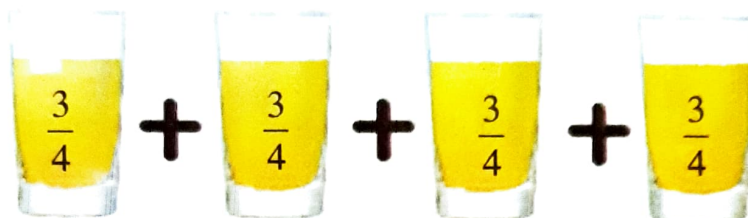




Mother gave lassi to Deepak and asked him to distribute it equally among his four friends. Each friend got $\frac{3}{4}$ glass of lassi. Find the number of glasses of lassi made by the mother.

Let's add and see-



$$\text{Hence, } \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{3 + 3 + 3 + 3}{4} = \frac{12}{4} = 3$$

Let's see it in this way too-

Quantity of lassi got by one friend $= \frac{3}{4}$ glass
 Quantity of lassi got by 4 friends $= 4 \times \frac{3}{4}$ glasses
 Here, the whole number 4 is multiplied by the fraction $\frac{3}{4}$.
 So, $4 \times \frac{3}{4} = 3$
 Thus, mother made total 3 glasses of lassi.

Example :

(a) $\frac{3}{4} \times 15$

Solution :

$$\frac{3 \times 15}{4} = \frac{45}{4} = 11\frac{1}{4}$$

(b) $4\frac{1}{2} \times 3$

Solution :

$$\frac{9}{2} \times 3 = \frac{27}{2} = 13\frac{1}{2}$$





Do it yourself-

1. Solve—

● $\frac{16}{8} \times 8$

● $\frac{19}{3} \times 9$

● $4\frac{1}{3} \times 12$

2. Choose the correct option and fill in the blanks — $1\frac{1}{8} \times 3 =$

(a) $1\frac{3}{8}$

(b) $3\frac{3}{8}$

(c) $2\frac{3}{8}$

(d) $3\frac{1}{8}$



Activity

A notice board of a school was equally divided into 3 parts for classes 3, 4, and 5. Students of each class wrote the details of the whole day activities on $\frac{1}{4}$ part of the notice board of their portion. Find the portion of the whole notice board used by the students of class 3.

Let's see

The students of class 3 got $\frac{1}{3}$ shaded portion of the given picture.

Students of each class used $\frac{1}{4}$ part of their portion to write the whole activities.

Class - 3	Class - 4	Class - 5
$\frac{1}{12}$ portion of the blackboard		

Portion of the notice board used by the students of class 3 = $\frac{1}{4}$ of $\frac{1}{3}$

This is solved in this way $\frac{1}{3} \times \frac{1}{4} = \frac{1 \times 1}{3 \times 4} = \frac{1}{12}$ part

Thus, the students of class 3 used $\frac{1}{12}$ portion of the notice board.



We have seen that

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

and $\frac{1}{3} \times \frac{1}{4} = \frac{1 \times 1}{3 \times 4} = \frac{1}{12}$

It means that for multiplying two fractions, we multiply the numerator of one fraction by the numerator of the other fraction and the denominator of one fraction by the denominator of the other fraction.

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

Example 1 : Find the value of $2\frac{1}{5} \times 3\frac{1}{5}$

Solution $2\frac{1}{5} \times 3\frac{1}{5}$
 $= \frac{11}{5} \times \frac{16}{5}$
 $= \frac{176}{25}$

Here, product $\frac{176}{25}$ is an improper fraction. Hence, we will convert it into a mixed fraction.

$$\frac{176}{25} = 7\frac{1}{25}$$

We have seen that when multiplying the mixed fractions, we first convert mixed fractions into improper fractions.

Example 2 : Simplify $\frac{6}{11} \times \frac{22}{27}$

Let's see : Here, the numerator of the second fraction i.e. 22 is divisible by the denominator of the first fraction i.e. 11. In the same way the numerator of the first fraction i.e. 6 and the denominator of the second fraction i.e. 27 are divisible by 3.

On dividing numerator and denominator by 11 $\frac{6}{\cancel{11}} \times \frac{\cancel{22}^2}{27} = \frac{6}{1} \times \frac{2}{27}$

Again on dividing numerator and denominator by 3 $= \frac{\cancel{2}^2}{1} \times \frac{2}{\cancel{27}_9} = \frac{2}{1} \times \frac{2}{9} = \frac{2 \times 2}{9} = \frac{4}{9}$

In multiplication of fraction if numerator and denominator are exactly divisible by the same number, then we can simplify the fraction by dividing both of them by that number.





Do it yourself-

1. Find the value –

• $\frac{1}{2}$ of $\frac{1}{3}$

• $\frac{1}{4}$ of $\frac{1}{4}$

• $\frac{1}{6}$ of $\frac{1}{3}$

2. Find the product –

• $4\frac{5}{11} \times 7$

• $3\frac{4}{9} \times 4\frac{7}{11}$

• $3 \times 2\frac{3}{5}$

Multiplication of more than two fractions

Example 1 : Find the product of $\frac{1}{2}$, $\frac{2}{3}$ and $\frac{3}{5}$

Look : $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{5}$

Here, numerator and denominator both have 2 as the common number. Hence, we divide numerator and denominator by 2. Again numerator and denominator have 3 as the common number, so we also divide them by 3.

$$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{5} = \frac{1}{\cancel{2}} \times \frac{\cancel{2}}{\cancel{3}} \times \frac{\cancel{3}}{5} = \frac{1}{5}$$

Example 2 : Solve $\frac{1}{6} \times \frac{3}{5} \times \frac{2}{7}$

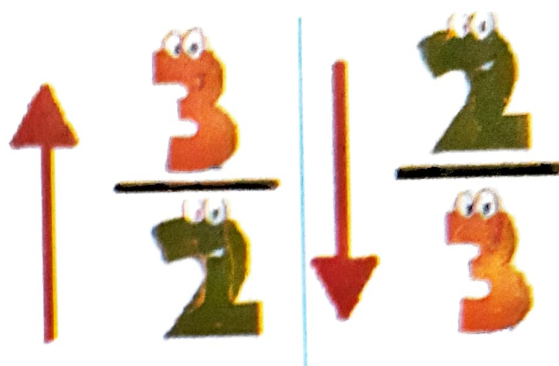
$$\begin{aligned} \text{Look : } \frac{1}{6} \times \frac{3}{5} \times \frac{2}{7} &= \frac{1}{\cancel{6}} \times \frac{\cancel{3}}{5} \times \frac{\cancel{2}}{7} \\ &= \frac{1}{1} \times \frac{1}{5} \times \frac{1}{7} \\ &= \frac{1}{35} \end{aligned}$$



Reciprocal of fractions

Let's see : What is the difference between the fractions $\frac{2}{3}$ and $\frac{3}{2}$?

The denominator of the second fraction is the numerator of the first fraction and the numerator of the second fraction is the denominator of the first fraction.



If the place of numerator and denominator of a fraction is interchanged, the new formed fraction will be the reciprocal of the previous fraction.

For example : Reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$

Look at these too—

- $\frac{3}{2} \times \frac{2}{3} = \frac{3 \times 2}{2 \times 3} = \frac{6}{6} = 1$

- $\frac{4}{7} \times \frac{7}{4} = \frac{4 \times 7}{7 \times 4} = \frac{28}{28} = 1$

If the product of two fractions is 1, then they are known as reciprocal or multiplicative inverse of each other.

Reciprocal of 2 is $\frac{1}{2}$ because $2 \times \frac{1}{2} = 1$

Reciprocal of 3 is $\frac{1}{3}$ because $3 \times \frac{1}{3} = 1$

Reciprocal of $\frac{4}{5}$ is $\frac{5}{4}$ because $\frac{4}{5} \times \frac{5}{4} = 1$

We saw that if the number is greater than 1, its reciprocal is less than 1. When the number is less than 1 (except 0), its reciprocal is greater than 1.



Do it yourself-

1. • $\frac{3}{5} \times \frac{4}{6} \times \frac{2}{3}$ • $2\frac{3}{5} \times 5\frac{3}{7}$ • $\frac{1}{5} \times \frac{1}{9} \times \frac{2}{7}$

2. Write the reciprocal of the following –

• $\frac{1}{5}$ • $\frac{7}{15}$ • 1 • 7

Let's know this too-

- On changing the order of fractions, the value of their product does not change-

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

- On multiplying any fraction with 1, we get the same fraction-

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

- On multiplying any fraction with 0, the value of their product is 0- $\frac{2}{5} \times 0 = 0$

Word Problems

Example 1 : A sack can contain $98\frac{1}{2}$ kg of sugar. How much sugar can be filled in 15 such sacks ?

Look : Quantity of sugar in 1 sack = $98\frac{1}{2}$ kg

$$\begin{aligned} \text{Quantity of sugar in 15 sacks} &= 15 \times 98\frac{1}{2} \text{ kg} \\ &= \frac{15}{1} \times \frac{197}{2} = 1477\frac{1}{2} \text{ kg} \\ &= 1477.5 \text{ kg} \left(\frac{1}{2} \text{ kg} = 0.5 \text{ kg} \right) \end{aligned}$$

Thus, 15 sacks can be filled with 1477.5 kg of sugar.



We have learnt

- On multiplying the fractions, we write the product of all the numerators at the place of numerator and the product of all the denominators at the place of denominator.
- When the product of two fractions is 1, they are reciprocal or multiplicative inverse of each other.
- Reciprocal of 1 is 1.
- There is no reciprocal or multiplicative inverse of zero.
- When a number is greater than 1, its reciprocal is less than 1.
- When a number is (except zero) less than 1, its reciprocal is greater than 1.
- To identify proper, improper and mixed fraction in the given fractions.
- To solve the questions based on addition, subtraction, multiplication and division of fractions.
- To solve the questions of fractions based on our day to day life.

Exercise

1. Solve –

(a) 5 of $\frac{9}{3}$

(b) 7 of $14\frac{1}{2}$

(c) 12 of $18\frac{1}{4}$

(d) 75 of $\frac{21}{15}$

2. Multiply –

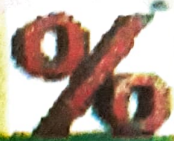
(a) $\frac{4}{3} \times \frac{7}{9}$

(b) $5\frac{1}{3} \times \frac{2}{5}$

(c) $2\frac{1}{7} \times 7\frac{1}{2}$

(d) $6\frac{3}{8} \times \frac{1}{2}$

Exercise



3. Simplify –

(a) $\frac{7}{9} \times \frac{4}{5} \times \frac{3}{2}$

(b) $\frac{11}{5} \times \frac{25}{22} \times \frac{13}{15}$

(c) $2\frac{1}{2} \times 4\frac{3}{6} \times 1$

4. Fill in the blanks–

(a) $\frac{5}{2} \times \frac{1}{3} = \frac{1}{3} \times \dots$

(b) $\frac{15}{7} \times \frac{18}{3} = \frac{18}{3} \times \dots$

(c) $14\frac{1}{2} \times 0 =$

(d) $2\frac{1}{7} \times 1 = \dots$

(e) $2\frac{1}{3} \times \dots = 0$

5. Colour the figures according to the given fractions–

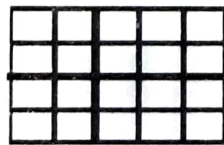
(a) $\frac{1}{2}$ part



(b) $\frac{3}{4}$ part



(c) $\frac{1}{5}$ part



(d) $\frac{5}{8}$ part



6. Vegetables are grown in $\frac{1}{2}$ portion of a field. In $\frac{1}{5}$ part of the vegetables portion, potatoes were sown. How much part of the whole field was used for sowing potatoes?

