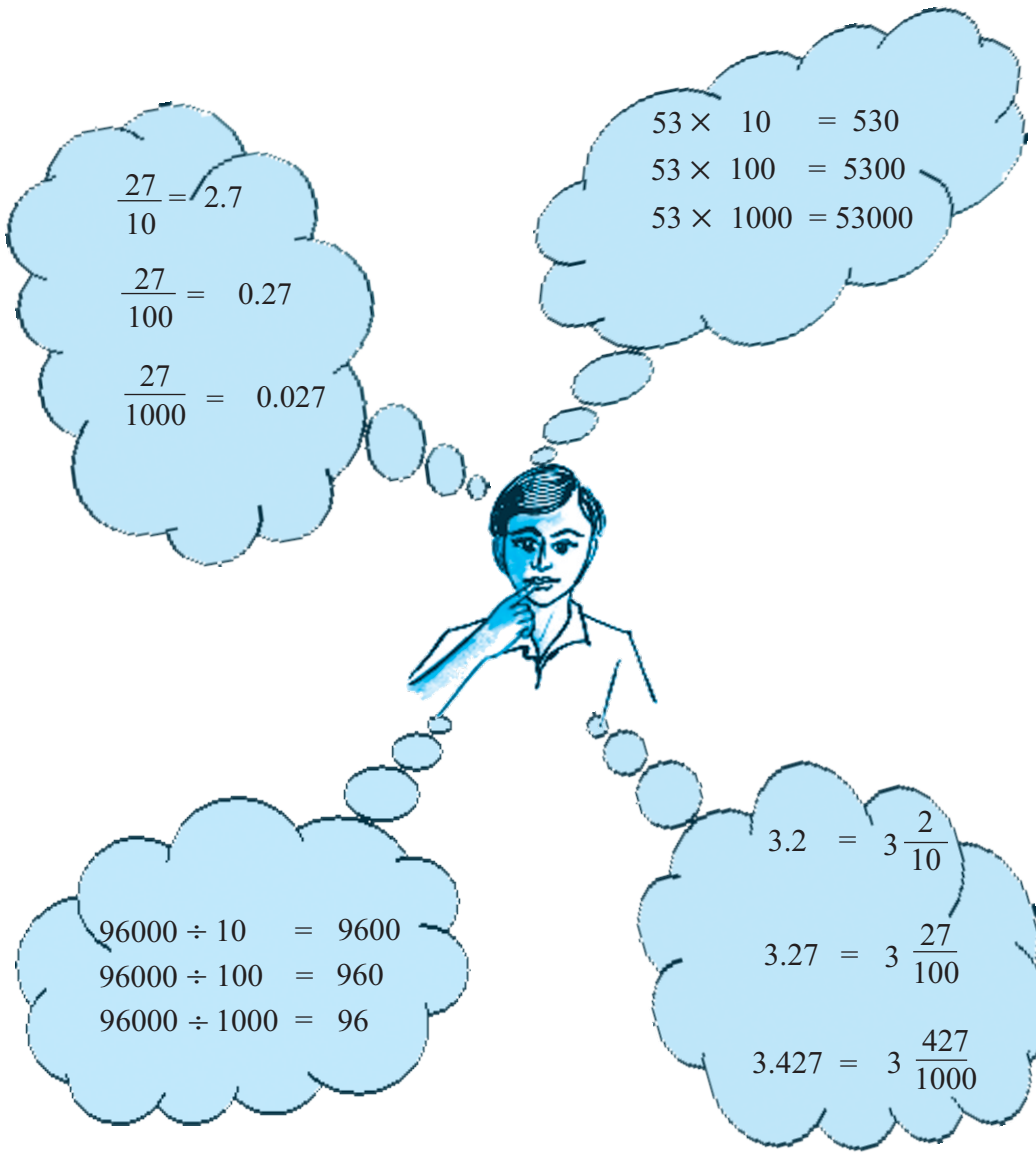
10 Decimals

After studying this chapter you will be able to get the ability to,

- ✶ multiply decimals by powers of 10.
- ✶ multiply and divide decimals by a whole number.
- ✶ solve problems with decimals correctly in day -to -day activities.



10.1 Multiplication of decimals by 10, 100 and 1000 which are powers of 10.

Example 1

(1) 3.2×10 (2) 3.2×100 (3) 3.2×1000

(1) $3.2 \times 10 = 3\frac{2}{10} \times 10$

$= \frac{32}{10} \times 10$

$= \frac{320}{10}$

$= \underline{\underline{32}}$

(2) $3.2 \times 100 = 3\frac{2}{10} \times 100$

$= \frac{32}{10} \times 100$

$= \frac{3200}{10}$

$= \underline{\underline{320}}$

(3) $3.2 \times 1000 = 3\frac{2}{10} \times 1000$

$= \frac{32}{10} \times 1000$

$= \frac{32000}{10}$

$= \underline{\underline{3200}}$

Let us observe the above multiplications carefully.

Ignoring the decimal point of 3.2, multiply it by 10 or 100, or 1000. Then separate one decimal place from the last digit of right hand side of the result. (here 3.2 has only one decimal.) Then you will have the same result for the above examples. Go through the examples given below.

$3.2 \times 10 = 32.0 = 32$

$3.2 \times 100 = 320.0 = 320$

$3.2 \times 1000 = 3200.0 = 3200$

Example 2

(i) $4.3 \times 10 = 43.0 = 43$

(ii) $4.3 \times 100 = 430.0 = 430$

(iii) $4.3 \times 1000 = 4300.0 = 4300$

Example 3

$3.24 \times 10 = 32.40 = 32.4$

$3.24 \times 100 = 324.00 = 324$

$3.24 \times 1000 = 3240.00 = 3240$

Example 4

$4.512 \times 10 = 45.12 = 45.12$

$4.512 \times 100 = 451.200 = 451.2$

$4.512 \times 1000 = 4512.000 = 4512$

When multiplying a decimal number by powers of 10, first ignore its decimal point and multiply it by the power of 10. Then separate the number of decimal digits from the end, which must be equal to the number of decimals of the original decimal. Then you get the answer.

Exercise 10.1

(1) Fill in the blanks of the table given below .

x	5.1	4.26	3.542
10			
100			
1000			

(2) Multiply the given decimal numbers by powers of 10.

(a)	(i) 9.4×10	(b) (i) 15.2×100	(c) (i) 0.93×1000
	(ii) 21.4×10	(ii) 0.62×100	(ii) 12.6×1000
	(iii) 2.43×10	(iii) 11.68×100	(iii) 11.65×1000
	(iv) 0.36×10	(iv) 0.06×100	(iv) 1.9342×1000

(3) If 1.85 m of cloth is sufficient to sew a uniform for a girl in Grade7, find the quantity of cloth necessary to sew 10 such uniforms.

(4) The perimeter of a land is 327. 75 m. What is the total length of barbed wire needed to build a fence with 10 strands, around the land ?

10.2 Division of a decimal number by powers of 10

Example 5

(i) $12.8 \div 10$

$= 12.8 \div 10 = 12\frac{8}{10} \div 10$

$= \frac{128}{10} \div \frac{10}{1}$

$= \frac{128}{10} \times \frac{1}{10}$

$= \frac{128}{100}$

$= \underline{\underline{1.28}}$

(ii) $12.8 \div 100 = 12\frac{8}{10} \div \frac{100}{1}$

$= \frac{128}{10} \div \frac{100}{1}$

$= \frac{128}{10} \times \frac{1}{100}$

$= \frac{128}{1000}$

$= \underline{\underline{0.128}}$

(iii) $12.8 \div 1000 = 12\frac{8}{10} \div \frac{1000}{1}$

$= \frac{128}{10} \div \frac{1000}{1}$

$= \frac{128}{10} \times \frac{1}{1000}$

$= \frac{128}{10000}$

$= \underline{\underline{0.0128}}$

★ Accordingly, we can see that when dividing by 10, the number of decimal places of the original number will increase by one.
★ When dividing by 100, the number of decimal places of the original number will increase by two.
★ When dividing by 1000, the number of decimal places of the original number will increase by three.

Accordingly, when a decimal number has to be divided by a power of 10, let us pay attention on how to obtain the answer directly without division.

Example 6

(i) $5.7 \div 10 = 0.57$
(ii) $5.7 \div 100 = 0.057$
(iii) $5.7 \div 1000 = 0.0057$

Example 7

(i) $25.23 \div 10 = 2.523$
(ii) $25.23 \div 100 = 0.2523$
(iii) $25.23 \div 1000 = 0.02523$

Example 8

(i) $143.785 \div 10 = 14.3785$
(ii) $143.785 \div 100 = 1.43785$
(iii) $143.785 \div 1000 = 0.143785$

Exercise 10.2

(1) Fill in the blanks of the table given below with the quotients when the numbers in the first row are divided by the numbers in the first column.

÷	2.3	51.24	3.725
10			
100			
1000			

(2) Write the solutions for the sums given below without doing any division.

(i) 48.2 ÷ 10 (ii) 93.6 ÷100 (iii) 5675 ÷1000
(iv) 112.5 ÷ 10 (v) 1163 ÷100 (vi) 436 ÷ 1000
(vii) 6.92 ÷ 10 (viii) 43.8 ÷ 100 (ix) 75.34 ÷ 1000
(x) 438 ÷ 10 (xi) 72.62 ÷100 (xii) 4.278 ÷ 1000

(3) Express the length of a 125 cm long ribbon in metres.

(4) There is a bottle with a capacity of 1.25*l* which is full of soft drink.
(i) Express in millilitres the volume of the soft drink in that bottle .
(ii) The soft drink in the bottle is poured into 10 tumblers equally. Find in millilitres the volume of soft drink in each tumbler .

10.3 Multiplication of a decimal by a whole number

Example 9

Find the value of 2.8 × 3 ,
First method
As multiplication is repeated addition:

$$\begin{array}{rl} 2.8 \times 3 = & 2.8 \\ & 2.8 \\ & \underline{2.8} + \\ & \underline{\underline{8.4}} \end{array} \qquad \therefore \ 2.8 \times 3 = \underline{\underline{8.4}}$$

Second method

$2.8 \times 3 = \frac{28}{10} \times \frac{3}{1}$

$= \frac{84}{10}$

$= 8.4$

$\therefore \ 2.8 \times 3 = \underline{8.4}$

Example 10

method I

5.73×2

$= 5.73$ (By repeated addition)

$+ \ 5.73$

$\underline{11.46}$

method II

5.73×2

$= \frac{573}{100} \times \frac{2}{1}$

$= \frac{1146}{100}$

$= \underline{11.46}$

You can observe that the result given in method I and II of example 9 can be obtained easily as,

$2.8 \times$

3

$\underline{8.4}$

and the result given in methods I and II of example 10 can be obtained easily as

$5.73 \times$

2

$\underline{11.46}$

When we pay attention to parts (I) and (II) above, the result which is given by multiplying a decimal number by a whole number, has the same number of decimal places as in the original decimal number.

When multiplying a decimal by a whole number, ignore the decimal point, get the solution and then separate decimal places equal to the number of decimal places of the original decimal number.

Exercise 10.3

(1) Multiply.

(i)	3.2×4	(ii)	32.4×7	(iii)	5.1×3
(iv)	124.02×5	(v)	7.32×4	(vi)	92.001×9
(vii)	8.51×5	(viii)	5.709×15	(ix)	4.32×8
(x)	3.287×12				

(2) A length of 1.65 m of lace is necessary for a pattern of a skirt. Find the total length of lace needed for 5 such skirts.

(3) Gayani's family consumes 1.5 kg of rice per day. Find the quantity of rice needed for them for two weeks.

10.4 Division of a decimal by a whole number

Example 11

Evaluate $39.2 \div 4$.

$$
\begin{array}{r}
9.8 \\
4\overline{)39.2} \\
\underline{36} \\
32 \\
\underline{32} \\
0
\end{array}
$$

$\therefore 39.2 \div 4 = \underline{\underline{9.8}}$

Example 12

Evaluate $51.18 \div 12$

$$
\begin{array}{r}
4.265 \\
12\overline{)51.18} \\
\underline{48}\downarrow \\
31 \\
\underline{24} \\
78 \\
\underline{72} \\
60 \\
\underline{60} \\
0
\end{array}
$$

$\therefore 51.18 \div 12 = \underline{\underline{4.265}}$

Exercise 10.4

(1) Evaluate

(i)	$3.9 \div 3$	(ii)	$44.88 \div 17$	(iii)	$8.42 \div 5$
(iv)	$4.29 \div 13$	(v)	$12.06 \div 9$	(vi)	$96.168 \div 12$
(vii)	$9.252 \div 18$	(viii)	$132.85 \div 25$	(ix)	$23.75 \div 19$
(x)	$76.95 \div 15$				

(2) Eight students have spent Rs. 426.00 on a picnic. What is the amount of money spent by each student?

(3) Kasun who works in Middle East draws a salary of 500 American Dollars ($). If that amount is equal to 54,650.00 Sri Lankan Rupees, what is in the value of an American Dollar in Sri Lankan Rupees?

(4) Asoka spent Rs. 60.00 for 8 chocolates. What is the price of a chocolate?

(5) If a rope of length 74.4 m is cut into 6 pieces of equal length, what is the length of each piece of rope?

Summary

- When multiplying a decimal number by a power of 10, do the multiplication, ignoring its decimal point, then separate the number of decimal places from the end of the answer and the number of decimal places of the answer should be equal to the number of decimal places of the original decimal.
- When multiplying a decimal by a whole number, the number of decimal places in the answer should be equal to the number of decimal places of the original decimal.
- When dividing a decimal number by 10, 100 and 1000 the number of decimal places of the answer should be increased by one, two, and three respectively.