 (Fig 2.13 (ii)) are darkended, so this is 0.15. Here both the numbers viz 0·5 and 0·3 i.e. have 1 + 1 = 2 digits after the decimal points and the product 0.15 has also two digits after the decimal point.

Example 12 : (i) $0{\cdot}2 \times 0{\cdot}3 = \frac{2}{10} \times \frac{3}{10} = \frac{6}{100} = 0{\cdot}06$ (ii) $0{\cdot}4 \times 0{\cdot}8 = \frac{4}{10} \times \frac{8}{10} = \frac{32}{100} = 0{\cdot}32$

In the preceding examples, we have noted that the total number of digits after the decimal point in the multiplicands is same as the number of digits after the decimal point in the product.

Conclusion : While multiplying two decimal numbers, first we have to multiply the numbers without considering the decimal points. Then the decimal point is put in the product such that the number of digits after the decimal point in the product of is equal to the total number of didgits after the decimal points in the multiplications.

Example 13 : The length of the school garden Raju is studying is 8.25 m and its breadth is 6.65 m. Find the area of the garden.

Solution : Length of the garden = 8·25 m

Breadth = 6·65 m

$\therefore$ Area = $(8{\cdot}25 \times 6{\cdot}65)$ m^2

= 54·86 m^2 (app.)

$$\begin{array}{r} 8{\cdot}25 \\ \times 6{\cdot}65 \\ \hline 4125 \\ 4950 \\ 4950 \\ \hline 54{\cdot}8625 \end{array}$$

Here since each of the two multiplicands has decimal point before two digits, therefore product has decimal point before four digits and then it is appropriated to two places after decimal.

2.6.2 Multiplying decimal number by 10, 100 and 1000.

Since, $0{\cdot}2 = \frac{2}{10}$, $1{\cdot}1 = \frac{11}{10}$, or $3{\cdot}25 = \frac{325}{100}$

Sneha observed that, a decimal number can be converted to fraction on the basis of number of digits after the decimal point. Thus, a decimal fraction can be converted to a

common fraction by considering its numerator as the decimal number without its decimal point and the denominator as 10, 100, 1000, ... according as there is decimal point before one, two, three, ... digits in the decimal fraction. Then she attempted to try this is opposite way by multiplying the decimal fraction by 10, 100, 1000,.. Look at the table and fill the blanks

$3{\cdot}825\times10=\frac{3825}{1000}\times10=38{\cdot}25$	$5{\cdot}83\times10=\ldots\ldots=\ldots\ldots$
$3{\cdot}825\times100=\frac{3825}{1000}\times100=382{\cdot}5$	$5{\cdot}83\times100=\ldots\ldots=\ldots\ldots$
$3{\cdot}825\times1000=\frac{3825}{1000}\times1000=3825$	$5{\cdot}83\times1000=\ldots\ldots=\ldots\ldots$

Sneha observed that when a particular decimal number is multiplied by 10, 100,1000, digits, the number remain the same, only position of the decimal pointcharges. Now she wanted to try with another example –

Example 14 : Multiply $4{\cdot}721$ by 10, 100, 1000.

Solution : $4{\cdot}721\times10=\frac{4721}{1000}\times10=47{\cdot}21$ $\quad 4{\cdot}721\times100=\frac{4721}{1000}\times100=472{\cdot}1$

$4{\cdot}721\times1000=\frac{4721}{100}\times1000=4721$ or $4721{\cdot}0$

Here each time decimal point is shifted towards right hand side and finally when decimal number is multiplied by1000, it is placed after the digit of the number.

Conclusion : When a decimal number is multiplied by 10, 100, or 1000, the digits in the product are same as in the decimal number, but the decimal point in the product is shifted to the right by as many places as there are zeroes in the multiplier.

Exercise-2.4

1. Find the product :
   (i) $0{\cdot}01\times5$ (ii) $6\times2{\cdot}7$ (iii) $3{\cdot}89\times4$ (iv) $7{\cdot}21\times9$ (v) $8\times11{\cdot}7$
2. Evaluate :
   (i) $0{\cdot}6\times10$ (ii) $2{\cdot}8\times10$ (iii) $5{\cdot}7\times100$ (iv) $3{\cdot}79\times100$ (v) $4{\cdot}286\times100$
   (vi) $12{\cdot}54\times100$ (vii) $2{\cdot}234\times1000$ (viii) $3{\cdot}9524\times1000$ (ix) $0{\cdot}08\times10$ (x) $1{\cdot}05\times10$
3. Find the product :
   (i) $0{\cdot}51\times0{\cdot}5$ (ii) $0{\cdot}25\times0{\cdot}25$ (iii) $1{\cdot}57\times3{\cdot}55$ (iv) $5{\cdot}7\times3{\cdot}25$
   (v) $100{\cdot}03\times2{\cdot}2$ (vi) $101{\cdot}01\times1{\cdot}01$ (vii) $0{\cdot}5\times0{\cdot}05$ (viii) $1{\cdot}51\times5{\cdot}15$
4. Bulbuli's father bought a plot of land of measure $18{\cdot}25$ m $\times$ 15.75 m in city. If he wants to cover the area by a bondary wall. What will be the length of the boundary wall ?

5. What is the area of a square of side 2·4 cm?
6. A four wheeler vehicle covers15·5 km distance by 1 litre of petrol. How much distance would it cover in 100 liters of petrol?

2.7 Division of decimal numbers :

Tomorrow is teacher's day. Ankita and her students decided to arrange the classroom. According to plan they required some pieces of ribbon of length 0·25 m. If she had a roll of 12·75 m of ribbon with her than the roll ? She just guessed it and the calculation should be $12{\cdot}75 \div 0{\cdot}25$. How would she evaluate?

2.7.1 Dividing decimal number by whole number :

Consider the example below

How would you evaluate $8{\cdot}4 \div 2$?

$$8{\cdot}4 \div 2 = \frac{84}{10} \div 2 = \frac{84}{10} \times \frac{1}{2} = \frac{42}{10} = 4{\cdot}2$$

```
   4·2
2 | 8·4
    8
    4
    4
```

Here, we start the division by common method as if there is no decimal point and as soon as we arrive at the part of the dividened just after the decimal point, we ut a decimal point in the quotient also.

That is $8{\cdot}4 \div 2 = 4{\cdot}2$

Example 15 : Evaluate $12{\cdot}25 \div 5$.

$$12{\cdot}25 \div 5 = \frac{1225}{100} \div 5 = \frac{1225}{100} \times \frac{1}{5} = \frac{245}{100} = 2{\cdot}45$$

```
   2·45
5 | 12·25
    10
    22
    20
    25
    25
```

Alternatively, supposing that there is no decimal point, if we divide 1225 by 5, we would obtain 245. However, after getting 2 in the quotient on dividing 12 by 5 we have to start dividing the part after the decimal point. Hence we put a decimal point after 2 in the quotient and continue with the divison till the end.

That is $12{\cdot}25 \div 5 = 2{\cdot}45$

Similarly, $345{\cdot}96 \div 4 = \frac{34596}{100} \div 4 = \frac{34596}{100} \times \frac{1}{4} = \frac{1}{100} \times \frac{34596}{4} = 86{\cdot}49$

It is to be noted in the above examples that, we have considered numbers which are completely divisible by the divisions. In the higher classes we shall study numbers which are not completely divisible.

2.7.2 Dividing decimal numbers by10, 100,1000 :

Let us divide 23·5 by 10, 100, 1000

$$23{\cdot}5 \div 10 = \frac{235}{10} \div 10 = \frac{235}{10} \times \frac{1}{10} = \frac{235}{100} = 2{\cdot}35$$

$$23{\cdot}5 \div 100 = \frac{235}{10} \div 100 = \frac{235}{10} \times \frac{1}{100} = \frac{235}{1000} = 0{\cdot}235$$

$$23{\cdot}5 \div 1000 = \frac{235}{10} \div 1000 = \frac{235}{10} \times \frac{1}{1000} = \frac{235}{10000} = 0{\cdot}0235$$

It is observed that when same decimal number is divided by 10, 100, 1000; digits of the number remain same, only the position of the decimal point is changed on the basis of the number of zeros following 1.

Conclusion : On dividing a decimal number by 10, 100, 1000 the decimal point is shifted to the left by number of places equal to the number of zeros following 1 in the divisor.

2.7.3 Dividing a decimal number by another decimal number :

Let us solve the problem of Ankita stated above. How many pieces of ribbon of length 0·25 m will she get out of the roll having length 12·75 m?

That is she has to find $12{\cdot}75 \div 0{\cdot}25 = ?$

$$12{\cdot}75 \div 0{\cdot}25 = \frac{1275}{100} \div \frac{25}{100} = \frac{1275}{100} \times \frac{100}{25} = \frac{1275}{25} = 51$$

Here number of digits (2 nos) after the decimal point are equal, for both divided and divisor. Thus, the decimal points can be removed from both of the divided and divisor and by dividing 1275 by 25 would get 51.

That is, Ankita got 51 pieces of ribbon of length 0.25 m from the strip of ribbon of 12.75 m.

Let us take another example –

$$246{\cdot}15 \div 1{\cdot}5 = \frac{24615}{100} \div \frac{15}{10} = \frac{24615}{100} \times \frac{10}{15} = \frac{1}{10} \times \frac{24615}{15} = \frac{1641}{10} = 164{\cdot}1$$

To find the value by the method of division, we removed the decimal point from both and divide 24615 by 15 then we get quotient equal to 1641. Here the number of digit after the decimal point in the divisor is one, so we multiply both dividend and divisor by 10 so there will be no decimal point in divisor and in the dividend there will be one digit after the decimal point. Now by general division method we can find the quotient.

$$\frac{246{\cdot}15}{1{\cdot}5} = \frac{246{\cdot}15 \times 10}{1{\cdot}5 \times 10} = \frac{2461{\cdot}5}{15} = \frac{2461{\cdot}5}{15} = 164{\cdot}1$$

```
      164·1
15 | 2641·5
     15
     ---
      96
      90
     ---
      62
      60
     ---
       15
       15
      ---
```

Example 16 : Length of a rectangular play ground is 25.75 metres and its area is 527.88 m^2. What is the breadth of the play ground?

Solution : Since area of the rectangular playground = (length × breadth)

$$\therefore \text{ Breadth} = \frac{\text{Area}}{\text{Length}}$$

Given that, Area of the playground = 527.88 m^2

Length = 25·75 m

$$\text{Breadth} = \frac{527.88}{25.75} \text{ m} = 20.5 \text{ m (app.)}$$

```
          20·50
2575 | 52788
       5150
       12880
       12875
           5
```

Here both Dividend and Divisor have same number of digits after the decimal point. Multiplying both dividend and divisor by 100 and dividing we get the breadth.

$\therefore$ Breadth = 20.5 m (app)

Exercise-2.5

1. Find the quotient :

(i) 0·6 ÷ 2	(ii) 0·24 ÷ 3	(iii) 2·75 ÷ 5	(iv) 107·52 ÷ 7
(v) 66·33 ÷ 11	(vi) 3·96 ÷ 4	(vii) 14·49 ÷ 7	(viii) 86·1 ÷ 3

2. Evaluate :

(i) 0·9 ÷ 10	(ii) 21·4 ÷ 10	(iii) 0·52 ÷ 10	(iv) 521·1 ÷ 10
(v) 236·75 ÷ 10	(vi) 527·33 ÷ 100	(vii) 123·7 ÷ 100	(viii) 0·01 ÷ 100
(ix) 1·482 ÷ 100	(x) 0·7 ÷ 1000	(xi) 2·1 ÷ 1000	(xii) 224·21 ÷ 1000
(xiii) 0·06 ÷ 1000	(xiv) 1113·05 ÷ 1000	(xv) 8411·27 ÷ 1000	(xvi) 84·50 ÷ 1000

3. Find the quotient :

(i) 0·5 ÷ 0·25	(ii) 8·64 ÷ 0·2	(iii) 32·94 ÷ 0·4	(iv) 329·4 ÷ 0·04
(v) 76·5 ÷ 0·15	(vi) 48·56 ÷ 3·2	(vii) 841·26 ÷ 0·3	(viii) 0·25 ÷ 0·5

4. If the cost of 5·5 m cloth is 547·25, what is the cost of 1 m cloth?
5. A vehicle covers a distance of 150·5 km in 3·5 hours. How far vehicle will cover in 1 hour?
6. Whole sale price of potato 10 kg is ₹ 186.50. What is the price of 1 kg of potato?
7. Perimeter of a square shaped vegetable garden is 76·8 m. What is the length of a side of the vegetable garden?
8. Breadth of a conference hall is 5·5 m and its area is 74·25 square metre (m^2). What is the length of the conference hall?

What we have learnt

1. We compare two unlike fractions by converting them to equivalent fractions.
2. We consider the value of fraction in terms of equal parts only.
3. When a fraction is multiplied by a whole number, the multiplication is done with the numberator of the fraction.
4. 'of' means multiplication.
5. Product of two fractions $= \frac{\text{product of the numerators of two fractions}}{\text{product of the demominators of two fractions}}$ or

$$\frac{\text{numerator} \times \text{numerator}}{\text{demominator} \times \text{demominator}}$$

6. Product of two proper fractions is smaller than each of the proper fractions.
7. Product of two improper fractions is greater than each of the improper fractions.
8. Product of a proper fraction and an improper fraction is greater than proper fraction, but smaller than the improper fraction.
9. If the product of two fractions is 1 then the two fractions are called reciprocal to each other.
10. To divide a number by a fraction is same as to multiply the number by the reciprocal of the fraction.
11. Decimal point is always placed between the unit's and tenth's place.
12. Multiplication of decimal number is same as multiplication of whole number. However to locate the decimal point in the product we have to count the number of digits after the decimal point in the numbers and place the total number of digits after decimal point is the two numbers.
13. To multiply a decial number by 10, 100 or 1000, we shift the decimal point in the number to the right by as many places as the number of zeros in the multiplier, to get the product.
14. To divide a decimal number by 10, 100 or 1000, we shift the decimal point in the number to the left by as many places as the number of zeroes in the divisor, to get the quotient.
15. While dividing a decimal number by another decimal number, we first convert the devisor into a whole number and then we divide.