



10 Decimal : Multiplication Division

Conversion of fraction into decimal numbers

Let's look at this figure —

In how many equal parts it has been divided ?

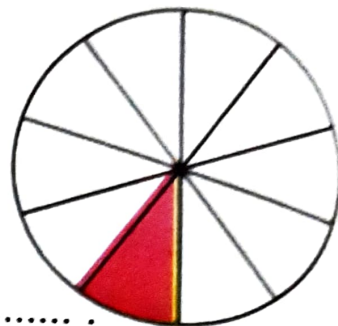
How many parts of it are coloured ?

Out of these 10 parts what will we say to 1 part of it ?

In the form of a fraction one tenth is written as

In the form of a decimal number, $\frac{1}{10}$ is written as.....

In the form of a decimal number, $\frac{2}{10}$ is written as.....



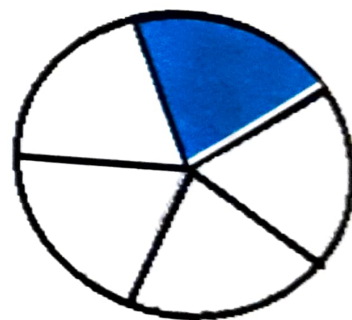
Now look at this figure—

How many parts are there in it ?

How many parts of it are coloured ?

Out of these 5 parts, one part of it is written as $\frac{1}{5}$ in the form of fraction.

How will we write $\frac{1}{5}$ as decimal number ?



Let's understand —

$\frac{1}{5} = \frac{1}{5} \times \frac{2}{2}$ to get the 10 as denominator, we multiply both, the numerator and the denominator by 2.

$$= \frac{2}{10} = 0.2 \text{ (decimal number obtained)}$$

Look at this too—

- $\frac{2}{4} = \frac{2}{4} \times \frac{25}{25}$ to get the 100 as denominator, we multiply both the numerator and the denominator by 25.

$$= \frac{50}{100} = 0.50$$

- $\frac{3}{8} = \frac{3}{8} \times \frac{125}{125}$ to get the 1000 as denominator, we multiply both the numerator and the denominator by 125.

$$= \frac{375}{1000} = 0.375$$

Let's understand this too —

To convert the fraction into decimal number another method is also used.

This is the division method —

denominator) numerator (decimal number

To solve $\frac{1}{5}$ —

5) 1 (0.2

First divide it zero times.

— 0

Again, 1 is not divisible by 5, place the decimal in the quotient.

— 10

As we put a decimal in quotient, a zero is inserted just right to the remainder.

— 10

— xx



Do it yourself—

Convert the given fractions into decimal numbers—

- $\frac{4}{5}$

- $\frac{3}{4}$

- $\frac{4}{8}$



To convert the decimal numbers into fractions

We know how to make the place value chart. Let's convert the decimal number with the help of place value chart –

1. Number 4.15

Place value chart –

Ones	Decimal	Tenths	Hundredths
4	.	1	5

In expanded form we write–

$$4 + 0.1 + 0.05$$

4 ones + 1 tenths + 5 hundredths

or $4 + \frac{1}{10} + \frac{5}{100}$ (here $\frac{1}{10}, \frac{5}{100}$ both are fractions)

or $\frac{415}{100}$

2. Number 0.463

Place value chart –

Ones	Decimal	Tenths	Hundredths	Thousandths
0	.	4	6	3

$$0.4 + 0.06 + 0.003$$

4 tenths + 6 hundredths + 3 thousandths

or $\frac{4}{10} + \frac{6}{100} + \frac{3}{1000}$ (These are fractions)

or $\frac{463}{1000}$

3. Number 0.567

$$0.5 + 0.06 + 0.007$$

5 tenths + 6 hundredths + 7 thousandths

or $\frac{5}{10} + \frac{6}{100} + \frac{7}{1000}$

or $\frac{567}{1000}$



Let's look at this too—

$$0.5 = 0.5 \times \frac{10}{10} = \frac{5}{10}$$

$$\frac{10}{10} = 1$$

On simplifying this fraction

$$= \frac{1}{2} \text{ (on dividing both numerator and denominator by 5)}$$

$$0.06 = 0.06 \times \frac{100}{100} = \frac{6}{100}$$

$$\frac{100}{100} = 1$$

On simplifying this fraction

$$= \frac{3}{50} \text{ (on dividing both numerator and denominator by 2)}$$

$$0.07 = 0.07 \times \frac{1000}{1000} = \frac{7}{1000}$$

$$\frac{1000}{1000} = 1$$

This fraction will not be further simplified as 7 and 1000 are co-prime numbers.



Do it yourself-

Write in the form of simplest fraction—

● 0.2

● 0.05

● 0.125

● 0.55

Multiplication of decimal numbers by 10, 100 and 1000-

$$2.45 \times 10 = 2.45 \times 10$$

$$= \frac{245}{100} \times 10$$

$$= \frac{245}{10}$$

$$= 24.5$$



$$56.127 \times 100 = \frac{56127}{1000} \times 100$$

$$= 5612.7$$

$$6.784 \times 1000 = \frac{6784}{1000} \times 1000$$

$$= 6784.000$$

$$= 6784$$

Similarly, $17.45 \times 1000 = \frac{1745}{100} \times 1000$

$$= 1745 \times 10$$

$$= 17450$$

We saw that on multiplying decimal numbers by 10, 100 and 1000, the decimal point is shifted by one place, two places and three places respectively to the right to give the product.



Do it yourself -

● **Multiply** — (a) 2.123×10 (b) 45.717×100 (c) 0.135×1000

● **Fill in the blanks** —

(a) $13.789 \times \dots = 1378.9$ (b) $0.7879 \times \dots = 7.879$ (c) $9.763 \times \dots = 9763$

Divide decimal number by 10, 100 and 1000

Look : $16.5 \div 10$

or

$$\begin{array}{r} 1.65 \\ 10 \overline{) 16.5} \\ \underline{- 10} \\ 65 \\ \underline{60} \\ 50 \\ \underline{50} \\ 00 \end{array}$$

On dividing a number by 10, the decimal point of dividend shifts from its position to the left by one place and becomes quotient.

Hence, $16.5 \div 10 = 1.65$



Similarly, $228.54 \div 100$

or

$$\begin{array}{r} 2.2854 \\ 100 \overline{) 228.54} \\ \underline{-200} \\ 285 \\ \underline{-200} \\ 854 \\ \underline{-800} \\ 540 \\ \underline{-500} \\ 400 \\ \underline{-400} \\ 000 \end{array}$$

On dividing a number by 100, the decimal point of dividend shifts from its position to its right by two places and becomes quotient.

$$\text{Hence, } 228.54 \div 100 = 2.2854$$

Similarly, $1256.3 \div 1000$

or

$$\begin{array}{r} 1.2563 \\ 1000 \overline{) 1256.3} \\ \underline{-1000} \\ 2563 \\ \underline{-2000} \\ 5630 \\ \underline{-5000} \\ 6300 \\ \underline{-6000} \\ 3000 \\ \underline{-3000} \\ 0000 \end{array}$$

On dividing a number by 1000, the decimal point of dividend shifts from its position to its right by three places and becomes quotient.

$$\text{Hence, } 1256.3 \div 1000 = 1.2563$$

We saw that if any number is divided by 10, 100 and 1000 then the decimal point of dividend shifts to one, two and three places respectively from its position to its right and becomes quotient.

While shifting the decimal point to its right side in the number, we increase as many zeros as the number of digits are less.



Example 1 : Find the value of $3.6 \div 100$

Here, in divisor '100' there are two zeros to the right after 1. Hence, decimal point will be shifted to two places towards left. There is only one digit to the left of decimal point. Hence, we will increase one zero to left side of the digit and then decimal will be placed to its left.

Hence $3.6 \div 100 = 0.036$



Divide -

(a)

$$44.15 \div 10$$

(b)

$$417.13 \div 100$$

Multiplication of a decimal number by a decimal number

Let's see and understand — 0.2×0.3

$$= \frac{2}{10} \times \frac{3}{10} \quad (\text{after converting in fractions})$$

$$= \frac{6}{100} \quad (\text{on multiplying numerator by numerator and denominator by denominator})$$

$$= 0.06$$

Let's do in this way too —

0.2	multiplicand	(number of digit after the decimal is one)
x 0.3	multiplier	(number of digit after the decimal is one)
0.06	product	(number of digits after the decimal are two)

Here, we saw that the multiplication of decimal has also been done like simple multiplication. The emphasis is on putting the decimal. In both multiplicand and multiplier we count the digits on the right side to decimal and add. Then we put decimal in the product after counting that many digits from right side.

Let's see this too—

36.36	(number of digits after the decimal are two)
x 2.3	(number of digit after the decimal is one)
10908	
72720	(number of digits after the decimal are three, 2 of multiplicand and 1 of multiplier)
83.628	





Do it yourself -

● Find the product —

(a) 15.38×2.1

(b) 436.51×2.14

(c) 5.06×2.07

Division of a decimal number by a decimal number

Look and learn to put decimal point —

$$0.45 \div 0.5$$

Here 0.45 is dividend. In this the decimal point is just before the two digits.

0.5 is divisor. Here decimal point is just before the one digit.

Let's find out the quotient —

$$\frac{0.45 \times 10}{0.5 \times 10} = \frac{4.5}{5}$$

$$\begin{array}{r} 5 \overline{) 4.5} \quad (0.9 \\ - 00 \\ \hline 45 \\ - 45 \\ \hline 00 \end{array}$$

While dividing a decimal number by a decimal number, first we convert the divisor into a whole number. To make the whole number, we multiply divisor and dividend by 10, 100 or 1000 etc. according to the place of decimal in divisor.

Let's do it this way too—

$$0.45 \div 0.5$$

$$= \frac{45}{100} \div \frac{5}{10} \quad (\text{on converting these decimal numbers in the form of fractions})$$

$$= \frac{45}{100} \times \frac{10}{5} \quad \text{Now, on multiplying by the reciprocal of } \frac{5}{10}$$

$$= \frac{9}{10} \quad (\text{on dividing both numerator and denominator by 5})$$

$$= 0.9 \quad (\text{zero decimal nine or zero point nine})$$



Let's understand again-

$$0.615 \div 0.15$$

or $15 \overline{) 61.5} \quad (4.1$

$$\begin{array}{r} 60 \\ \times 15 \\ \hline 15 \\ \times \times \\ \hline \end{array}$$

$0.615 \times 100 \div 0.15 \times 100 = 61.5 \div 15$
To remove the decimal from divisor we multiply both dividend and divisor by 100.

Let's understand it this way too –

$$0.615 \div 0.15$$

$$= \frac{615}{1000} \div \frac{15}{100}$$

$$= \frac{615}{1000} \times \frac{100}{15}$$

$$= \frac{41}{10}$$

$$= 4.1$$

In any decimal number if there is only zero on the right side of the decimal, it has no value.

For example – $40.000 = 40$

$40.5000 = 40.5$

$40.0500 = 40.05$



Do it yourself-

● Find out the quotient –

(a) $0.715 \div 0.5$

(b) $9.756 \div 0.09$

(c) $3.850 \div 0.25$

Word problem

Example 1 : Mohit bought a plate for ₹ 25.75. How many rupees Mohit will have to pay to buy 12 plates ?

Solution : To solve these types of questions we first write –

What has been given? And what we have to find out ?



As it is given in this question –

$$\text{Cost of 1 plate} = ₹ 25.75$$

To find out –

$$\text{Cost of 12 plates} = ?$$

$$\text{Cost of 1 plate} = ₹ 25.75$$

Therefore, cost of 12 plates = cost of 1 plate $\times$ 12 (total number of plates)

$$= 25.75 \times 12$$

$$= 309$$

Hence, Mohit will pay ₹ 309 for 12 plates.

Example 2 : Anjali bought 12 pens for ₹ 114. If she buys one pen, how many rupees will she spend ?

Solution : Given cost of 12 pens = ₹ 114

To find out cost of 1 pen = ?

Let's do and see—

$$\text{Given cost of 12 pens} = ₹ 114$$

$$\text{To find out cost of 1 pen} = \frac{\text{cost of total objects}}{\text{number of objects}}$$

$$= \frac{114}{12}$$

$$= 9.5$$

Hence, ₹ 9.5 will be spent for 1 pen.

When the value of one object is given in the question and we have to find out the value of more objects, we do multiplication.

We divide when the value of many objects are given in the question and we have to find out the value of one object.



We have learnt

- We count all the digits to the right after the decimal in multiplier and multiplicand. After multiplication, we count the same number of digits to the right of the product and insert a decimal in it.
- To convert decimal numbers into fractions.

Exercise



1. Find the value-

(a) 2.341×100 (b) 3.2×1000 (c) $37685.34 \div 1000$

(d) 19.026×0.05 (e) 12.32×1.05 (f) $40.25 \div 2.3$

2. Julie covers a distance of 1.05 km in one hour by bicycle. How many kilometres will she cover in 12 hours with the same speed?



3. 782.25 kg wheat has to be filled in 15 sacks. If all the sacks are equally filled with wheat, how much wheat a sack will contain?

4. The cost of one metre cloth is ₹ 53.50. Find the cost of 13 metres of cloth.

5. A can contain 16 litres of oil. How many bottles of 0.85 litre capacity can be filled from it? How much oil will be left?

6. How many pieces of 4.3 metres length can be cut from 86 metres long wire ?

7. A grocer has 6 kg of coriander powder. How many packets of 30 gm each will be prepared from it ?





How much have you learnt — 2



1. Find the greatest and the smallest four digit number which is formed by the digits 5, 3, 0 and 6 using each digit only once. Find the difference between both the numbers?
2. What should be subtracted from 10 lakhs to get 276489 ?
3. Raman had ₹ 25000. He bought a television for ₹ 9600 and 11 transistors from remaining money. What was the cost of each transistor ?
4. After solving a question of division Sarita said that its quotient is 6 times the remainder and divisor is 10 times the quotient. If remainder is 14, find out the dividend.
5. A playground is 176 metres long and 112 metres wide. Find the length of that longest measuring tape by which we can measure the length and breadth of the whole playground ?
6. Find the L.C.M. and H.C.F. of 12 and 18. What is the relation between product of L.C.M., H.C.F. and product of both the numbers ?
7. Deepika covers a distance of $9\frac{2}{3}$ km in 1 hour by bicycle. How many kilometres will she cover in $4\frac{1}{2}$ hours ?
8. Mohan spins $1\frac{3}{5}$ grams of cotton fibre in 1 hour. How many hours will he take in spinning $4\frac{4}{5}$ grams of cotton fibre ?
9. In a bamboo $\frac{1}{3}$ part is red, $\frac{1}{6}$ part is green, $\frac{1}{10}$ is yellow and the remaining part is white. If the length of white part is $\frac{7}{2}$ metres, find out the length of the whole bamboo ?
10. In a map a distance of 10 metres is represented by 1 cm. Find out the distance which will be represented by the measurements : 2 cm, 3.5 cm, 5.2 cm.
11. In a class 5.2 litres of milk is equally distributed among the children during lunch break. If there are 26 children in the class, how much milk does each child get?
12. A car covers a distance of 7.3 km in one litre of petrol. How much distance will it cover in 3.5 litres of petrol ?
13. In which group all the numbers are multiple of 13 —
 - (a) 13, 26, 36, 49
 - (b) 26, 39, 42, 52
 - (c) 13, 52, 91, 117
 - (d) 13, 26, 81, 104

