Modern Simple Mathematics

PART - 5

By

Council for Preparation of Textbooks

Translated and Edited By

Irfan Ahmed Siddiqui

Foreword

New developments in science and technology, explosion of knowledge in various fields and changing trends in the methodology of teaching, and their effects on society and culture demand that textbooks are revised accordingly. In view of the above we have drawn a plan to revise all our textbooks. *Modern Simple Mathematics* is part of the plan.

In preparing the book, besides taking into account the objectives of teaching Mathematics, those thoughts and views have been given due importance with which is associated the real purpose of the life of pupils.

The psychology of pupils, their mental level and teaching principles have also been given due weight. With a view to create interest in Mathematics, which is othervise considered a boring and dull subject for pupils, exercises in the book have been so designed as to relate them to their day-to-day life.

The principles and method of solving problems have been explicitly explained with sample solved examples. The book, as the pupils as well as the teachers will find, has been profusely illustrated with graphics to clarify each and every point and also to make the book interesting and attractive.

This book is English version of the original Urdu book *Jadeed Asan Riyazi*. This is our first attempt to bring out books for English Medium students. Suggestions and comments are highly appreciated and will be thankfully acknowledged. We acknowledge all those whose kind co-operation, guidance and assistance have culminated in the production of this book.

Muhammad Ashfaque Ahmed
(Incharge)

New Delhi
- Jamadi-ul-Akhir
- May 2013

Teaching Mathematics

The need and utility of Mathematics in our day-to-day life is universally acknowledged. No one can eventually do without the basic concept of Mathematics - whatsoever profession one is in.

Everyone has to deal, more or less, with personal and family budget, marketing, mutual give-and-take, measurement, Zakat and Ushr, inheritance and other obligations. That is why the practice of teaching basic Mathematics to little children from the very beginning has been in vogue for centuries. And in this age of science and technology this need has assumed much more importance. Inventions, industries and scientific developments in the various fields have left an abiding influence on the very course of our life. Whether it is industry or handloom, business or agriculture, science or technology, the knowledge of Mathematics is required at every step. Thus for the success of life it is essential that every pupil is taught Mathematics up to the secondary level.

Not only to meet practical needs of life, the knowledge of basic concepts of Mathematics is necessary to gain mastery over different subjects, to study science and social sciences and even the books of language, and to understand them quite well.

Children do require the knowledge of counting, addition, subtraction and other details of weighing and measurement in doing work at home and school, in knowing the quantity and number, shape and size of things, in business transaction, in games and sports and in satisfying their curiosity at every step in their day-to-day life. For the fulfilment of this need it is necessary to teach them Mathematics. This is the most important subject next only to the basic knowledge of Islam and the mother tongue. Thus it should be given special attention accordingly.

The real purpose of teaching Mathematics at the elementary level is to gradually develop so much awareness in children that they may solve mathematical problems in their day-to-day life, ascertain the quantity and number as well as shape and size of the things they come across, handle business transaction, have sufficient knowledge of weighing and measurement as well as time and distance, and make further study in Mathematics. To achieve this purpose it is inevitable to teach Mathematics at the elementary level.

(Late) **Afzal Hussain**, M.A.; L.T.

Contents

Chapter 1

REVISION

Reading and writing of numbers and fundamental operation on them

In previous classes you have learnt ten crore (100000000) is the smallest 9-digit number. Ten crore is also called 100 million.

Exercise 1

1. Write the following numbers in words:

(i) 10,520 **(ii)** 11,024 **(iii)** 9,03,448 **(iv)** 63,00,783

(v) 11,02,90,087 **(vi)** 2,52,08,090

2. Write in numerals:

(i) Eleven thousand five hundred sixty nine.

(ii) One lakh twenty five thousand nine hundred two.

(iii) Seven lakh nine thousand two.

(iv) Two crore thirteen lakh ten thousand one hundred forty-seven.

3. Find the place value of 3 in each of the following numbers:

(i) 48,02,143 **(ii)** 8,05,378 **(iii)** 71,23,041
(iv) 20,75,30,601 **(v)** 91,25,435 **(vi)** 13,14,207

4. Solve:

(i) 2,75,043 + 28,736 **(ii)** 3,64,879 – 37,520

(iii) 1,52,031 – 79,324 + 11,357

(iv) 7,35,408 – 2,35,798 + 13,08,506

5. Find the product:

(i) 5848×172 **(ii)** 15634×267

(iii) $215 \times 15 \times 42$ **(iv)** $457 \times 639 \times 78$

6. Find quotient and remainder:

(i) $78025 \div 17$ **(ii)** $905463 \div 25$

(iii) $82540 \div 30$ **(iv)** $9035 \div 54$

7. Solve the following questions:

(i) $8 + 15 - 13$ **(ii)** $25 + 3 \times 4$ **(iii)** $28 + 21 \div 7$

(iv) $35 \div 5 - 2$ **(v)** $(25+23) \div 12$ **(vi)** $80 \div (4 \times 5)$

8. Fill in the blanks:

(i) 4 Rupees 35 Paise = ... Paise.

(ii) 13 Rupees 75 Paise = ... Paise.

(iii) 3 Kg 400 g = ... g.

(iv) 10 Kg 560 g = ... g.

(v) 5 Km 275 m. = ... m.

(vi) 8 lit 25 ml = ... ml.

(vii) 2 Min 20 Sec. = ... Sec.

(viii) 3 Hrs. 15 Min. = ... Min.

(ix) 3 Days 3 Hrs. = ... Hrs.

(x) 2 Yrs. 4 Months 10 Days = ... Days.

9. Separate the following fractions as 'Proper' and 'Improper':

(i) $\frac{2}{3}$ (ii) $\frac{1}{5}$ (iii) $\frac{7}{8}$ (iv) $\frac{3}{2}$

(v) $\frac{12}{19}$ (vi) $\frac{37}{41}$ (vii) $\frac{6}{5}$ (viii) $\frac{9}{10}$

10. Write two equivalent fractions of each of the following:

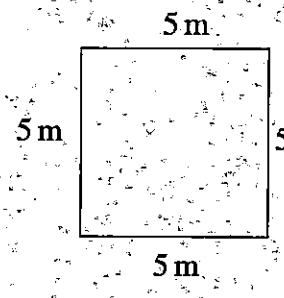
(i) $\frac{1}{2}$ (ii) $\frac{3}{4}$ (iii) $\frac{5}{6}$ (iv) $\frac{4}{5}$

11. Use the symbols '<' and '>' in the following:

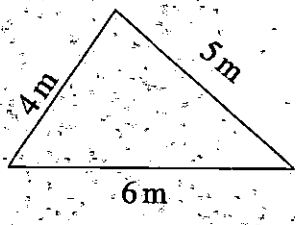
(i) $\frac{3}{10} \square \frac{9}{10}$ (ii) $\frac{7}{12} \square \frac{5}{12}$

(iii) $\frac{11}{30} \square \frac{11}{40}$ (iv) $\frac{35}{75} \square \frac{35}{81}$

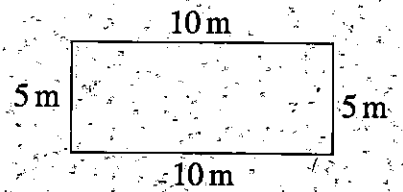
12. Find the Perimeter of the following figures:



(i)



(ii)



(iii)

Answers

REVISION

Exercise 1

(1) **(i)** Ten thousand five hundred twenty
(ii) Eleven thousand twenty four
(iii) Nine lac three thousand four hundred forty eight
(iv) Sixty three lac seven hundred eighty three
(v) Eleven crore two lac ninety thousand eighty seven
(vi) Two crore fifty two lac eight thousand ninety

(2) **(i)** 11,569 **(ii)** 1,25,902 **(iii)** 7,09,002
(iv) 2,13,10,147

(3) **(i)** 3 **(ii)** 300 **(iii)** 3000
(iv) 30000 **(v)** 30 **(x)** 3.00000

(4) **(i)** 3,03,779 **(ii)** 3,27,359
(iii) 84,064 **(iv)** 18,08,116

(5) **(i)** 10,05,856 **(ii)** 41,74,278 **(iii)** 1,35,450
(iv) 2,27,77,794

(6) **(i)** 4589 = Quotient **(ii)** 36218 = Quotient
12 = Remainder 13 = Remainder

(iii) 2751 = Quotient **(iv)** 167 = Quotient
10 = Remainder 17 = Remainder

(7) **(i)** 10 **(ii)** 37 **(iii)** 31 **(iv)** 5 **(v)** 4 **(vi)** 4

(8) **(i)** 435 **(ii)** 1375 **(iii)** 3400 **(iv)** 10560 **(v)** 5275
(vi) 8025 **(vii)** 140 **(viii)** 195 **(ix)** 75 **(x)** 860

(9) Proper Fractions: **(i)** $\frac{2}{3}$ **(ii)** $\frac{1}{5}$ **(iii)** $\frac{7}{8}$ **(v)** $\frac{12}{19}$ **(vi)** $\frac{37}{41}$ **(viii)** $\frac{9}{10}$

Improper Fractions: **(iv)** $\frac{3}{2}$ **(vii)** $\frac{6}{5}$

(10) **(i)** $\frac{2}{4}, \frac{3}{6}$ **(ii)** $\frac{6}{8}, \frac{9}{12}$ **(iii)** $\frac{10}{12}, \frac{15}{18}$ **(iv)** $\frac{8}{10}, \frac{12}{15}$

(11) **(i)** < **(ii)** > **(iii)** > **(iv)** >

(12) **(i)** 20m **(ii)** 15m **(iii)** 30m

Chapter 2

INTRODUCTION OF BILLION

You have already learnt reading 9-digit number. In this chapter we shall learn how to write these numbers.

Consider, Fifty-six Crore Seven Lakh Twenty-three Thousand forty eight.

This number represents – 56 Crores, 7 lakhs, 23 thousands 4 tens and 8 ones. We can show them in the following place value chart.

Crores		Lakhs		Thousands		Ones		
One crore 10000000	Ten crores 100000000	One lakh 100000	Ten lakhs 1000000	One thousan 1000	Ten thousands 10000	Ones 1	Tens 10	Hundreds 100
5	6	0	7	2	3	0	4	8

We put 0 (zero) at blank places.

So, the above number will be written as

560723048

Any number can be written likewise

For Example:

Five crore nine thousand twenty-eight 5, 00, 09, 028

Eighty three crore sixty lakh five thousand 83,60,05,000

Nine crore sixty-five	9,00,00,065
Eighty-seven crore nine lakh forty-six thousand	87,09,46,000
Seven crore five lakh three thousand four hundred	7,05,03,400

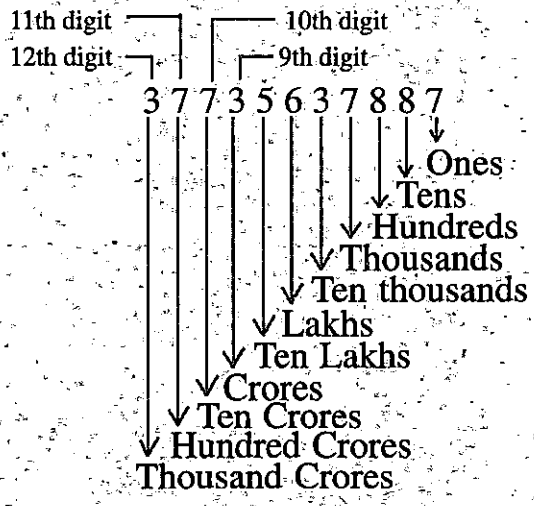
Exercise 2.1

Write the following numbers in numerals:

1. Twenty-seven crore ninety lakh three thousand eighty-seven.
2. Thirty-nine crore thirty lakh fifty-four thousand nine hundred forty-two.
3. Ten crore five lakh fifty-seven thousand thirty nine.
4. Forty six crore eighty lakh seven thousand three hundred eighty-two.
5. Seven crore seventy-nine lakh seventy thousand four hundred fifty two.
6. Sixty-five crore six lakh eighty-three.
7. Nine crore ninety three.
8. Forty crore seventy two thousand nine.
9. Five crore ninety-five lakh nine thousand eighty-three.
10. Seventy seven lakh seventy seven thousand seven hundred seventy seven.
11. Ninety thousand five hundred five.
12. One crore one lakh one thousand one.
13. Nine crore nine thousand nine hundred nine.
14. Eighty crore eighty.
15. Eighty-nine crore sixty-nine lakh fifty nine.

International Value Chart

You have learnt writing 9-digit numbers according to Indian system. To include more places beyond 9-digit, the chart will be extended towards left. The place next to crore's place will be 10 crore and the one adjacent to 10 crore's place is 100 crore.



Let's learn 9-digit number in international place value chart.

283674519 is a 9-digit number. We write this in international place value chart as following.

Millions			Thousands			Ones		
Hundred Million 100000000	Ten Mililion 10000000	One Million 1000000	Hundred thousands 100000	Ten thousands 10000	One thousand 1000	Hundreds 100	Tens 10	Ones 1
2	8	3	6	7	4	5	1	9

According to this table 9-digit number is divided into three periods

Ones period

Thousands period

Millions period

ONES PERIOD includes ones Tens and Hundreds places.

THOUSANDS PERIOD includes one thousands, Ten Thousands and Hundred Thousands places.

MILLION PERIOD includes One Millions, Ten Millions and Hundred Millions places.

MILLION PERIOD			THOUSAND PERIOD			ONES PERIOD		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones

You may notice that in International place value system each period consists of 3-digit but in Indian place value system there are 3 digits in only the first period and in all of the rest periods there are only two digits.

1 2 , 3 4 , 5 6 , 7 8 9 ⟶ Indian system

1 2 3 , 4 5 6 , 7 8 9 ⟶ International system

The number given at the bottom of the table is 283674519. In this number:

5,1,9 are digits of ones period

6,7,4 are digits of thousands period

and 2,8,3 are digits of millions period

We read this number two hundred eighty three (283) millions six hundred seventy-four (674) thousand and five hundred nineteen. Similarly 789,231,508 is read as seven hundred eighty-nine million two hundred thirty-one thousand five hundred eight.

[In international system commas are put after every three digit starting from right as 12,345,678 or 123,456,789 or 12,34,567,890.]

Can you read 628953146?

If your answer is "Six Hundred Twenty Eight Million, Nine Hundred Fifty Three Thousand, One Hundred Forty six", then your answer is correct.

To include more digits, the table is extended towards left. The period next to million is billion.

Now write one hundred fifty-four million, six thousand twelve in numerals.

Well your answer is 154,006,012.

The missing numbers in each place of every period is represented by a '0" zero.

You might have noticed that each period is separated by a comma.

See more example:-

1. One hundred five million fifty-seven thousand = 105, 057, 000
2. Five hundred four million two hundred thirteen thousand seven hundred ninety-two = 504,213,792
3. Seven hundred sixty million three hundred thousand fifty-two = 760,300,052
4. Forty-four million four hundred forty thousand five hundred fifteen = 44,440,515
5. Six hundred nine million fifty-two thousand three hundred nine = 609,052,309

Exercise 2.2

1. Write the following numbers in numeral in International system:

(i) Eighty-eight million four hundred twenty-two thousand four hundred five.

(ii) One hundred fifteen million five hundred forty thousand nine hundred forty four.

(iii) Sixty-four million two hundred ninety-three.

(iv) Two million two thousand two hundred two.

(v) Five hundred four million ten thousand ten.

(vi) Seven hundred sixty million two hundred twelve thousand three.

(vii) Eight hundred nine million eight hundred nine thousand eight hundred nine.

(viii) Seven billion six hundred nineteen million forty nine.

(ix) Sixty-nine billion nine hundred ninety-one million two hundred thousand three hundred seventy nine.

(x) Six hundred nineteen billion fifty nine million forty-nine.

Ans. Exe 2.1

(1) 27,90,03,087	**(2)** 39,30,54,942	**(3)** 10,05,57,039
(4) 46,80,07,382	**(5)** 7,79,70,452	**(6)** 65,06,00,083
(7) 9,00,00,093	**(8)** 40,00,72,009	**(9)** 5,95,09,083
(10) 77,77,777	**(11)** 90,505	**(12)** 1,01,01,001
(13) 9,00,09,909	**(14)** 80,00,00,080	**(15)** 89,69,00,059

Ans. Exe 2.2

1.

(i) 88,422,405	**(ii)** 115,540,944	**(iii)** 64,000,293
(iv) 2,002,202	**(v)** 504,010,010	**(vi)** 760,212,003
(vii) 809,809,809	**(viii)** 7,619,000,049	**(ix)** 69,991,200,379
(x) 619,059,000,049		

Chapter 3

ADDITION AND SUBTRACTION

In class 4 you have learnt addition and subtraction of 7 digit numbers. Now we shall learn addition and subtraction of bigger numbers.

8-digit numbers are added or subtracted exactly like 7-digit numbers.

Example 1: Add 95,728,229 and 12, 503, 718.

Solution :

$$\begin{array}{r} 95,728,229 \\ +\ 12,503,718 \\ \hline 108,231,947 \end{array}$$

Explanation: [First we add unit nos. 9 and 8, we get 17, 7 ones are placed below ones column and 1 (one) ten is carried to tens column. Now we add 2-tens and 1-ten and 1-ten which was carried. We get 4 tens and write it under tens column. We continue to do so till all the digits are added.]

Example 2: Add 29513309, 8139518 and 91311294.

Solution : [Note: In International system the latest convention is to leave a blank space to separate periods and commas are normally omitted.]

$$\begin{array}{r} 29\ 513\ 309 \\ 8\ 139\ 518 \\ 91\ 311\ 294 \\ \hline 128\ 964\ 121 \end{array}$$

Example 3: In a charity fund Rs 12,313,728 were deposited in January, Rs.15,729,517 in February, Rs. 28,717,903 in March and Rs.55,926,719 in April. Find the total amount deposited in these four months.

Solution:

Amount deposited in January	Rs.	12 313 728
in February	Rs.	15 729 517
in March	Rs.	28 717 903
in April	Rs.	55 926 719
Total amount in these four months		112 687 867

Ans. Rs. 112,687,867

Exercise 3.1

1. Find the Sum:

(i) 74526025 + 16257281

(ii) 32967801 + 96231814 + 81664590

(iii) 48313219 + 16312702 + 15227415

(iv) 31201786 + 61652710 + 90688712

(v) 79624034 + 15312491 + 41512114

(vi) 30900512 + 30090012 + 40001200

(vii) 1000910 + 40035000 + 1300018

(viii) 51800012 + 51000120 + 31000712

(ix) 16500918 + 29000000 + 91700100

(x) 71800297 + 12900301 + 91700100

2. A soap factory manufactured 73,526,741 soap cakes on Monday and 10,000,098 soap cakes on Tuesday. Find the total number of soap cakes produced in these two days.

3. In an election three candidates got 87,682,671, 6,271,785 and 67,854,323 votes. How many votes were polled for three candidates?

Example 1: Subtract 35869721 from 74084845.

Solution:

$$\begin{array}{r} {\scriptstyle 6\ 13\ 10\ 7\ 14} \\ \not{7}\ \not{4}\ \not{0}\ \not{8}\ \not{4}\ 8\ 4\ 5 \\ -3\ 5\ 8\ 6\ 9\ 7\ 2\ 1 \\ \hline 3\ 8\ 2\ 1\ 5\ 1\ 2\ 4 \end{array}$$

The answer is → 38,215,124

Example 2: Subtract 27588653 from 83173954.

Solution:

$$\begin{array}{r} {\scriptstyle 7\ 12\ 10\ 16\ 13} \\ \not{8}\ \not{3}\ \not{1}\ \not{7}\ \not{3}\ 9\ 5\ 4 \\ -2\ 7\ 5\ 8\ 8\ 6\ 5\ 3 \\ \hline 5\ 5\ 5\ 8\ 5\ 3\ 0\ 1 \end{array}$$

Answer is → 55, 585, 301

Example 3: In a leather factory Rs. 54,673,210 were spent in purchasing raw material and Rs. 66,437,421 were spent on the employees. How many more rupees were spent on employees than on purchasing raw material?

Solution:

Expense on employees	Rs. 66437421
Expense in purchasing raw material	− 54673210
difference	Rs. 11,764,211

So, Rs. 11,764,211 more were spent on employees than in purchasing raw material.

Exercise 3.2

1. Subtract:-

(i) 58,757,271 – 34,115,071

(ii) 66,450,810 – 49,765,502

(iii) 99,874,427 – 57,998,599

(iv) 86,543,219 – 80,000,018

(v) 75,298,318 – 65,478,615

2. 54,789,160 children out of a total of 75,864,328 children go to school. Find how many children do not go to school.

3. In a factory 65,746,210 pen were manufactured in the first month and 76,748,207 pens in the second month. Tell how many more pens were manufactured in the second month than in the first month.

4. 78,657,405 pair of socks were manufactured in a factory and 45,798,743 pairs of socks were sold. How many pairs of socks are left now?

Ans. Exe 3.1

1.

(i)	90,783,306	**(ii)**	210,864,205	**(iii)**	79,853,336
(iv)	183,543,208	**(v)**	136,448,639	**(vi)**	100,991,724
(vii)	42,335,928	**(viii)**	133,800,844	**(ix)**	137,201,018
(x)	176,400,698	**(2)**	83,526,839	**(3)**	161,808,779

Ans. Exe 3.2

1.

(i)	24,642,200	**(ii)**	16,685,308	**(iii)**	41,875,828
(iv)	6,543,201	**(v)**	9,819,703	**(2)**	21,075,168
(3)	11,001,997	**(4)**	32,858,662		

Chapter 4

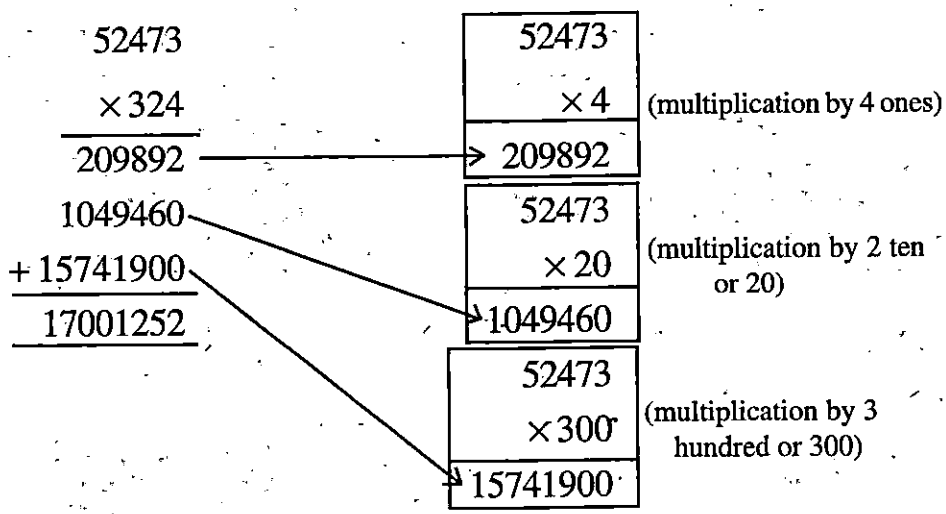
MULTIPLICATION AND DIVISION

Multiplication: In previous class you have learnt how to multiply two numbers whose product is not greater than 8-digit number (i.e. upto 99999999)

Now we shall learn multiplying numbers whose product is a 9-digit number or more.

Example 1: Multiply 52,473 by 324

Solution: We multiply 52473 by 324 as following

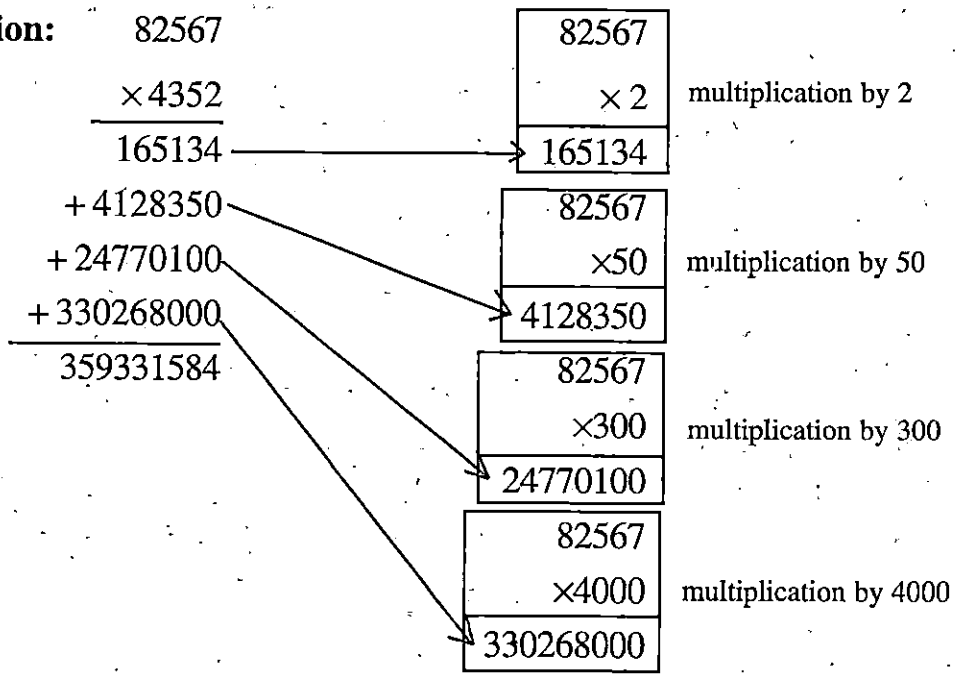


Thus the product of 52473 and 324 is 17001252.

Now consider multiplication by 4-digit number.

Example 2: Multiply 82567 by 4352

Solution:



Exercise 4.1

1. Find the product:

(i) 84572 × 2051

(ii) 12457 × 8152

(iii) 49048 × 3120

(iv) 41736 × 4253

(v) 72639 × 5265 -

2. If the cost of a fan is ₹1285, then find the cost of 25,650 such fans.

3. 35,782 meter of cloth is manufactured daily in a cloth mill. How many meters of cloth will be manufactured in 4 years?

4. ₹ 2,572 each were contributed by 85,975 persons of a city to the chief minister's "Relief Fund." How many rupees were collected in the fund?

5. How many seconds are there in 25 years. (including leap year)?

DIVISION

In class 4th you have studied division upto 2-digit numbers (i.e. Division of 4-digit number by a 2-digit number)

Now we shall learn division of 5-digit number by a 2-digit number.

Division of 5-digit number by 2-digit numbers.

Example (1): Divide 42325 by 25.

Solution:

First step: We start division from left. Since there are two digits in the divisor, we shall consider 1st two digits from left in the dividened, these are 4 and 2. So we get 42. Now we shall read table of 25 such that it does not exceed 42. It goes one time, since $25\times2 = 50$ $(50>42)$ and $25\times1 = 25$ $(25< 42)$. We write 25 just below 42 and subtract. We get 17 remainder.

$$\begin{array}{r} 1 \\ 25\overline{)42325} \\ -25 \\ \hline 17 \end{array}$$

Second step: We bring down the next digit and write right to 17 (remainder) now we have 173. We shall divide it by 25 as earlier. It goes 6 times (25x6 = 150 which very close to 173 and also less than 173) We again subtract whereupon we get 23.

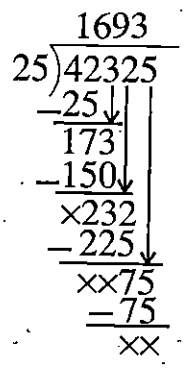
$$\begin{array}{r} 16 \\ 25\overline{)42325} \\ -25\downarrow \\ \hline 173 \\ -150 \\ \hline \times 23 \end{array}$$

Third step: The same process (as in step II) is repeated in this step.

$$\begin{array}{r} 169 \\ 25\overline{)42325} \\ -25\downarrow \\ \hline 173 \\ -150\downarrow \\ \hline \times 232 \\ -225 \\ \hline \times\times 7 \end{array}$$

Fourth step: In this step we follow the process of step 2 and 3. We have remainder zero and no other digit is left to be brought now. i.e. division upto ones digit is complete. Now with this step division is also completed.

We get quotient 1693 and remainder 00.



Exercise 4.2

1. Divide and find quotient and remainder.

(i) $78750 \div 15$

(ii) $45291 \div 31$

(iii) $64829 \div 24$

(iv) $61515 \div 45$

(v) $84563 \div 40$

2. Train fare of 23 persons is Rs. 11,040. Find the fare for one person?

3. A book costs Rs. 35. How many such books will be available for Rs. 87,535.

4. 10,125 plants are to be planted in 45 rows. How many plants will be there in each row?

5. Find the number which is when multiplied by 81 gives the product 10,854.

Division by 3 digit number

Example (1): Divide 54368 by 142

Solution: Since divisor is 142 of which table you do not know. How can you solve this question then?

Since there are 3 digits in the divisor, we shall consider first three digits from left in the dividened. These 3 digits form 543. Now we shall multiply 142 by 1, 2, 3, ... and see which product is less than and which is more than 543

142	142	142	142
×1	×2	×3	×4
142	284	426	568

Since $143 \times 3 = 426$ $[426 < 543]$

and $143 \times 4 = 568$ $[568 > 543]$

we shall write 3 in the quotient column and 426 just below 543.

Now as earlier! we shall bring down the next digit and continue the process of division till all the digits are brought down.

```
      3
142)54368
  -426
   117
```

Now,
Since 124 < 142,
So, you can not divide more.

Finally we get 382 as quotient and 124 remainder.

```
      382
142)54368
  -426↓
   1176
  -1136↓
    408
   -284
    124
```

Example (2): The cost of a chair is Rs. 122. How many such chairs will be purchased in Rs. 61244.

Solution: Given amount Rs. 61244

Cost of 1 chair Rs. 122

Number of chairs purchased = $61244 \div 122$

Step one: Divide 612 by 122 $(612 \div 122)$

$$\begin{array}{r} 5 \\ 122\overline{)61244} \\ -610\downarrow \\ \times\times 24 \end{array}$$

Step two: Bring down next digit i.e. 4 next to 2. You get 24. Table of 122 goes 0 (zero) times.

$$\begin{array}{r} 50 \\ 122\overline{)61244} \\ -610\downarrow \\ \times\times 24 \\ -\ 00\downarrow \\ \hline 244 \end{array}$$

Step three: Bring down next digit i.e. 4. You get 244. (divide $244 \div 122$) it goes 2 times.

$$\begin{array}{r} 502 \\ 122\overline{)61244} \\ -610\downarrow \\ \times\times 24 \\ -\ 00\downarrow \\ \hline 244 \\ -244 \\ \hline 000 \end{array}$$

Finally you get remainder zero and quotient 502.

Answer: 502 chairs.

Exercise 4.3

1. Find the quotient and the remainder:

(i) 96024 ÷ 102 **(ii)** 67875 ÷ 213

(iii) 20398 ÷ 235 **(iv)** 88888 ÷ 888

2. Rs. 150785 was collected at an examination as exam fee. If each examinee paid Rs. 265. Find the number of examinees apeared in the examination.

3. A pen manufacturing company produces 21817728 pens in 288 days. How many pens will produced in one day.

4. Rs. 170 were collected from every house of a village for Darsgah-e-Islami. If a total of Rs. 41650 were collected. How many houses were donated the money.

5. A printer prints 5212170 letters in one and half of an hour. How many letters will be printed in one minute.

6. The total fare of passangers from Aurangabad to Delhi by Sachkhanda Express is Rs. 31025000. If each passanger paid Rs. 425 as fare. Find the number of passangers.

7. The total amount of Rs. 49368555 was collected as ration fee from the delegates of a conference. If every one paid Rs. 135 as ration fee, how many delegates were attended the conference.

8. 3250890 Oranges were kept in few cartones. If each carton has 246 oranges, how many cartons will be required.

9. How many uniforms will be purchased in Rs. 368200. If each uniform costs Rs. 263.

10. 620375 is divided by a number. If quotient is 709 then find that number.

Miscellaneous Exercise

1. Find the product:

(i) 49154×406

(ii) 75541×203

(iii) 80000×1652

(iv) 42459×4005

(v) 674310×332

2. Do orally and tell the product:

(i) 785×10000

(ii) 100×48675

(iii) 500×50000

3. Divide and find quotient and remainder:

(i) $76432 \div 100$ **(ii)** $85421 \div 112$

(iii) $66666 \div 666$ **(iv)** $55874 \div 785$

(v) $73441 \div 912$

4. Divide orally and find quotient and remainder:

(i) $46729 \div 10$ **(ii)** $75436 \div 100$

(iii) $85848 \div 1000$ **(iv)** $19810 \div 10000$

(v) $999999 \div 100000$

5. Every citizen of a city reads on average 302 pages annually. If the population of the city is 75214, how many pages are read annualy in that city?

6. A computer printer prints 240 letters per minute. How long will it take to print 8400 letters?

7. A lock factory in Aligarh produces 18620 locks annually. If 133 locks are packed in a carton, find the number of cartons needed to pack the lock every year?

INTERESTING

25 and 76 are such number that when these are multiplied by numbers which of 25 or 76 at their ones and tens place, the product correspond have 25 or 76.

$$25 \times 25 = 625$$
$$125 \times 25 = 3125$$
$$76 \times 76 = 5776$$
$$76 \times 176 = 13376$$
$$176 \times 276 = 48576$$
$$125 \times 225 = 28125$$

Ans. Exe 4.1

1.

(i)	173457172	**(ii)**	101549464	**(iii)**	153029760
(iv)	177503208	**(v)**	382444335	**2.**	Rs. 32,960,250
3.	52,241,720 meters	**4.**	Rs. 221,127,700	**5.**	788,918,400 Sec.

Ans. Exe 4.2

1.

(i)	Quotient = 5250 Remainder = 0	**(ii)**	Quotient = 1461 Remainder = 0	**(iii)**	Quotient = 2701 Remainder = 5
(iv)	Quotient = 1367 Remainder = 0	**(v)**	Quotient = 2114 Remainder = 3	**(2)**	Rs.480
(3)	2,501	**(4)**	225	**(5)**	134

Ans. Exe 4.3

1.

(i)	Quotient = 941 Remainder = 42	**(ii)**	Quotient = 318 Remainder = 141	**(iii)**	Quotient = 86 Remainder = 188
(iv)	Quotient = 100 Remainder = 88				
[2]	569	**[3]**	75756	**[4]**	245
[5]	57913	**[5]**	73000	**[7]**	3656.93
[8]	13215	**[9]**	1400	**[10]**	875

Ans. Miscellaneous Exe.

1. **(i)** 19956524 **(ii)** 15334823 **(iii)** 132160000
(iv) 170048295 **(v)** 223870920

2. **(i)** 7850000 **(ii)** 4867500 **(iii)** 25000000

3. **(i)** Quotient = 764 **(ii)** Quotient = 762 **(iii)** Quotient = 100
Remainder = 32 Remainder = 77 Remainder = 66
(iv) Quotient = 71 **(v)** Quotient = 80
Remainder = 139 Remainder = 481

4. **(i)** Quotient = 4672 **(ii)** Quotient = 754 **(iii)** Quotient = 85
Remainder = 9 Remainder = 36 Remainder = 848
(iv) Quotient = 1 **(v)** Quotient = 9
Remainder = 9810 Remainder = 99999

5. 22714628 pages

6. 35 minutes

7. 140 carton

Chapter 5

TYPES OF NUMBERS

EVEN NUMBERS

We know counting by skipping. Starting from 2 count by skipping 1 number at every step. (count by 2s)

2 4 6 8 10 12 14 16 18 20

22 24 26 28 30 32 34 36 38 40

Consider their properties:

- These numbers have been obtained by multiplying 2 by 1, 2, 3, 4, ...
- These are all multiples of 2.
- Now try dividing these numbers one by one by 2.

You find that all these numbers are divisible by 2. i.e. We get remainder as zero.

- Another property of these numbers is that there is always 0, 2, 4, 6 or 8 at one's place of these numbers irrespective of the number of digits in these.

Remember — All such numbers which are divisible by 2 are called even numbers.

Exercise 5.1

1. Tell the even numbers:

(i) 8 **(ii)** 24 **(iii)** 15 **(iv)** 30 **(v)** 52

(vi) 21 **(vii)** 53 **(viii)** 96 **(ix)** 99 **(x)** 78

2. By division method find the even numbers:

(i) 36 **(ii)** 54 **(iii)** 81 **(iv)** 122 **(v)** 153

(vi) 4852 **(vii)** 10690 **(viii)** 39291 **(ix)** 98052 **(x)** 320903

ODD NUMBER

Start counting from 1 by skipping one number at every step.

We observe that, these numbers are not divisible by 2. They always gives remainder 1. There is always 1, 3, 5, 7 or 9 at one's place of these numbers.

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, ...

All such numbers which are not divisible by 2, are called odd numbers.

Exercise 5.2

1. Tell the odd numbers:

(i) 5 **(ii)** 19 **(iii)** 23 **(iv)** 27 **(v)** 20

(vi) 34 **(vii)** 43 **(viii)** 89 **(ix)** 91 **(x)** 94

2. Find the odd numbers by division method:

(i) 63 **(ii)** 45 **(iii)** 28 **(iv)** 112 **(v)** 111

(vi) 3001 **(vii)** 4290 **(viii)** 8956 **(ix)** 75670 **(x)** 28933

Prime and Composite Numbers

Such parts of a given number which when multiplied together give the number are called factors of the number. Observe the following factors:

$1 = 1 \times 1$

$2 = 2 \times 1$

$3 = 3 \times 1$

$4 = 2 \times 2$ and 4×1

$5 = 5 \times 1$

$6 = 3 \times 2$ and 6×1

$12 = 4 \times 3$ and 2×6 and 12×1

$15 = 5 \times 3$ and 15×1

On considering the above factor you will find that there are three types of numbers.

1. Numbers which have only 1 as factor. Example. 1. (Interesting no other number has only one factor)
2. Numbers which have only two factors 1 and the number itself. Example. 2, 3, 5, 7, 11, 13 etc.
3. Numbers which have more than two factors. Example: 4, 6, 9, 12, 18 etc.

Learn:

The numbers which have only two factors '1' and the number itself are called **PRIME NUMBERS.**

The numbers which have more than two factors are called **COMPOSITE NUMBERS**

'1' is neither composite nor prime since it has only one factor

'2' is only such even number which is prime. All other even numbers are composite numbers.

Exercise 5.3

1. Identify composite and prime numbers:
13, 15, 17, 20, 35, 46, 29, 43, 71

2. Write from 1 to 30 and circle ○ the prime numbers and make □ around composite numbers.

3. Tell the smallest odd composite number.

4. Tell the smallest prime number.

5. Tell such prime numbers, between 40 and 100 which has/have 2 at ones place.

6. What numbers will be there at ones place in the prime numbers between 10 and 20.

7. Tell such 3 numbers which are both composite and odd.

Ans. Exe 5.1

[1] (i), (ii), (iv), (v), (viii) and (x)

[2] (i), (ii), (iv), (vi) , (vii) and (ix)

Ans. Exe 5.2

[1] (i), (ii), (iii), (iv), (vii), (viii) and (ix)

[2] (i); (ii), (v), (vi) and (x)

Ans. Exe 5.3

[1] Prime Numbers → 13, 17, 29, 43, 71

Composite Numbers → 15, 20, 35, 46

[2] 1 (2) (3) 4 (5) 6 (7) 9 10
(11) 12 (13) 14 15 16 (17) 18
(19) 20 21 22 (23) 24 25 26
27 28 (29) 30

[3] 9 **[4]** 2 **[5]** No One **[6]** 1,3,7,9

[7] 9,15,21

Chapter 6

TEST OF DIVISIBILITY

Test of Divisibility by 2.

The number which have 0, 2, 4, 6 or 8 at unit place will be divisible by 2.

ALL THE EVEN NUMBERS ARE DIVISIBLE BY TWO.

Exercise 6.1

1. Tell which of these are divisible by 2.

(i) 214 (ii) 315 (iii) 200 (iv) 111 (v) 248
(vi) 341 (vii) 327 (viii) 452 (ix) 1316 (x) 4507

Test of Divisibility by 3

If the sum of the digits of the number is divisible by 3, the number is also divisible by 3

Example 1: 432 is divisible by 3, because the sum of its digits i.e. 4, 3 and 2 is (4+3+2 = 9) and 9 is multiple of 3 or divisible by 3.

Example 2: 253 is not divisible by 3. Because the sum of digits 2, 5 and 3 = 2+5+3 = 10. Since, 10 is not the multiple of 3.

So, 253 is not divisible by 3.

Exercise 6.2

1. Which of the following numbers are divisible by 3:

(i) 425 **(ii)** 732 **(iii)** 303 **(iv)** 132

(v) 197 **(vi)** 2533 **(vii)** 4562

Test of Divisibility by 5

All the number which have 0 or 5 at their ones/unit place are divisible by 5. e.g. 105, 220, 4375, 111115 etc.

Exercise 6.3

1. Identify the numbers divisible by 5.

(i) 311 **(ii)** 2030 **(iii)** 7654 **(iv)** 1000

(v) 445 **(vi)** 5553

Miscellaneous Exercise

1. Sort them in groups of numbers according to their divisibility by 2, 3 and 5.

(i) 728 **(ii)** 321 **(iii)** 1001 **(iv)** 972 **(v)** 2132

(vi) 670 **(vii)** 5000 **(viii)** 151 **(ix)** 325 **(x)** 9354

Ans. Exe 6.1

1. (i) 214 (iii) 200 (v) 248 (viii) 452 (ix) 1316

Ans. Exe 6.2

1. (ii) 732 (iii) 303 (iv) 132

Ans. Exe 6.3

1. (ii) 2030 (iv) 1000 (v) 445

Ans. Miscellaneous Exe

1. The Numbers divisible by 2 → (i) 728 (iv) 972 (v) 2132 (vi) 670 (vii) 5000 (x) 9354

The Numbers divisible by 3 → (ii) 321 (iv) 972 (x) 9354

The Numbers divisible by 5 → (vi) 670 (vii) 5000 (ix) 325

Chapter 7

FACTOR AND MULTIPLES

Factors:-

You know that,

$20 = 5 \times 4$

i.e. we can write 20 as 5×4. 5 and 4 are such numbers which when multiplied give 20. So, 5 and 4 are called 'factors' of 20.

Factorisation

Example: Find the factors of 45.

Solution: To get factors of 45, we think of two such numbers which upon multiplication give 45.

$15 \times 3 = 45, \qquad 9 \times 5 = 45$

We got two different factors of 45, { i.e. (3 &15) and (9 & 5).}

Remember — This method of finding factors is limited only to those simple numbers whose table you know.

Prime Factorisation

You got two set of factors of 45 as (9,5) and (15,3). These factors of 45 can be further factorised as

$$45 = 15 \times 3 = 3 \times 5 \times 3 = 3 \times 3 \times 5$$

$$45 = 9 \times 5 = 3 \times 3 \times 5$$

Can you further factorise 3 or 5? No. Now you have got only prime numbers in the factor of 45

$45 = 3 \times 3 \times 5$

These are called prime factors of 45.

Method of Finding Prime Factors

See some examples to understand the method of finding prime factors of a given number.

Example - 1 : Find the prime factors of 45.

Solution : To find the prime factors of 45, we follow the following steps:

- First of all divide 45 by smallest prime number 3. The quotient will be 15 which is written below 45.
- Again divide 15 by 3, we get quotient 5 which is written below 15.
- Now divide 5 by 5, we get quotient 1.

3	45
3	15
5	5
	1

By getting 1 as quotient, the process of finding prime factors is completed.

So, the prime factors of $45 = 3 \times 3 \times 5$

Example - 2 : Find the prime factors of 240.

Solution : Since 0 is at one's place of 240. So it is divisible by 2 and 5 both. But 2 is less than 5, so divide 240 by 2 first. The quotient 120 is also divide by 2. New quotient 60 is again divided by 2.

Now quotient 30 is again divided by 2. Now we get quotient 15 which has prime factors 3 and 5.

2	240
2	120
2	60
2	30
3	15
5	5
	1

So, the prime factors of $240 = 2 \times 2 \times 2 \times 2 \times 3 \times 5$

Properties of Factors:

(1) 1 is a factor of every number.
(2) Every number is a factor of itself.
(3) Every factor of a number is less than or equal to the number
(4) Every factor of a number divides that number completely.

Exercise 7.1

1. Find prime factors of:

(i) 35	**(ii)** 128	**(iii)** 273	**(iv)** 99
(v) 196	**(vi)** 400	**(vii)** 78	**(viii)** 345
(ix) 121	**(x)** 3125		

MATH'S MAGIC

Take any 5-digit number — 32546

multiply it by 11 — $32546 \times 11 = 358006$

multiply the product by 9091 = $358006 \times 9091 = 3254632546$

You observe that this product consists of 2 exact sets of numbers 32546. 3254632546

This is true for any 5-digit number

REALLY AMAZING!

Multiples:-

We know that 35 can be written as 5×7.

i.e. $35 = 5 \times 7$

The representation $35 = 5 \times 7$ shows that 5 and 7 are factors of 35 whereas 35 is a multiple of 5 and 7.

So we can say that a number is a multiple of each of its factors.

See few more examples -

In $21 = 3 \times 7$, 21 is the multiple of 3 and 7 both.

In $30 = 2 \times 3 \times 5$, 30 is the multiple of 2, 3 and 5.

Method of Finding Multiples

To find the multiples of any given number, multiply the number by 1, 2, 3, ... respectively.

For Example - Multiples of 5 can be find as follows:-

5×1, 5×2, 5×3, 5×4, ...

i.e. 5, 10, 15, 20, ...

So, the multiples of 5 are : 5, 10, 15, 20, ...

Example 1 : Find the first five multiples of 7.

Solution : First five multiples of $7 = 7 \times 1$, 7×2, 7×3, 7×4, 7×5,

$= 7, 14, 21, 28, 35$

Example 2 : Find first four multiples of 12.

Solution : First four multiples of $12 = 12 \times 1$, 12×2, 12×3, 12×4,

$= 12, 24, 36, 48.$

Properties of Multiples :-

1. Every number is a multiple of 1.
2. Every number is a multiple of itself.
3. Every multiple of a number is greater than or equal to that number.
4. The multiples of a given number are infinite.

Exercise 7.2

1. Write first five multiples of each:

(i) 8 (ii) 12 (iii) 15 (iv) 25

2. Mark (✓) on the correct statements and mark (×) on the incorrect statement:

(i) 18 is the multiple of 3. ( )

(ii) 9 can not be a multiple of 9. ( )

(iii) The multiple of 7 is 210. ( )

(iv) The multiple of 13 is 93. ( )

(v) The number of multiples for any number is finite. ( )

Common Factors and common Multiples:

Children! We have learnt about factors, multiples and how to find factors and multiples of a number.

Now we study about common factors and common multiples. Let us see following examples:

Example 1 : Write the factors of 4 and 12.

Solution : Factors of 4 = 1, 2, 4

Factors of 12 = 1, 2, 3, 4, 6, 12

Do you tell me the same (equal) factors among the factors of 4 and 12.

Yes, these are 1, 2, and 4.

These same factors are called "common factors."

So, the common factors of 4 and 12 = 1, 2, 4.

Example 2 : Write common factors of 6 and 18.

Solution : Factors of 6 = 1, 2, 3, 6

Factors of 18 = 1, 2, 3, 6, 9, 18

Common factors of 6 and 18 = 1, 2, 3, 6.

Example 3 :–Write common multiples of 2 and 3.

Solution : Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...
Multiples of 3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...
Common multiples of 2 and 3 = 6, 12, 18, ...

Example 4 : Write the common multiples of 12 and 18.

Solution : Multiples of 12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, ...
Multiples of 18 = 18, 36, 54, 72, 90, 108, ...
Common multiples of 12 and 18 = 36, 72, 108, ...

Exercise 7.3

1. Write down the common factors each of the following:
(i) 12 and 16 (ii) 20 and 25 (iii) 9, 15 and 21

2. Write first five common multiples for each of the following:
(i) 3 and 6 (ii) 4 and 8 (iii) 10 and 15

Ans. Exe. 7.1

1. **(i)** 5×7 **(ii)** $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ **(iii)** $3 \times 7 \times 13$
(iv) $3 \times 3 \times 11$ **(v)** $2 \times 2 \times 7 \times 7$ **(vi)** $2 \times 2 \times 2 \times 2 \times 5 \times 5$
(vii) $2 \times 3 \times 13$ **(viii)** $3 \times 5 \times 23$ **(ix)** 11×11 **(x)** $5 \times 5 \times 5 \times 5 \times 5$

Ans. Exe. 7.2

1. **(i)** 8, 16, 24, 32, 40 **(ii)** 12, 24, 36, 48, 60 **(iii)** 15, 30, 45, 60, 75
(iv) 25, 50, 75, 100, 125
2. **(i)** True **(ii)** False **(iii)** True **(iv)** False **(v)** False

Ans. Exe. 7.3

1. **(i)** 1, 2, 4 **(ii)** 1, 5 (iii) 1, 3
2. **(i)** 6, 12, 18, 24, 30 (ii) 8, 16, 24, 32, 40 **(iii)** 30, 60, 90, 120, 150

Chapter 8

HIGHEST COMMON FACTOR (HCF) AND LOWEST COMMON MULTIPLE (LCM)

Highest Common Factor (H.C.F.)

We have learnt about the "common factors" and "Common multiples" of a given number.

Now we study about the "highest common factor" among the common factors of a given number.

Let us see few examples --

Example 1: Factors of 12 = 1, 2, 3, 4, 6, 12
Factors of 16 = 1, 2, 4, 8, 16
Common factors = 1, 2, 4
Highest common factor = 4

Example 2 : Factors of 30 = 1, 2, 3, 5, 6, 10, 15, 30
Factors of 45 = 1, 3, 5, 9, 15, 45
Common factors = 1, 3, 5, 15
Highest common factor = 15

Children! Do you know the other name of this Highest common factor? This Highest common factor is also called "Greatest Common Divisor" (GCD).

The Highest Common Factor (HCF) of two or more given number is the highest of their common factors.

or

The Highest Common Factor (HCF) of two or more given numbers is the greatest number which divides the given numbers exactly.

Finding Highest Common Factor (HCF):

There are two methods of finding HCF of two or more given numbers--

(1) Prime Factorisation Method (2) Division Method

Finding HCF by prime factorisation method

Example 1: Find out H C F of 36 and 48.

Solution: First we shall find prime factors of 36 and 48.

2	36
2	18
3	9
3	3
	1

2	48
2	24
2	12
2	6
3	3
	1

Prime factors of 36 = $2 \times 2 \times 3 \times 3$

Prime factors of 48 = $2 \times 2 \times 2 \times 2 \times 3$

Common factors are 2 , 2, 3

Their multiplication give $2 \times 2 \times 3 = 12$

So, HCF of 36 and 48 = 12

Example 2: Find out the highest common factor of 18, 27 and 45

Solution:

2	18
3	9
3	3
	1

3	27
3	9
3	3
	1

3	45
3	15
5	5
	1

Prime factors of 18 = $2 \times 3 \times 3$

Prime factors of 27 = $3 \times 3 \times 3$

Prime factors of 45 = $5 \times 3 \times 3$

H.C.F. of 18, 27 and 45 = $3 \times 3 = 9$

Exercise 8.1

1. Find HCF by prime factorisation method.

(i) 6, 8 **(ii)** 15, 25 **(iii)** 60, 72 **(iv)** 12, 18, 24

(v) 15, 20, 25 **(vi)** 30, 40, 50 **(vii)** 144, 324 **(viii)** 72, 108, 144

Finding HCF by division method

Example 1 : Find HCF of 64 and 96 by division method.

Solution:

In this method we divide the larger number by the smaller one.

96 ÷ 64, it goes 1 time and we get remainder 32. Now remainder becomes divisor and divisor becomes dividend, this process continues till we get 0 as remainder.

```
    1
64)96
  -64
  32)64(2
    -64
     ×
```

The last divisor (here 32) is the H.C.F.

So, the H.C.F. of 64 and 96 is 32

Example 2: Find HCF of 380, 475 and 570 by division method.

Solution:

Since there are 3 numbers 380, 475 and 570

We start with only two numbers (any two numbers)

```
     1
380)475
  -380
   95)380(4
     -380
      ×
```

So, 95 is the HCF of 380 and 475. Now divide third number 570 by 95. We get zero as remainder, and 6 as quotient. So, 95 is also the factor of 570.

So the H.C.F. of 380, 475 and 570 is 95

$$95\overline{)570}\ 6,\quad 570,\quad \times$$

Example 3 : Find the greatest number which divides the numbers 45 and 100.

Solution : We know that, the greatest number will be the HCF of 45 and 100.

Now find HCF of 45 and 100 by division method.

HCF of 45 and 100 = 5

So, the required greatest number is 5 by which 45 and 100 divides exactly.

$$45\overline{)100}(2,\quad -90,\quad 10)45(4,\quad -40,\quad 5)10(2,\quad -10,\quad \times$$

Exercise 8.2

1. Find out the H.C.F. by division method.

(i) 195, 325 **(ii)** 172, 215 **(iii)** 216, 360

(iv) 945, 135 **(v)** 645, 1075 **(vi)** 476, 1190, 952

(vii) 1405, 1235, 3050

2. Find the largest number which can divide both 2496 and 3264 without leaving any remainder.

3. Find the greatest number which can divide 1403, 2135 and 3050 equally.

4. Mumtaz had 9625 rupees and Athar had 11375 rupees. Both of them bought radio of the same cost. What was the maximum cost of the radio?

Lowest Common Multiple (LCM)

We have learnt about the multiples of a given number and common multiples of two or more given numbers. Now we study about the further information of multiples--

Examples 1 : Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

Multiples of 3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30,.....

Common Multiples = 6, 12, 18, ...

Smallest common multiple = 6

Examples 2 : Multiples of 5 = 5, 10, 15, 20, 25, 30, 35, 40, ...

Multiples of 10 = 10, 20, 30, 40, 50, 60, 70, 80,.....

Common Multiples = 10, 20, 30, 40, 50, ...

Smallest common multiple = 10

This smallest common multiple is known as Lowest Common Multiple (LCM)

The Lowest Common Multiple (LCM) of two or more given numbers is the lowest or smallest or least of their common multiples.

Finding Lowest Common Multiple (LCM)

There are three method to finding LCM of two or more given numbers --

(1) Multiple Method (2) Prime Factorisation Method

(3) Division Method

Finding LCM by Multiple Method

Example 1: Find the LCM of 12 and 15.

Solution: Multiples of 12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120,.....

Multiples of 15 = 15, 30, 45, 60, 75, 90, 105, 120, 135, ...

Common multiples of 12 and 15 = 60, 120, ...

Smallest Common Multiple = 60

Since, smallest common multiple is called LCM.

So, LCM of 12 and 15 = 60

Example 2: Find the LCM of 2, 3 and 4.

Solution: Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, ...

Multiples of 3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...

Common Multiples of 2, 3 and 4 = 12, 24, ...

Smallest Common Multiple = 12

So, LCM of 2, 3 and 4 = 12

Exercise 8.3

1. Find the LCM of the following numbers by multiple method:

(i) 3, 12 **(ii)** 5, 20 **(iii)** 6, 12

(iv) 10,15 **(v)** 4, 6, 10 **(vi)** 5, 10, 15

2. Find the least number to which when 5 is added can be divided by 4, 8 and 10.

3. I have few marbles. I distributed these marbles in 6-6 and 8-8 marbles groups. If 7 marbles are left in every condition, then tell the least number of marbles that I have.

Finding LCM by prime factorisation method

You have already learnt the method of finding LCM by finding their multiples. Now we shall learn to find LCM by prime factorisation.

Example 1: Find LCM of 15 and 25 by prime factorisation method.

Solution: Prime factors of 15 and 25 are:

$15 = 3 \times 5$

$25 = 5 \times 5$

Underline or encircle the common factors. This is 5.

Pick out uncommon factors. These are 3 and 5.

Find the product of common and uncommon factors.

This product will be the LCM of given numbers.

So, LCM of 15 and 25 = Common factors × Uncommon factors

$= 5 \times 3 \times 5$

$= 75$

Example 2: Find LCM of 60, 96 and 108 by prime factorisation method.

Solution:

p. f. of 60 = $\underline{2} \times \underline{2} \times \underline{3} \times 5$

p. f. of 96 = $\underline{2} \times \underline{2} \times 2 \times 2 \times 2 \times \underline{3}$

p. f. of 108 = $\underline{2} \times \underline{2} \times \underline{3} \times 3 \times 3$

Common factors = 2, 2, 3

Uncommon factors = 5, 2, 2, 2, 3, 3

LCM of 60, 96 & 108 = $2 \times 2 \times 3 \times 5 \times 2 \times 2 \times 2 \times 3 \times 3$

= 4320

Exercise 8.4

1. Find LCM of the following by prime factorisation method:

(i) 48, 120 **(ii)** 72, 60 **(iii)** 100, 175 **(iv)** 125, 175, 225

(v) 84, 120, 480 **(vi)** 315, 135 **(vii)** 512, 128

Finding LCM by division method

Example 1: Find LCM of 20, 36 and 12.

Solution:

2	20, 36, 12
2	10, 18, 6
3	5, 9, 3
3	5, 3, 1
5	5, 1, 1
	1, 1, 1

The LCM of 20, 36 and 12 = $2 \times 2 \times 3 \times 3 \times 5$ = 180

Example 2 : Four bells rings at the interval of 10, 15, 20 and 25 minutes. If they rings together at 6 a.m. then at what time they will rings together again?

Solution: First of all find the LCM of given time interval of 10, 15, 20 and 25 minutes.

LCM of 10, 15, 20 & 25

$= 2 \times 5 \times 3 \times 2 \times 5$

$= 300$ minutes

$= 300 \div 60$ (Change into hours)

$= 5$ hours.

2	10, 15, 20, 25
5	5, 15, 10, 25
	1, 3, 2, 5

So, they will ring together again after 5 hours.

i.e. $6 + 5 = 11$ a.m.

Example 3 : Find the smallest number which when divided by 10, 25, 45 and 60 leaves a remainder 5 in each case.

Solution: Find the LCM of 10, 25, 45 and 60 by division method.

LCM of 10, 25, 45 and 60

$= 2 \times 2 \times 3 \times 3 \times 5 \times 5$

$= 900$

Since, there is a remainder 5 in each case.

So, the required smallest number $= 900 + 5$

$= 905$

2	10, 25, 45, 60
2	5, 25, 45, 30
3	5, 25, 45, 15
3	5, 25, 15, 5
5	5, 25, 5, 5
5	1, 5, 1, 1
	1, 1, 1, 1

Example 4 : Find the smallest number of 5-digit which is completely divisible by 20, 30, 35 and 42.

Solution: First of all find the LCM of 20, 30, 35 and 42 by division method---

LCM of 20, 30, 35 and 42 $= 2 \times 2 \times 3 \times 5 \times 7$

$= 420$

Smallest number of 5-digit = 10,000

Now divide 10,000 by LCM 420.

So, the required smallest 5-digit number $= 10000 + (420 - 340)$

$= 10000 + 80$

$= 10080$

2	20, 30, 35, 42
2	10, 15, 35, 21
3	5, 15, 35, 21
5	5, 5, 35, 7
7	1, 1, 7, 7
	1, 1, 1, 1

$$\begin{array}{r} 23 \\ 420\overline{)10000} \\ -840 \\ \hline 1600 \\ -1260 \\ \hline 340 \text{ (Remainder)} \end{array}$$

Example 5 : Find the largest 4-digit number which is completely divisible by 16, 24, 36 and 40.

Solution: Find the LCM of 16, 24, 36 and 40 by division method--

The LCM of 16, 24, 36 and 40

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$

$= 720$

Largest number of 4-digit = 9999

Now divide 9999 by LCM 720.

So, the required largest 4-digit number $= 9999 - 639$

$= 9360$

2	16, 24, 36, 40
2	8, 12, 18, 20
2	4, 6, 9, 10
2	2, 3, 9, 5
3	1, 3, 9, 5
3	1, 1, 3, 5
5	1, 1, 1, 5
	1, 1, 1, 1

$$\begin{array}{r} 13 \\ 720\overline{)9999} \\ -720 \\ \hline 2799 \\ -2160 \\ \hline 639 \text{ (Remainder)} \end{array}$$

Exercise 8.5

1. Find the LCM by division method

(i) 4, 28, 40 **(ii)** 15, 100, 225 **(iii)** 12, 84, 120

(iv) 36, 98, 100 **(v)** 45, 75, 105, 135

2. Find the least number which when divided by 25, 55 75 and 110 leaves remainder 3 in each case.

3. From Delhi 3 buses leave for Chandigarh, Jaipur and Agra after an interval of every 10, 15 and 20 minutes respectively. If all the three buses leave Delhi at 9 o'clock simultaneously. At what time will again these buses leave together.

4. Find out the greatest 4-digit number which can be divided by 35, 49 and 63 without leaving any remainder.

1, 5 and 6 are such numbers which when multiplied by the same number give the product on whose ones place is the same number.

$1 \times 1 = 1$

$5 \times 5 = 25$

$6 \times 6 = 36$

$5 \times 5 \times 5 = 125$

$6 \times 6 \times 6 = 216$

and so on

Ans. Exe 8.1

1.

(i) 2	**(ii)** 5	**(iii)** 12	**(iv)** 6
(v) 5	**(vi)** 10	**(vii)** 12	**(viii)** 36

Ans. Exe 8.2

1.

(i) 65	**(ii)** 43	**(iii)** 72	**(iv)** 135
(v) 215	**(vi)** 238	**(vii)** 5	

2. 192 **3.** 61 **4.** Rs. 875

Ans. Exe 8.3

1.

(i) 12	**(ii)** 20	**(iii)** 12	**(iv)** 30
(v) 60	**(vi)** 30	**2.** 35	**3.** 55

Ans. Exe 8.4

1.

(i) 240	**(ii)** 360	**(iii)** 700	**(iv)** 7875
(v) 3360	**(vi)** 945	**(vii)** 512	

Ans. Exe 8.5

1.

(i) 280 **(ii)** 900 **(iii)** 840 **(iv)** 44100 **(v)** 4725

2. 1653 **3.** 10 O'clock **4.** 8820

Chapter 9

ADDITION AND SUBTRACTION OF FRACTIONS

Addition of a whole number and fractional number

You have learnt addition and subtraction of fractions with unequal denominators.

Let us revise:

Add the following fractions.

(i) $\frac{4}{7}+\frac{2}{5}$ (ii) $\frac{3}{5}+\frac{2}{3}$ (iii) $3+\frac{2}{7}$

Out of above three questions, first two questions you can solve, but how will you solve the (iii). In this question (3) is a whole number and another $\left(\frac{2}{7}\right)$ is fractional number. Look we can write 3 as $\frac{3}{1}$.

Now we can solve $\frac{3}{1}+\frac{2}{7}$ easily.

See the solution on the right. You know the method of making denominator equal. The same method has been followed here.

$$\frac{3}{1}+\frac{2}{7}$$

$$= \frac{3\times7}{1\times7}+\frac{2\times1}{7\times1}$$

$$= \frac{21}{7}+\frac{2}{7}$$

$$= \frac{21+2}{7}$$

$$= \frac{23}{7} \text{ or } 3\frac{2}{7}$$

Exercise 9.1

Add:

(1) $2+\frac{5}{7}$ **(2)** $5+\frac{3}{4}$ **(3)** $9+\frac{3}{5}$

(4) $9+\frac{5}{6}$ **(5)** $12+\frac{4}{7}$ **(6)** $15+\frac{4}{5}$

(7) $20+\frac{5}{8}$ **(8)** $2+\frac{4}{11}$ **(9)** $3+\frac{1}{10}$

(10) $5+\frac{7}{15}$

Subtraction of a whole number and fractional number

As you have added a whole number and fractional number, you can subtract them like wise.

Example: Solve: $2-\frac{3}{5}$

Solution:

$$2-\frac{3}{5} = \frac{2}{1}-\frac{3}{5}$$

$$= \frac{2\times5}{1\times5}-\frac{3\times1}{5\times1}$$

$$= \frac{10}{5}-\frac{3}{5}$$

$$= \frac{10-3}{5} = \frac{7}{5} \text{ or } 1\frac{2}{5}$$

Exercise 9.2

Subtract:

(1) $5-\frac{3}{8}$ **(2)** $7-\frac{2}{5}$ **(3)** $10-\frac{3}{7}$ **(4)** $7-\frac{9}{10}$

(5) $11-\frac{5}{7}$ **(6)** $9-\frac{5}{6}$ **(7)** $12-\frac{4}{7}$ **(8)** $15-\frac{3}{8}$

(9) $18-\frac{3}{4}$ **(10)** $19-\frac{5}{8}$

Addition and Subtraction of Mixed Fractions

Example 1: Add: $3\frac{1}{7}$ and $5\frac{2}{7}$

Solution :

$$3\frac{1}{7}+5\frac{2}{7}$$

Step 1: Mixed fractions are written as sum of whole numbers and fractional numbers $= 3+\frac{1}{7}+5+\frac{2}{7}$

Step 2: Whole numbers and fractional numbers are grouped together separately. $= [3+5]+\left[\frac{1}{7}+\frac{2}{7}\right]$

Step 3: Whole numbers and fractional numbers added separately $= 8+\left[\frac{3}{7}\right]$

Step 4: Sum written as mixed fraction $= 8\frac{3}{7}$

Example 2: Add $5\frac{1}{3}$ and $3\frac{1}{2}$

Solution: We can solve these mixed fractions as follows:

$$5\frac{1}{3}+3\frac{1}{2}$$

Step 1: Mixed fractions written as sum of whole numbers and fractional numbers.

$$= 5+\frac{1}{3}+3+\frac{1}{2}$$

Step 2: Whole numbers and fractional numbers grouped separately.

$$= [3+5]+\left[\frac{1}{2}+\frac{1}{3}\right]$$

Step 3: Whole numbers added and fractional numbers added after making their denominators equal.

$$= 8+\left[\frac{1\times3}{2\times3}+\frac{1\times2}{3\times2}\right]$$

$$= 8+\left[\frac{3}{6}+\frac{2}{6}\right]$$

$$= 8+\left[\frac{3+2}{6}\right]$$

$$= 8+\frac{5}{6}$$

Step 4: Answer written as mixed fraction

$$= 8\ \frac{5}{6}$$

Example 3: Subtract $2\frac{2}{5}$ from $3\frac{4}{5}$

Solution: $3\frac{4}{5} - 2\frac{2}{5}$

Step 1: Write mixed fractions as the sum of whole numbers and fractional numbers

$$=\left[3+\frac{4}{5}\right]-\left[2+\frac{2}{5}\right]$$

Step 2: Whole numbers and fractional numbers grouped separately

$$=[3-2]+\left[\frac{4}{5}-\frac{2}{5}\right]$$

Step 3: Subtract whole numbers and fractional numbers separately $= 1 + \frac{2}{5}$

Step 4: Write answer as mixed fraction. $= 1\frac{2}{5}$

Example 4: Subtract $1\frac{1}{3}$ from $4\frac{2}{5}$

Solution: $4\frac{2}{5} - 1\frac{1}{3}$

Step 1: Write mixed fractions as the sum of whole numbers and fractional numbers $= \left(4 + \frac{2}{5}\right) - \left(1 + \frac{1}{3}\right)$

Step 2: Whole numbers and fractional numbers grouped together separately $= (4-1) + \left(\frac{2}{5} - \frac{1}{3}\right)$

Step 3: Subtract the whole numbers and make the denominators equal of fractional numbers $= 3 + \left(\frac{2\times3}{5\times3} - \frac{1\times5}{3\times5}\right)$

$= 3 + \left(\frac{6}{15} - \frac{5}{15}\right)$

Step 4: Subtract whole numbers and fractional numbers separately $= 3 + \frac{1}{15}$

Step 5: Write answer as mixed fraction $= 3\frac{1}{15}$

Exercise 9.3

1. Add:

(i) $2\frac{3}{5} + 3\frac{2}{5}$ (ii) $3\frac{4}{7} + 5\frac{3}{7}$ (iii) $7\frac{8}{9} + 8\frac{7}{9}$

(iv) $12\frac{3}{5} + 7\frac{2}{5}$ (v) $3\frac{5}{7} + 7\frac{3}{5}$ (vi) $13\frac{2}{4} + 11\frac{2}{3}$

(vii) $2\frac{6}{11} + 3\frac{5}{7}$ (viii) $\frac{4}{7} + 5\frac{3}{8}$ (ix) $15\frac{17}{20} + 19\frac{10}{25}$

(x) $18\frac{7}{18} + 6\frac{10}{24}$

2. Subtract:

(i) $3\frac{1}{2} - 2\frac{1}{2}$ (ii) $7\frac{5}{8} - 4\frac{3}{8}$ (iii) $10\frac{7}{9} - 5\frac{5}{9}$

(iv) $13\frac{1}{3} - 5\frac{2}{3}$ (v) $5\frac{2}{5} - 4\frac{1}{3}$ (vi) $7\frac{3}{8} - 5\frac{2}{7}$

(vii) $15\frac{4}{9} - 10\frac{3}{7}$ (viii) $18\frac{3}{4} - 10$ (ix) $19\frac{9}{10} - 9\frac{8}{15}$

(x) $21\frac{17}{18} - 11$

Ans. Exe 9.1

(1) $\frac{19}{7}$ **(2)** $\frac{23}{4}$ **(3)** $\frac{48}{5}$ **(4)** $\frac{59}{6}$

(5) $\frac{88}{7}$ **(6)** $\frac{79}{5}$ **(7)** $\frac{165}{8}$ **(8)** $\frac{26}{11}$

(9) $\frac{31}{10}$ **(10)** $\frac{82}{15}$

Ans. Exe 9.2

(1) $\frac{37}{8}$ **(2)** $\frac{33}{5}$ **(3)** $\frac{67}{7}$ **(4)** $\frac{61}{10}$

(5) $\frac{72}{7}$ **(6)** $\frac{49}{6}$ **(7)** $\frac{80}{7}$ **(8)** $\frac{117}{8}$

(9) $\frac{69}{4}$ **(10)** $\frac{147}{8}$

Ans. Exe 9.3

1.

(i) 6 **(ii)** 9 **(iii)** $16\frac{2}{3}$ **(iv)** 20

(v) $11\frac{11}{35}$ **(vi)** $25\frac{1}{6}$ **(vii)** $6\frac{20}{77}$ **(viii)** $5\frac{53}{56}$

(ix) $35\frac{1}{4}$ **(x)** $24\frac{29}{36}$

2.

(i) 1 **(ii)** $3\frac{1}{4}$ **(iii)** $5\frac{2}{9}$ **(iv)** $7\frac{2}{3}$ **(v)** $1\frac{1}{15}$

(vi) $2\frac{5}{56}$ **(vii)** $5\frac{1}{63}$ **(viii)** $8\frac{3}{4}$ **(ix)** $10\frac{11}{30}$ **(x)** $10\frac{17}{8}$

Chapter 10

MULTIPLICATION AND DIVISION OF FRACTIONS

Multiplication of whole number and fractional number

You have already learnt addition and subtraction of fractional numbers. Now we shall learn multiplication of fractional numbers.
See the following examples:

Example 1 : Multiply $\frac{3}{5}$ by 4.

Solution : We know that repeated addition is same as multiplication. So,

$$\frac{3}{5}\times 4 = \frac{3}{5}+\frac{3}{5}+\frac{3}{5}+\frac{3}{5}$$

$$= \frac{3+3+3+3}{5}$$

$$= \frac{12}{5}$$

$$= 2\frac{2}{5}$$

Now see the other method --

$$\frac{3}{5}\times 4 = \frac{3}{5}\times\frac{4}{1}$$ (Change whole number into fraction)

$$= \frac{3\times 4}{5\times 1}$$ (Multiply Numerators and Denominators)

$$= \frac{12}{5} = 2\frac{2}{5}$$

Both methods give the same answers, but second method is short in comparision to first method.

So, we use the second method to solve the problem.

Example 2 : Multiply $\frac{3}{4}$ by 5.

Solution: $\frac{3}{4} \times 5 = \frac{3}{4} \times \frac{5}{1}$

$= \frac{3 \times 5}{4 \times 1}$

$= \frac{15}{4}$

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

There are following steps to multiply a fraction by a whole number--

1) Change whole number into fractional number.
2) Multiply the Numerators.
3) Multiply the Denominators.
4) If possible reduce the fraction into simplest form.

Exercise 10.1

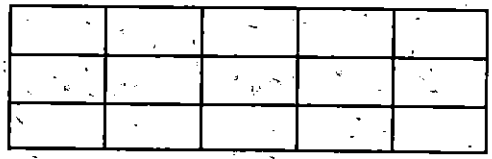
1. Multiply:

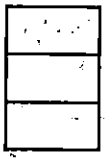
(i) $\frac{5}{6} \times 3$ **(ii)** $\frac{7}{4} \times 5$ **(iii)** $\frac{8}{3} \times 2$ **(iv)** $\frac{9}{5} \times 4$

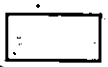
(v) $\frac{7}{9} \times 10$ **(vi)** $21 \times \frac{5}{32}$ **(vii)** $4 \times \frac{2}{21}$ **(viii)** $9 \times \frac{3}{10}$

(ix) $15 \times \frac{7}{8}$ **(x)** $19 \times \frac{4}{5}$

Multiplication of fractional number by another fractional number

if  represents 1,

then  represents $\frac{1}{5}$,

and  represent $\frac{1}{3}$ of $\frac{1}{5}$ or $\frac{1}{15}$

we write $\frac{1}{3}$ of $\frac{1}{5}$ as $\frac{1}{3} \times \frac{1}{5}$

$$\Rightarrow \quad \frac{1}{3} \times \frac{1}{5} = \frac{1 \times 1}{3 \times 5} = \frac{1}{15}$$

Example 1 : Find $\frac{1}{6}$ of $\frac{1}{2}$

Solution: $\frac{1}{6}$ of $\frac{1}{2} = \frac{1}{6} \times \frac{1}{2}$

$$= \frac{1 \times 1}{6 \times 2} = \frac{1}{12}$$

Example 2: Find $\frac{1}{9}$ of $\frac{1}{2}$

Solution: $\frac{1}{9}$ of $\frac{1}{2} = \frac{1}{9} \times \frac{1}{2} = \frac{1 \times 1}{9 \times 2} = \frac{1}{18}$

Steps of multiplying two fractional numbers:

1) Multiply the numerators of given fractions.
2) Multiply the denominators of given fractions.
3) Reduce the fraction if possible.

Exercise 10.2

Find the product:

(1) $\frac{1}{3} \times \frac{1}{8}$ **(2)** $\frac{1}{5} \times \frac{1}{7}$ **(3)** $\frac{1}{9} \times \frac{1}{6}$ **(4)** $\frac{1}{7} \times \frac{1}{20}$

(5) $\frac{1}{12} \times \frac{1}{5}$ **(6)** $\frac{4}{5} \times \frac{2}{7}$ **(7)** $\frac{3}{4} \times \frac{5}{7}$ **(8)** $\frac{1}{10} \times \frac{3}{25}$

(9) $\frac{7}{11} \times \frac{13}{17}$ **(10)** $\frac{8}{19} \times \frac{9}{11}$

Multiplicative inverse of a fractional number

Observe the following examples:

(i) $\frac{1}{5} \times 5 = 1$ **(ii)** $\frac{1}{3} \times 3 = 1$

(iii) $\frac{1}{9} \times 9 = 1$ **(iv)** $\frac{1}{13} \times 13 = 1$

You may notice that, in the above examples there are two parts of each example, one is the whole number and another a fractional number and their product is always '1'. If the product of a whole number and a fractional number is 1, the such two numbers are called the multiplicative inverse (reciprocal) of one another.

as $\frac{1}{2}$ and 2 are multiplicative inverse of each other.

[multiplicative inverse of 2 is $\frac{1}{2}$ and that of $\frac{1}{2}$ is 2 because $\frac{1}{2} \times 2 = 1$ and $2 \times \frac{1}{2} = 1$ too.]

Similarly 5 is multiplicative inverse of $\frac{1}{5}$ and vice versa.

Now consider the following examples:

(i) $\frac{3}{5} \times \frac{5}{3} = 1$ (ii) $\frac{2}{7} \times \frac{7}{2} = 1$

(iii) $\frac{5}{9} \times \frac{9}{5} = 1$ (iv) $\frac{7}{13} \times \frac{13}{7} = 1$

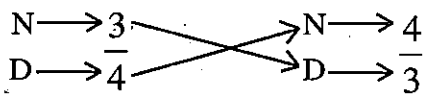
In all of the above examples the product is always '1'.

If product of two fractional numbers is 1, we call them multiplicative inverse of each other i.e. $\frac{5}{7}$ is multiplicative inverse of $\frac{7}{5}$; $\frac{7}{13}$ is multiplicative inverse of $\frac{13}{7}$ and so on.

$\frac{3}{4}$ is multiplicative Inverse of $\frac{4}{3}$ and $\frac{4}{3}$ is multiplicatve Inverse of $\frac{3}{4}$

because $\frac{3}{4} \times \frac{4}{3} = 1$ $\left[\frac{3}{4} \times \frac{4}{3} = \frac{12}{12} = \frac{1}{1} = 1\right]$

Remember To obtain the multiplicative inverse (reciprocal) of a given fraction, we inter change the numerator and denominator of the fraction..



'1' is the only number, whose multiplicative inverse is same as itself.

Multiplicative inverse of 1 is 1.

The prouduct of zero (0) and a number (whole or fractional) is always zero. so, zero has no multiplicative inverse.

There is no multiplicative inverse of zero

Multiplicative inverse of mixed fractional numbers

Example 1: What will be the multiplicative inverse of $5\frac{1}{3}$

Solution: We can write $5\frac{1}{3}$ as $\frac{16}{3}$.

We know that, to obtain the multiplicative inverse of a given fraction, interchange the numerator and denominator of the fraction.

So, the multiplicative inverse of $5\frac{1}{3} = \frac{3}{16}$

Example 2: Find the multiplicative inverse of $13\frac{1}{2}$.

Solution: $13\frac{1}{2}$ can be written as $\frac{27}{2}$.

We know that, to obtain the multiplicative inverse of a given fraction, interchange the numerator and denominator of the fraction.

So, $\frac{2}{27}$ is the multiplicatiplicative inverse of $13\frac{1}{2}$.

Remember To obtain multiplicative inverse of a mixed fraction, first we change it into improper fraction and then interchange their numerator and denominator.

Characteristics of multiplication of fractional numbers

See the following examples--

(i) $\frac{2}{3}\times 0 = \frac{2\times 0}{3} = \frac{0}{3} = 0$

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

from above examples we conclude that --

If any fractional number is multiplied by zero, the product is always zero.

Observe the following examples:

(i) $\frac{4}{7}\times 1 = \frac{4\times 1}{7} = \frac{4}{7}$

(ii) $2\frac{3}{4}\times 1 = \frac{11}{4}\times 1 = \frac{11\times 1}{4} = \frac{11}{4} = 2\frac{3}{4}$

We conclude that--

If any fractional number is multiplied by 1, the product is fractional number itself..

Now see the following examples:

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

OR

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

We conclude that --

The product of two fractional numbers remains the same, if their order is changed.

Exercise 10.3

1. Find the product and also tell that the first number is the multiplicative inverse of the second.

(i) $19 \times \frac{1}{19}$ **(ii)** $13 \times \frac{13}{1}$ **(iii)** $17 \times \frac{1}{17}$

(iv) $20 \times \frac{1}{20}$ **(v)** $4\frac{1}{2} \times \frac{2}{9}$ **(vi)** $\frac{5}{7} \times \frac{7}{5}$

(vii) $\frac{23}{2} \times \frac{1}{23}$ **(viii)** $\frac{7}{6} \times 1\frac{1}{6}$ **(ix)** $5\frac{1}{4} \times \frac{4}{21}$

(x) $\frac{2}{17} \times \frac{17}{2}$

2. Fill in the blanks with suitable numbers:

(i) $\frac{5}{9} \times \cdots\cdots = 1$ **(ii)** $3\frac{1}{3} \times \cdots\cdots = 1$

(iii) $\frac{7}{15} \times \cdots\cdots = 1$ **(iv)** $\cdots\cdots \times 5\frac{1}{3} = 1$

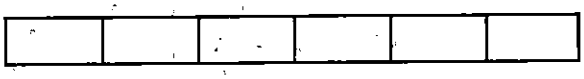
(v) $\frac{25}{7} \times \cdots\cdots = 1$ **(vi)** $\frac{23}{5} \times \frac{5}{23} = \cdots\cdots$

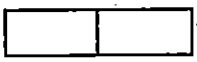
(vii) $3 \times \cdots\cdots = 1$ **(viii)** $\cdots\cdots \times \frac{1}{7} = 1$

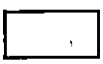
(ix) $\cdots\cdots \times 9 = 1$ **(x)** $\cdots\cdots \times 4\frac{1}{9} = 1$

Dividing a fractional number by a whole number

See the following figures:

If figure  represents 1,

then figure  represents $\frac{2}{6}$ *or* $\frac{1}{3}$, $1 \div 3$ or $\frac{1}{3}$ of 1

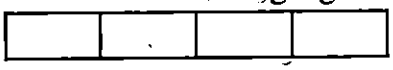
and figure  represents $\frac{1}{6}$ *or* $\frac{1}{3} \div 2$ or $\frac{1}{2}$ of $\frac{1}{3}$

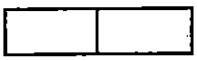
that is, $\frac{1}{3} \div 2 = \frac{1}{2}$ of $\frac{1}{3}$

$= \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ [Since 'of' is also '×']

Remember — When we change division into multiplication the numerator and denominator of divisor interchanged.

Now consider the following figures.

If figure  represents 1.

then figure  represents $\frac{2}{4}$ *or* $\frac{1}{2}$, or $\frac{1}{2}$ of 1

and figure  represent $\frac{1}{2} \div 2$ or $\frac{1}{2}$ of $\frac{1}{2}$

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

[**Note for teachers:-** Teachers should demonstrate these steps using paper, coloured sketches and scissors by drawing and cutting the figures of card sheets and showing that the final figure is actually $\frac{1}{4}$ of the 1st figure]

Example 1: Divide $\frac{2}{7}$ by 5

Solution : $\frac{2}{7} \div 5 = \frac{2}{7} \times \frac{1}{5} = \frac{2\times1}{7\times5} = \frac{2}{35}$

Example 2: Divide $\frac{6}{13}$ by 3

Solution : $\frac{6}{13} \div 3 = \frac{6}{13} \times \frac{1}{3} = \frac{6\times1}{13\times3} = \frac{\cancel{6}^{2}}{\cancel{39}_{13}} = \frac{2}{13}$

Example 3: Divide $5\frac{1}{3}$ by 4

Solution : $5\frac{1}{3} \div 4 = \frac{16}{3} \div 4 = \frac{16}{3} \times \frac{1}{4} = \frac{16\times1}{3\times4} = \frac{\cancel{16}^{4}}{\cancel{12}_{3}} = \frac{4}{3}$

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

Example 4: Rubina has a ribbon of length $8\frac{1}{2}$ m. If she cuts it into two equal parts, what will be the length of each part.

Solution: Length of ribbon = $8\frac{1}{2}$ m

number of pieces = 2

So, length of each piece = $8\frac{1}{2} \div 2$

$= \frac{17}{2} \div 2 = \frac{17}{2} \times \frac{1}{2}$

$= \frac{17}{4} = 4\frac{1}{4}$ m

Exercise 10.4

Divide:

(1) $\frac{4}{7} \div 2$ (2) $\frac{7}{13} \div 3$ (3) $5\frac{1}{2} \div 3$

(4) $12\frac{1}{3} \div 5$ (5) $\frac{8}{15} \div 7$

Division of whole numbers by fractional numbers

Consider the following examples:

Example 1: Aliya cut a ribbon into some equal parts. If the length of each part is $\frac{1}{3}$ of total length find out the number of pieces she cut from the ribbon.

Solution: Let 1 represent the whole ribbon.

Every piece is $\frac{1}{3}$ of the whole i.e. 1

So number of pieces $= 1 \div \frac{1}{3} = 1 \times \frac{3}{1} = 3$

Number of pieces $= 3$

Example 2 : Among how many boys 12 bananas can be distributed if each boy gets $\frac{1}{2}$ banana.

Solution: No of bananas = 12

each boy gets $\frac{1}{2}$ banana

So, the number of boys $= 12 \div \frac{1}{2}$

$= 12 \times \frac{2}{1}$

$= 24$

Example 3 : Divide 18 by $\frac{3}{4}$

Solution: $18 \div \frac{3}{4} = 18 \times \frac{4}{3}$

$= \frac{\cancel{72}^{24}}{\cancel{3}_{1}} = 24$

We can also solve the above example as under –

$18 \div \frac{3}{4} = 18 \times \frac{4}{3}$

$= \frac{\cancel{18}^{6} \times 4}{\cancel{3}_{1}}$

$= 24$

Example 4: Divide 21 by $5\frac{1}{4}$

Solution: $21 \div 5\frac{1}{4} = 21 \div \frac{21}{4}$

$= 21 \times \frac{4}{21}$

$= \frac{\cancel{21}^{1} \times 4}{\cancel{21}_{1}} = \frac{4}{1} = 4$

We concluded from the above examples that,

In division involving fractional numbers we actually multiply by the multiplicative inverse of the divisor.

Exercise 10.5

Divide:

(1) $15 \div 2\frac{1}{2}$ **(2)** $12 \div \frac{3}{4}$ **(3)** $24 \div \frac{12}{5}$

(4) $39 \div 6\frac{1}{2}$ **(5)** $30 \div \frac{1}{3}$ **(6)** $60 \div \frac{15}{4}$

(7) $5 \div \frac{5}{2}$ **(8)** $48 \div \frac{12}{7}$ **(9)** $63 \div \frac{7}{9}$

(10) $81 \div \frac{27}{29}$

Division of a fractional number by another fractional number

Consider the following examples.

Example (1) : Divide $\frac{7}{5}$ by $\frac{2}{5}$

Solution : $\frac{7}{5} \div \frac{2}{5} = \frac{7}{5} \times \frac{5}{2} = \frac{7}{\cancel{5}_1} \times \frac{\cancel{5}^1}{2} = \frac{7}{2}$

Example (2): Divide $8\frac{1}{4}$ by $\frac{3}{4}$

Solution: $8\frac{1}{4} \div \frac{3}{4} = \frac{33}{4} \div \frac{3}{4} = \frac{\cancel{33}^{11}}{\cancel{4}_1} \times \frac{\cancel{4}^1}{\cancel{3}_1} = \frac{11}{1} = 11$

Example (3): Divide $\frac{4}{5}$ by $\frac{6}{7}$

Solution: $\frac{4}{5} \div \frac{6}{7} = \frac{4}{5} \times \frac{7}{6}$

$= \frac{\cancel{4}^2}{5} \times \frac{7}{\cancel{6}_3}$

$= \frac{14}{15}$

From above examples, it is clear that, to divide a fractional number by another fractional number, we multiply the first fractional number by the multiplicative inverse of the second fractional number.

Exercise 10.6

Divide:

(1) $\frac{1}{2} \div \frac{3}{4}$ **(2)** $\frac{3}{8} \div \frac{3}{5}$ **(3)** $6\frac{1}{4} \div 2\frac{1}{2}$

(4) $8\frac{1}{2} \div \frac{7}{4}$ **(5)** $4\frac{3}{5} \div 3\frac{4}{5}$ **(6)** $18\frac{3}{8} \div 3\frac{3}{4}$

(7) $10\frac{1}{2} \div 3\frac{1}{2}$ **(8)** $\frac{5}{9} \div \frac{4}{3}$ **(9)** $\frac{12}{25} \div \frac{6}{25}$

(10) $\frac{13}{27} \div \frac{39}{54}$

Characteristics (properties) of division of fractional numbers

Consider the following examples:

(1) $\frac{5}{3} \div 1 = \frac{5}{3} \times 1 = \frac{5}{3}$

(2) $3\frac{1}{2} \div 1 = \frac{7}{2} \times 1 = \frac{7}{2}$ *or* $3\frac{1}{2}$

(3) $9\frac{5}{4} \div 1 = \frac{41}{4} \times 1 = \frac{41}{4}$ *or* $9\frac{5}{4}$

From the above examples, it is clear that,

> if a fractional number is multiplied by 1, then we get the same fractional number as quotient.

Now consider the following examples:

(1) $0 \div \frac{1}{3} = 0 \times \frac{3}{1} = 0$

(2) $0 \div 2\frac{1}{2} = 0 \div \frac{5}{2} = 0 \times \frac{2}{5} = 0$

It is clear from above examples, that,

> when we divide zero by any fractional number, we always obtain zero as quotient.

Now consider the following examples:

(1) $\frac{5}{3} \div \frac{5}{3} = \frac{5}{3} \times \frac{3}{5} = \frac{15}{15} = 1$

(2) $3\frac{1}{2} \div 3\frac{1}{2} = \frac{7}{2} \div \frac{7}{2} = \frac{7}{2} \times \frac{2}{7} = \frac{14}{14} = 1$

> If a non-zero fractional number is divided by itself the quotient is always 1.

Consider the following examples:

(1) $1 \div \frac{5}{11} = 1 \times \frac{11}{5} = \frac{1 \times 11}{5} = \frac{11}{5}$

(2) $1 \div \frac{12}{17} = 1 \times \frac{17}{12} = \frac{1 \times 17}{12} = \frac{17}{12}$

So, we conclude that,

> If 1 is divided by any fractional number then product is the multiplicative inverse of given fractional number.

Exercise 10.7

Fill in the blanks with suitable numbers:

(1) $\frac{3}{4} \div 1 =$ ..... **(2)** $\frac{5}{2} \div \frac{5}{2} =$ .....

(3) $2\frac{1}{3} \div 2\frac{1}{3} =$ ..... **(4)** $\frac{3}{2} \div 1 =$ .....

(5) $6\frac{1}{9} \div$ ..... $= 1$ **(6)** $0 \div 5\frac{1}{3} =$ .....

(7) ..... $\div \frac{5}{3} = 0$ **(8)** $\frac{5}{3} \div$ ..... $= 1$

Ans. Exe 10.1

1.

(i) $2\frac{1}{2}$ **(ii)** $8\frac{3}{4}$ **(iii)** $5\frac{1}{3}$ **(iv)** $7\frac{1}{5}$

(v) $7\frac{7}{9}$ **(vi)** $3\frac{9}{32}$ **(vii)** $\frac{8}{21}$ **(viii)** $2\frac{7}{10}$

(ix) $13\frac{1}{8}$ **(x)** $15\frac{1}{5}$

Ans. Exe 10.2

(1) $\frac{1}{24}$ **(2)** $\frac{1}{35}$ **(3)** $\frac{1}{54}$ **(4)** $\frac{1}{140}$

(5) $\frac{1}{60}$ **(6)** $\frac{8}{35}$ **(7)** $\frac{15}{28}$ **(8)** $\frac{3}{250}$

(9) $\frac{91}{187}$ **(10)** $\frac{72}{209}$

Ans. Exe 10.3

1.

(i) 1, Yes **(ii)** 169, No **(iii)** 1, Yes **(iv)** 1, Yes

(v) 1, Yes **(vi)** 1, Yes **(vii)** $\frac{1}{2}$, No **(viii)** $\frac{49}{36}$, No

(ix) 1, Yes **(x)** 1, Yes

2.

(i) $\frac{9}{5}$ **(ii)** $\frac{3}{10}$ **(iii)** $\frac{15}{7}$ **(iv)** $\frac{3}{16}$

(v) $\frac{7}{25}$ **(vi)** 1 **(vii)** $\frac{1}{3}$ **(viii)** 7

(ix) $\frac{1}{9}$ **(x)** $\frac{9}{37}$

Ans. Exe 10.4

(1) $\frac{2}{7}$ **(2)** $\frac{7}{39}$ **(3)** $\frac{11}{6}$ *or* $1\frac{5}{6}$ **(4)** $\frac{37}{15}$ *or* $2\frac{7}{15}$

(5) $\frac{8}{105}$

Ans. Exe 10.5

(1) 6 **(2)** 16 **(3)** 10 **(4)** 6 **(5)** 90

(6) 16 **(7)** 2 **(8)** 28 **(9)** 81 **(10)** 87

Ans. Exe 10.6

(1) $\frac{2}{3}$ **(2)** $\frac{5}{8}$ **(3)** $\frac{5}{2}$ or $2\frac{1}{2}$ **(4)** $\frac{34}{7}$ or $4\frac{6}{7}$

(5) $\frac{23}{19}$ or $1\frac{4}{19}$ **(6)** $\frac{49}{10}$ or $4\frac{9}{10}$ **(7)** 3 **(8)** $\frac{5}{12}$

(9) 2 **(10)** $\frac{2}{3}$

Ans. Exe 10.7

(1) $\frac{3}{4}$ **(2)** 1 **(3)** 1 **(4)** $\frac{2}{3}$

(5) $6\frac{1}{9}$ **(6)** 0 **(7)** 0 **(8)** $\frac{5}{3}$

Chapter 11

ADDITION AND SUBTRACTION OF DECIMAL FRACTIONS

In previous class you have learnt how to find out the place value of any digit in the decimal numbers.

Now consider the following examples.

Example (1): What will be place value of every digit in 2.3?

Solution : In 2.3 place value of 2 is 2 ones i.e 2

and place value of 3 is 3 tenths i.e. $\frac{3}{10}$

It can be written as under which also called expanded form:

$2.3 = 2 \text{ ones and } 3 \text{ tenths}$

$= 2 + \frac{3}{10}$

Example (2): Write 45.67 in expanded form.

Solution: 45.67 = 4 Tens + 5 ones + 6 tenths + 7 hundredths

$= 40 + 5 + \frac{6}{10} + \frac{7}{100}$

Example (3): Write 351.508 in expanded form.

Solution: 351.508 = 3 hundreds + 5 tens + 1 one + 5 Tenths + 0 hundredths + 8 thousandths

$= 300 + 50 + 1 + \frac{5}{10} + \frac{0}{100} + \frac{8}{1000}$

or $300 + 50 + 1 + \frac{5}{10} + \frac{8}{1000}$

Exercise 11.1

Write in expanded forms:

(1)	0.8	**(2)**	13.6	**(3)**	49.873
(4)	354.97	**(5)**	101.097	**(6)**	548.957

Changing of decimal into simple fraction

Now we shall learn how to change a decimal into simple fraction using expanded form. Consider the following example:

Example (1) : Change 0.5 into simple fraction.

Solution : $0.5 = 0 + \frac{5}{10}$

$= \frac{5}{10}$

Example (2) : Change 0.35 into simple fraction.

Solution : $0.35 = 0 + \frac{3}{10} + \frac{5}{100}$

$= \frac{3\times10}{10\times10} + \frac{5}{100}$ [Making denominators equal]

$= \frac{30}{100} + \frac{5}{100}$

$= \frac{30+5}{100} = \frac{35}{100}$

Example (3) : Change 4.73 into simple fraction.

Solution : $4.73 = 4 + \frac{7}{10} + \frac{3}{100}$

$= \frac{4\times100}{1\times100} + \frac{7\times10}{10\times10} + \frac{3}{100}$ [Making denominators equal]

$= \frac{400}{100} + \frac{70}{100} + \frac{3}{100}$

$= \frac{400+70+3}{100} = \frac{473}{100}$

Example (4) : Change the decimal 58.974 into simple fraction.

Solution : $58.974 = 50 + 8 + \frac{9}{10} + \frac{7}{100} + \frac{4}{1000}$

$$= \frac{50}{1} + \frac{8}{1} + \frac{9}{10} + \frac{7}{100} + \frac{4}{1000}$$

$$= \frac{50\times1000}{1\times1000} + \frac{8\times1000}{1\times1000} + \frac{9\times100}{10\times100} + \frac{7\times10}{100\times10} + \frac{4}{1000}$$ [Making denominators equal]

$$= \frac{50000}{1000} + \frac{8000}{1000} + \frac{900}{1000} + \frac{70}{1000} + \frac{4}{1000}$$

$$= \frac{50000 + 8000 + 900 + 70 + 4}{1000}$$

$$= \frac{58974}{1000}$$

You observed that

(i) The given number is always numerator of the resultant fraction.

(ii) Denominator is obtained by putting as many zeros to the right of 1 as there are digits to the right of decimal point.

Now, we can change decimal into a simple fraction directly. e.g.

(i) $135.6 = \frac{1356}{10}$

(ii) $15.29 = \frac{1529}{100}$

(iii) $42.378 = \frac{42378}{1000}$

Consider some more examples:

Example (1): Change 0.25 into simple fraction.

Solution : $0.25 = \frac{25}{100} = \frac{\cancel{25}^{1}}{\cancel{100}_{4}} = \frac{1}{4}$

Example (2) : Change 3.75 into fraction.

Solution : $3.75 = \frac{\cancel{375}^{15}}{\cancel{100}_{4}} = \frac{15}{4} = 3\frac{3}{4}$

You might have observed that wherever is possible the fractional numbers is simplified.

Exercise 11.2

Change the following in simplest fraction:

(1)	0.7	**(2)**	0.09	**(3)**	6.85	**(4)**	42.98
(5)	10.1000	**(6)**	985.55	**(7)**	287.13	**(8)**	657.955

Like and Unlike decimal fractions

Like Decimal Fractions:

Those decimal fractions, in which the number of digits after decimal point are same, called "Like Decimal fractions" .

OR

Decimals which have the same number of decimal places are called "Like Decimals".

For Example:

12.09, 3.05, 2.67, 0.32, 339.09,

Unlike Decimal Fractions:

Those decimal fractions, in which the number of digits after decimal point are not same, called "Unlike Decimal fractions".

OR

Decimals which have different number of decimal places are called "Unlike Decimals."

For Example:

8.456, 1.25, 0.3, 14.7013

Exercise 11.3

Classify the following into "Like" and "Unlike" decimal fractions. (By assuming two digits after decimal point as base)

(1)	3.52	**(2)**	0.8	**(3)**	19.345	**(4)**	100.9
(5)	325.523	**(6)**	0.9	**(7)**	673.55	**(8)**	637.55

Changing of unlike decimal fractions into like decimal fractions

Consider two unlike decimal fractions 0.8 and 0.35. The number of digits to the right of decimal point in the first number is one and in the second number is two.

We can also write o.8 as 0.80 without changing its value.

$$[\,0.8 = 0 + \frac{8}{10} \text{ or } \frac{8}{10}]$$

$$[0.80 = 0 + \frac{8}{10} + \frac{0}{100} \text{ or } \frac{80}{100} = \frac{8}{10}]$$

Now in 0.80 and 0.35 the number of digits to the right of decimal point is identical i.e. 2 digits. So, 0.80 and 0.35 will be the like decimal fractions.

Consider the following pairs of unlike fractions and see how these have been changed to like decimal fractions:

Unlike decimal fractions	Like decimal
0.5 and 9.73	0.50, 9.73
25.78, 3.857	25.780, 3.857
73.1, 5.6591	73.1000, 5.6591

We find that in order to change unlike decimal fractions to like decimal fractions, we consider the fraction with greatest number of digits to the right of decimal point and make changes in other decimal fraction: (to make the number of digits equal we put 'zero's)

Exercise 11.4

Change the following pairs of unlike decimal fractions into like decimal fractions:

(1) 5.6, 6.11 **(2)** 3.03, 5.4 **(3)** 51.8, 121.395

(4) 301.052, 32.51 **(5)** 5.1, 32.595 **(6)** 3.8, 23.7365

(7) 4.7232, 28.3 **(8)** 3.95, 17.01595.

Order of decimal fractions

To compare two or more decimal fractions follow the rules given below:

(1) First of all convert the given decimal fraction into like decimal fraction.

(2) Then compare the whole number part. The decimal fraction with greater whole number part is greater.

(3) If whole number parts are equal, then compare the tenths digits. The decimal fractions with greater tenths place digit is greater.

(4) If the tenths place digits are equal, then compare the hundredths place digits. The decimal fractions with greater hundredths place digit is greater.

Similarly exceed the process.

Example 1 : Compare 11.04 and 23.12

Solution : First compare the whole number part -

$11 < 23$

So, $11.04 < 23.12$

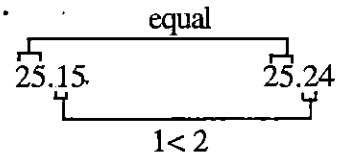
Example 2 : Which is greater 25.24 or 25.15

Solution : Since, the whole number part of both decimal fraction are equal.

So, compare the tenths place digits.

$1 < 2$

Therefore, $25.15 < 25.24$



Example 3 : Compare 5.876 and 5.888

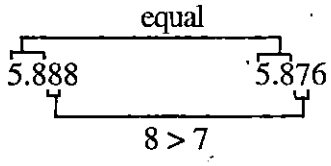
Solution : Since, the whole number parts and tenths digits are equal.

So, compare the hundredths place digits -

$8 > 7$

Therefore,

$5.888 > 5.876$



Example 4 : Arrange the following decimal fractions in ascending order --

2.8, 2.82, 2.081, 2.28

Solution : Change into like decimal fractions -

2.800, 2.820, 2.081, 2.280

Since, whole number parts are equal.

So, compare their tenths place digits.

0, 2, 8, 8 (Ascending order)

equal

or 2.081, 2.280, 2.800, 2.820

The last two decimal fractions have same tenths place digits. So, on comparing their hundredths place digits, we get,

0, 2

Therefore, Ascending order of given decimal frction --

2.081, 2.280, 2.800, 2.820

OR

$2.081 < 2.280 < 2.800 < 2.820$

Example 5 : Arrange the following in descending order --

5.123, 5.243, 5.343, 5.345

Solution : Since, these are like decimal fraction having equal whole number parts. So, on comparing their tenths digits, we get.

3, 3, 2, 1 (Descending order)

equal

or 5.343 , 5.345 , 5.243, 5.123

equal

Because, 5.343 and 5.345 are having equal tenths and hundredths place digits. So, compare their thousandth place digits --

5.345, 5.343 (Descending order)

Therefore, the descending order of given decimal fractions -

$5.345 > 5.343 > 5.243 > 5.123$

Exercise 11.5

1. Identify the bigger decimal fraction:

(i) 0.3, 0.8 **(ii)** 0.4, 0.7 **(iii)** 0.3, 0.03

(iv) 0.57, 0.87 **(v)** 0.521, 0.215 **(vi)** 19.995, 21.9

2. Identify the smaller decimal fraction:

(i) 3.5, 2.5 **(ii)** 14.3, 9.3 **(iii)** 0.37, 0.48

(iv) 40.35, 14.50 **(v)** 2.009, 1.030 **(vi)** 0.09, 10.05

3. Arrange in descending and ascending order:

(i) 2.67, 8.96, 5.72, 3.95, 10.57

(ii) 0.527, 0.597, 0.215, 0.575, 0.125

(iii) 4.732, 42.832, 40.399, 14.209, 4.372

Basic operation on decimal fractions

1. Addition of decimal fractions:

Example (1): Add 0.7 and 0.2

Solution: We add these numbers as follows --

$$\begin{array}{r} 0.7 \\ +\ 0.2 \\ \hline 0.9 \end{array}$$

Example (2): Add 213.95, 4.85 and 31.78

Solution:

$$\begin{array}{r} 213.95 \\ 4.85 \\ +\ 31.78 \\ \hline 250.58 \end{array}$$

Example (3): Add 99.378, 107.395 and 0.998

solution:

$$\begin{array}{r} 99.378 \\ 107.395 \\ +\ 0.998 \\ \hline 207.771 \end{array}$$

Remember

In addition of decimal numbers we arrange number in column such that decimal points always comes under the decimal point of the number above it. Then we add the numbers as usual and put the decimal point in the sum thus obtained.

See few more examples --

Example 4 : Hamid got Rs. 12.50 from his father, Rs. 11.75 from his mother and Rs. 5.25 from his brother. Find the total amount he got.

Solution :

Rupees given by father = 12.50
Rupees given by mother = 11.75
Rupees given by brother = 05.25 +
Total Amount he got = 29.50

So, Hamid got Rs. 29.50.

Example 5 : Zafar purchases a book for Rs. 20, two copies for Rs. 10.50 and a pen for Rs. 6.75. Find the total amount spent by Zafar.

Solution :

Cost of a book = 20.00
Cost of two copies = 10.50
Cost of a pen = 06.75 +
Total Amount = 37.25

So, total amount spent by Zafar = Rs. 37.25.

Exercise 11.6

1. Add.

(i) 6.4 + 3.7 + 7.2 (ii) 5.12 + 3.25 + 4.97

(iii) 182.35 + 972.35 + 10.51 (iv) 20.201 + 525.81 + 748.3

(v) 431.31 + 0.972 + 101.397 (vi) 30.125 + 395.001 + 475.3

2. Aslam bought a book for Rs. 40, a pen for Rs. 12.75 and a note-book for Rs. 6.50. How many rupees did he spend?

3. In Delhi it rained 4.15cm, 2.96 cm and 3.45 cm for three successive days. What is the total rainfall of these three days?

4. A labour earned Rs. 70.00 on the first day, Rs.75.50 on the second day and Rs. 95.75 on the third day. What is his total earning of the three days?

5. A shopkeeper sold 50.500 kg of wheat on the first day, 42.250 kg on the second day and 35.750 kg on the third day. How much wheat did he sell in these three days.

2. Subtraction of Decimal Fractions

Example (1): Subtract 0.3 from 0.8

Solution:

$$\begin{array}{r} 0.8 \\ -\ 0.3 \\ \hline 0.5 \end{array}$$

Example (2): Subtract 4.2 from 6.84

Solution:

$$\begin{array}{r} 6.84 \\ -4.20 \\ \hline 2.64 \end{array} \qquad (4.20 = 4.2)$$

Example (3): Subtract 5.173 from 8.987

Solution:

$$\begin{array}{r} 8.987 \\ -5.173 \\ \hline 3.814 \end{array}$$

Example (4): Subtract 195.87 from 216.93

Solution:

$$\begin{array}{r} 216.93 \\ -195.87 \\ \hline 21.06 \end{array}$$

Remember

In subtraction we arrange decimal number one below the other in column such that the decimal point falls just under the decimal point of the number above it. We subtract as usual and put decimal at the end.

Example 5: Shakir had Rs. 10. He bought a pen cost Rs. 6.50. How much rupees left with Shakir.

Solution :

Total amount of money	= 10.00
Amount spent on pen	= 06.50 –
Balance amount	= 03.50

So, amount left with Shakir = Rs. 3.50

Exercise 11.7

1. Subtract:

(i)	85.3 – 44.1	**(ii)**	98.9 – 49.3
(iii)	117.35 – 96.03	**(iv)**	857.29 – 50.13
(v)	397.32 – 79.30	**(vi)**	795.03 – 670.99

2. For the help of flood effected persons, children of a school collected an amount of Rs. 2540.75. If they distributed Rs. 1803.50 among effected persons. How much amount left with them.

3. The monthly income and expenses of Abdullah is Rs. 10,000 and Rs. 8175.50 respectively. Find his monthly saving.

Ans. Exe 11.1

(1) $\frac{8}{10}$ **(2)** $10+3+\frac{6}{10}$ **(3)** $40+9+\frac{8}{10}+\frac{7}{100}+\frac{3}{1000}$

(4) $300+50+4+\frac{9}{10}+\frac{7}{100}$ **(5)** $100+1+\frac{9}{100}+\frac{7}{1000}$

(6) $500+40+8+\frac{9}{10}+\frac{5}{100}+\frac{7}{1000}$

Ans. Exe 11.2

(1) $\frac{7}{10}$ **(2)** $\frac{9}{100}$ **(3)** $\frac{137}{20}$ **(4)** $\frac{2149}{50}$

(5) $\frac{101}{10}$ **(6)** $\frac{19711}{20}$ **(7)** $\frac{28713}{100}$ **(8)** $\frac{131591}{200}$

Ans. Exe 11.3

(1) , (7) and (8) are like decimal fractions

Ans. Exe 11.4

(1) 5.60 **(2)** 5.40 **(3)** 51.800 **(4)** 32.510

(5) 5.100 **(6)** 3.8000 **(7)** 28.3000 **(8)** 3.95000

Ans. Exe 11.5

1.

(i) 0.8 **(ii)** 0.7 **(iii)** 0.3 **(iv)** 0.87

(v) 0.521 **(vi)** 21.9

2.

(i) 2.5 **(ii)** 9.3 **(iii)** 0.37 **(iv)** 14.50

(v) 1.030 **(vi)** 0.09

3. In ascending order

(i) $2.67 < 3.95 < 5.72 < 8.96 < 10.57$

(ii) $0.125 < 0.215 < 0.527 < 0.575 < 0.597$

(iii) $4.372 < 4.732 < 14.209 < 40.399 < 42.832$

In descending order

(i) $10.57 > 8.96 > 5.72 > 3.95 > 2.67$

(ii) $0.597 > 0.575 > 0.527 > 0.215 > 0.125$

(iii) $42.832 > 40.399 > 14.209 > 4.732 > 4.372$

Ans. Exe 11.6

1.

(i) 17.3 **(ii)** 13.34 **(iii)** 1165.21 **(iv)** 1294.311

(v) 533.679 **(vi)** 900.426

2. Rs.59.25 **3.** 10.56 cm. **4.** Rs. 241.25 **5.** 128.5 Kg.

Ans. Exe 11.7

1.

(i) 41.2 **(ii)** 49.6 **(iii)** 19.32 **(iv)** 807.16

(v) 318.02 **(vi)** 124.04

2. Rs. 737.25 **3.** Rs. 1824.50

Chapter 12

MULTIPLICATION AND DIVISION OF DECIMAL FRACTIONS

Multiplication of Decimal fraction with whole number

Example (1): Multiply 0.4×3

Solution : Multiply the given numbers ignoring decimal point
Number of decimal places in multiplicands (i.e. decimal fraction) = 1
So, put decimal point after one digit from right in the product.

$$\begin{array}{r} 0.4 \\ \times 3 \\ \hline 12 \end{array}$$

Hence, $0.4 \times 3 = 1.2$

Example (2) : Multiply 36×0.4

Solution : Multiply the given numbers ignoring decimal point
Number of decimal places in multiplicands = 2
So, put decimal point after 2 digits from right in the product.

$$\begin{array}{r} 0.24 \\ \times 36 \\ \hline 144 \\ +72 \\ \hline 864 \end{array}$$

Therefore, $0.4 \times 36 = 8.64$

Example (3): Multiply 4.592×24

Solution : Multiply the given numbers ignoring decimal point.
Number of decimal places in multiplicands = 3
So, put decimal point after 3 digits from right in the product.

$$\begin{array}{r} 4.592 \\ \times 24 \\ \hline 18368 \\ +9184 \\ \hline 110208 \end{array}$$

Hence, $4.592 \times 24 = 110.208$

Remember

First of all we multiply as usual ignoring decimal point.
In the product we put decimal point after as many digits (starting from right) as the number of digits to the right of decimal point in the multiplicands.

Exercise 12.1

1. Multiply

(i) 3.8×4 **(ii)** 5.74×19 **(iii)** 0.004×82

(iv) 49.8×7 **(v)** 198.05×37 **(vi)** 6.017×194

2. If a pencil costs Rs. 1.25. Find the cost of 5 pencils.

3. One Kg of mangoes costs for Rs. 18.75. Find the cost of 7 Kg of mangoes.

Multiplication of dicimal fraction with another decimal fraction

Consider the following example:

Example 1: Multiply 0.3×0.7

Solution : Multiply given decimal fractions ignoring decimal point-
Number of decimal places in multiplicands = 1+1 = 2
So, put decimal point after 2 digits from right in the product.
Hence, $0.3 \times 0.7 = 0.21$

$$\begin{array}{r} 0.3 \\ \times 0.7 \\ \hline 21 \end{array}$$

Example 2 : Find product 1.5×2.7

Solution : Multiply given decimal fractions ignoring decimal point-
Number of decimal places in multiplicands = 1+1 = 2
So, put decimal point after two digits from right in the product.
The required product will be-

$$1.5 \times 2.7 = 4.05$$

$$\begin{array}{r} 1.5 \\ \times 2.7 \\ \hline 405 \end{array}$$

Example 3 : Multiply 1.72×0.3

Solution : Multiply given decimal fractions ignoring decimal point-
Number of decimal places in multiplicands = 2+1 = 3
So, put decimal point after 3 digits from right in the product.
Hence required product = $1.72 \times 0.3 = 0.516$

$$\begin{array}{r} 1.72 \\ \times 0.3 \\ \hline 516 \end{array}$$

Example 4 : Multiply 25.3×1.42

Solution : Multiply ignoring decimal point-
Number of decimal places in multiplicands = 2+1 = 3
So, the product = $25.3 \times 1.42 = 35.926$

$$\begin{array}{r} 25.3 \\ \times\ 1.42 \\ \hline 506 \\ 1012 \\ +253 \\ \hline 35.926 \end{array}$$

Exercise 12.2

1. Find the product:

(i) 0.1×0.4 **(ii)** 1.3×0.8 **(iii)** 2.52×1.7

(iv) 39.7×3.72 **(v)** 127.3×0.07 **(vi)** 373.03×0.576

Multiplication of decimal fractions by 10, 100 and 1000

Observe the following examples:

Example 1 : Multiply 6.32 by 10.

Solution :

$$\begin{array}{r} 6.32 \\ \times\ 10 \\ \hline 000 \\ 632 \\ \hline 63.20 \end{array}$$

Example 2 : Multiply 6.32 by 100.

Solution :

$$\begin{array}{r} 6.32 \\ \times\ 100 \\ \hline 000 \\ 000 \\ 632 \\ \hline 632.00 \end{array}$$

Example 3 : Multiply 6.32 by 1000.

Solution :

$$\begin{array}{r} 6.32 \\ \times\ 1000 \\ \hline 000 \\ 000 \\ 000 \\ +\ 632 \\ \hline 6320.00 \end{array}$$

Above examples show that in each case the decimal point has moved to the right equal to the number of zeros in 10, 100 and 1000 respectively.

Remember

When we multiply a decimal fraction by 10, 100 or 1000, the decimal point of the given number moves towards right one, two or three places respectively. If there are not sufficient digits towards rights, zero to be added in the product as required.

Exercise 12.3

1. Multiply each of the following by 10, 100 and 1000.

(i) 4.321 **(ii)** 7.527 **(iii)** 0.2

(iv) 0.73 **(v)** 0.08 **(vi)** 0.039

Characteristics of multiplication of decimal fractions

Multiply the following and observe the product -

(i) $0.7 \times 6 = 4.2$ **(ii)** $6 \times 0.7 = 4.2$

(iv) $2.5 \times 0.5 = 1.25$ **(v)** $0.5 \times 2.5 = 1.25$

So, we conclude that,

If a decimal fraction is multiplied by a whole number or other decimal fraction, the order of multiplicands does not effect the product.

Now observe the following examples --

(i) $0.39 \times 1 = 0.39$ **(i)** $3.52 \times 1 = 3.52$

> So, the product of a decimal fraction and 1 is same as the given decimal fraction.

Consider the following examples --

(i) $0.45 \times 0 = 0$ **(ii)** $90.05 \times 0 = 0$

> The product of a decimal fraction and 0 is always 0.

Division of decimal fraction

First we learn about the division of a dicimal fraction by a whole number.

Example (1): Divide 0.9 by 3

Solution : There are three different methods to divide 0.9 by 3

First Method: $0.9 \div 3 = 9 \text{ tenth} \div 3$

$= (9 \div 3) \text{ tenth}$

$= 3 \text{ tenth}$

$= 0.3$

So, $0.9 \div 3 = 0.3$

Second Method:

$$3\overline{)0.9}\ (0.3$$
$$-0$$
$$9$$
$$-9$$
$$\times$$

Third Method: $0.9 \div 3 = \frac{0.9}{3} = \frac{\cancel{9}^{3}}{\cancel{30}_{10}}$

$= \frac{3}{10} = 0.3$

So, $0.9 \div 3 = 0.3$

Example (2): $0.28 \div 7$

I Method:

$0.28 \div 7 = 28$ hundredths $\div 7$

$= (28 \div 7)$ hundredths

$= 4$ hundredths

$= 0.04$

II Method:

$$\begin{array}{r} 0.04 \\ 7\overline{)0.28} \\ \underline{0} \\ 2 \\ \underline{-0} \\ 28 \\ \underline{-28} \\ \times \end{array}$$

III Method:

$$0.28 \div 7 = \frac{0.28}{7}$$

$$= \frac{28}{700} = \frac{4}{100} \text{ (Divide by 7)}$$

$$= 0.04$$

So $0.28 \div 7 = 0.04$

Example (3): $15.693 \div 3$

I Method : $15.693 \div 3 = (15 \text{ ones} + 693 \text{ thousandths}) \div 3$

$= 15000$ thousandths $+ 693$ thousandths $\div 3$

$= (15\,693 \div 3)$ thousandths

$= 5231$ thousandths

$= 5.231$

II Method :

$$\begin{array}{r} 5.231 \\ 3\overline{)15.693} \\ \underline{-15} \\ 6 \\ \underline{-6} \\ 9 \\ \underline{-9} \\ 3 \\ \underline{-3} \\ \times \end{array}$$

III Method:

$$15.693 \div 3 = \frac{15.693}{3}$$

$$= \frac{15\,693}{3000}$$

$$= \frac{5231}{1000} \text{ (Divide by 3)}$$

$$= 5.231$$

So, $15.693 \div 3 = 5.231$

Rules for division of a decimal fraction by a whole numer

(1) When dividend is greater than divisor:

Example: Divide 25.92 by 8.

$$\begin{array}{r} 3.24 \\ 8\overline{)25.92} \\ -24 \\ \hline 19 \\ -16 \\ \hline 32 \\ -32 \\ \hline \times \end{array}$$

I Step: Divide 25 by 8. It goes 3 times, we get remainder 1

II Step: Bring down 9, we get 19. Divide 19 by 8, quoteint 2, remainder 3. Decimal point is put in the quotient as soon as we move to the number next to decimal (i.e. when 9 was brought down decimal point was simultaneously put before writing quotient 2 in the quotient column.)

III Step. Bring down 2 we get 32. Dividing it by 8, we get 4 in the quotient and zero in the remainder.

2. When dividend is smaller than the divisor:

(i) When whole number part of dividend is zero.

Example: Divide 0.4 by 8.

If the whole number part of dividend is zero and there are one or two digits after decimal, then write zero at one's place in quotient and then start division. Now add zeroes right to the digit after decimal untill the dividend must be greater than divisor.

$$\begin{array}{r} 0.05 \\ 8\overline{)0.40} \\ -0 \\ \hline \times 4 \\ -0 \\ \hline 40 \\ -40 \\ \hline \times \end{array}$$

(ii) When whole number part of dividend is not zero

Example: Divide 4.10 by 82

We divide from extreme left and go on dividing as usual except that decimal point is put in the quotient column as soon as we bring down the digit immediately after decimal point.

$$
\begin{array}{r}
0.05 \\
82\overline{)4.10} \\
-0 \\
\hline
41 \\
-00 \\
\hline
410 \\
-410 \\
\hline
\times
\end{array}
$$

Exercise 12.4

Divide and find the quotient upto 2 places of decimal:

(1)	$3.6 \div 9$	**(2)**	$9.3 \div 3$	**(3)**	$95.38 \div 19$
(4)	$48.72 \div 12$	**(5)**	$6.25 \div 25$	**(6)**	$17.6 \div 7$
(7)	$493.24 \div 3$	**(8)**	$734.05 \div 23$	**(9)**	$0.3 \div 6$

Division of decimal fraction by 10, 100 and 1000

Consider the following examples:

(i) $16.6 \div 10$ **(ii)** $370.7 \div 100$ **(iii)** $1464.4000 \div 1000$

(i) $16.6 \div 10$

$$
\begin{array}{r}
1.66 \\
10\overline{)16.60} \\
-10 \\
\hline
66 \\
-60 \\
\hline
60 \\
-60 \\
\hline
\times\times
\end{array}
$$

So, $16.6 \div 10 = 1.66$

(ii) $370.7 \div 100$

$$
\begin{array}{r}
3.707 \\
100\overline{)370.700} \\
-300 \\
\hline
707 \\
-700 \\
\hline
70 \\
-00 \\
\hline
700 \\
-700 \\
\hline
\times\times
\end{array}
$$

So, $370.7 \div 100 = 3.707$

(iii) $1464.4000 \div 1000$

$$
\begin{array}{r}
1.4644 \\
1000\overline{)1464.4000} \\
-1000 \\
\hline
4644 \\
-4000 \\
\hline
6440 \\
-6000 \\
\hline
4400 \\
-4000 \\
\hline
4000 \\
-4000 \\
\hline
\times\times\times
\end{array}
$$

So, $1464.4000 \div 1000 = 1.4644$

From above examples it is clear that :-

(i) When we divide a decimal fraction by 10, the decimal point move one place towards left.

(ii) When we divide by 100, the decimal point moves two places towards left.

(iii) When divide by 1000, the decimal point move three places towards left.

Exercise 12.5

1. Divide and find the quotient:

(i) $0.89 \div 10$ **(ii)** $2.573 \div 100$ **(iii)** $43.052 \div 1000$

(iv) $445.93 \div 1000$ **(v)** $8973.52 \div 1000$

Division of decimal fraction by multiples of 10, 100 or 1000

Example (1): $316.84 \div 40$

Solution: We can solve this question by two methods. First method has already been discussed. Now we consider another method.

$$316.84 \div 40 = \frac{316.84}{40}$$

$$= \frac{316.84}{10 \times 4}$$

$$= \frac{316.84}{10} \times \frac{1}{4}$$

$$= 31.684 \times \frac{1}{4}$$

$$= \frac{31.684}{4}$$

$$= 7.921$$

Example (2): Divide 8.48 by 400

Solution: $8.48 \div 400 = \frac{8.48}{400} = \frac{8.48}{100} \times \frac{1}{4}$

$$= .0848 \times \frac{1}{4}$$

$$= \frac{.0848}{4} = 0.0212$$

Exercise 12.6

Find the quotient:

(1) $732.52 \div 40$ **(2)** $690.4 \div 80$ **(3)** $55.5 \div 50$

(4) $780.46 \div 200$ **(5)** $0.008 \div 40$ **(6)** $4920.24 \div 600$

Division of a decimal fraction by another decimal fraction

Example (1): Divide 0.0112 by 0.16

Solution:- **First Method:**

In this method, first we change the denominator of decimal fraction into whole number. Here, the denominator is 0.16. So, change it into whole number, we multiply it by 100, because it has two digits after decimal point. Now, by rule, numerator will aslo be multiply by 100.

$$0.0112 \div 0.16 = \frac{0.0112}{0.16}$$

$$= \frac{0.0112 \times 100}{0.16 \times 100}$$

$$= \frac{1.12}{16} = 0.07$$

Second Method:

If divisor and dividend both are decimal fractions, then first we change divisor into whole number. So, we move decimal point of dividend as many places towards right as there are digits after decimal in divisor.

$$0.0112 \div 0.16 = \frac{0.0112}{0.16}$$

$$= \frac{1.12}{16} = 0.07$$

Example (2): Divide 112.005 by 0.375

Solution: New divisor 0.375×1000

$= 375$

New dividend $= 112.005 \times 1000 = 112005$

Now divide, $112005 \div 375$

$$\begin{array}{r} 298.68 \\ 375\overline{)112005.00} \\ -750 \\ \hline 3700 \\ -3375 \\ \hline 3255 \\ -3000 \\ \hline 2550 \\ -2250 \\ \hline 3000 \\ -3000 \\ \hline \times\times\times\times \end{array}$$

So, from above examples, we conclude that,

- According to the number of decimal places of divisor, we multiply the divisor and dividend both by 10 or 100 or 1000 as required to make divisor a whole number.
- Then divide the new dividend by new divisor.

Exercise 12.7

Divide and find the quotient:

(1)	$2.25 \div 1.5$	**(2)**	$0.05 \div 0.25$	**(3)**	$0.175 \div 0.25$
(4)	$54.6 \div 1.3$	**(5)**	$0.442 \div 0.221$	**(6)**	$0.035 \div 0.07$

Division of whole number by decimal fraction.

Consider the following examples.

Example (1): $26 \div 1.25$

Solution : $26 \div 1.25 = \frac{26}{1.25} = \frac{26}{1.25} \times \frac{100}{100}$

$= \frac{2600}{125} = 20.8$

Example (2): $8 \div 0.4$

Solution: $8 \div 0.4 = \frac{8}{0.4}$

$= \frac{8}{0.4} \times \frac{10}{10}$

$= \frac{80}{4} = 20$

Example (3): $4422 \div 0.2211$

Solution: $= \frac{4422}{0.2211} \times \frac{10000}{10000}$

$= \frac{44220000}{2211} = 20{,}000$

Exercise 12.8

Find the quotient:

(1) $23 \div 0.46$ **(2)** $34 \div 4.25$

(3) $215 \div 12.45$ **(4)** $438 \div 16.44$

(5) $3456 \div 0.144$

Division of a whole number by another whole number when dividend < divisor

Consider the following examples:

Examples: **(1)** $3 \div 4$ **(2)** $2 \div 8$ **(3)** $5 \div 25$

Solutions:

(1)
$$\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ -0 \\ \hline 30 \\ -28 \\ \hline 20 \\ -20 \\ \hline 0 \end{array}$$

(2)
$$\begin{array}{r} 0.25 \\ 8\overline{)2.000} \\ -0 \\ \hline 20 \\ -16 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

(3)
$$\begin{array}{r} 0.2 \\ 25\overline{)5.0} \\ -00 \\ \hline 50 \\ -50 \\ \hline 0 \end{array}$$

So, $3 \div 4 = 0.75$ So, $2 \div 8 = 0.25$ So, $5 \div 25 = 0.2$

In the above examples the dividend has been made the multiple of divisor by adding decimal point to the rightside of the number and adding required number of zeroes. The rest division has been done as usual.

Exercise 12.9

1. Divide:

(i) 2 by 4 **(ii)** 5 by 8 **(iii)** 3 by 6

(iv) 10 by 25 **(v)** 15 by 40

Changing simple fraction into decimal fraction

Examples: (1) $\frac{1}{4} = 1 \div 4$ (2) $\frac{3}{6} = 3 \div 6$ (3) $\frac{3}{5} = 3 \div 5$

$$\begin{array}{r} 0.25 \\ 4\overline{)1.00} \\ -0 \\ \hline 10 \\ -8 \\ \hline 20 \\ -20 \\ \hline 00 \end{array} \qquad \begin{array}{r} 0.5 \\ 6\overline{)3.0} \\ -0 \\ \hline 30 \\ -30 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0.6 \\ 5\overline{)3.0} \\ -0 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

So, $1 \div 4 = 0.25$ So, $3 \div 6 = 0.5$ So, $3 \div 5 = 0.6$

In all the above examples sufficient number of zeroes has been added to the right of number in the dividend and the rest has been done as usual.

Remember

One quarter $= \frac{1}{4} = 0.25$

One half $= \frac{1}{2} = 0.50$

3- quarters $= \frac{3}{4} = 0.75$

Exercise 12.10

Find the quotient:

(1) $7 \div 28$ **(2)** $5 \div 40$ **(3)** $23 \div 92$

(4) $11 \div 44$ **(5)** $13 \div 104$ **(6)** $27 \div 216$

Ans. Exe 12.1

1.

(i) 15.2 **(ii)** 109.06 **(iii)** 0.328 **(iv)** 348.6

(v) 7327.85 **(vi)** 1167.298 **(2)** Rs. 6.25 **(3)** Rs. 131.25

Ans. Exe 12.2

(1) 0.04 **(2)** 1.04 **(3)** 4.284 **(4)** 147.684

(5) 8.911 **(6)** 214.86528

Ans. Exe 12.3

1.

(i) 43.21, 432.1, 4321 **(ii)** 75.27, 752.7, 7527

(iii) 2, 20, 200 **(iv)** 7.3, 73, 730

(v) 0.8, 8, 80 **(vi)** 0.39, 3.9, 39

Ans. Exe 12.4

(1) 0.4 **(2)** 3.1 **(3)** 5.02 **(4)** 4.06

(5) 0.25 **(6)** 2.51 **(7)** 164.41 **(8)** 31.91

(9) 0.05

Ans. Exe 12.5

1.

(i) 0.089 **(ii)** 0.02573 **(iii)** 0.043052

(iv) 0.44593 **(v)** 8.97352

Ans. Exe 12.6

(1) 18.313 **(2)** 8.63 **(3)** 1.11 **(4)** 3.902

(5) 0.0002 **(6)** 8.2004

Ans. Exe 12.7

(1) 1.5 **(2)** 0.2 **(3)** 0.7 **(4)** 42

(5) 2 **(6)** 0.5

Ans. Exe 12.8

(1) 50 **(2)** 8 **(3)** 17.269 **(4)** 26.642

(5) 24000

Ans. Exe 12.9

1.

(i) 0.5 **(ii)** 0.625 **(iii)** 0.5 **(iv)** 0.4

(v) 0.375

Ans. Exe 12.10

(1) 0.25 **(2)** 0.125 **(3)** 0.25

(4) 0.25 **(5)** 0.125 **(6)** 0.125

Chapter 13

MIXED OPERATIONS

Solve the ollowing questions:

(1) 15 + 6 = ... **(2)** 35 – 10 = ...

(3) 12 × 5 = ... **(4)** 48 ÷ 8 = ...

You can solve these questions very easily as you are already acquainted with these basic operations.

Now look at these questions.

(1) $10 + 3 - 6$ **(2)** $25 \times 2 + 4$

(3) $22 \div 7 \times 2$ **(4)** $74 \div 2 \times 3 + 9$

You find that in all the aboye problems there are two or more than two operations.

The problems in which two or more operations are involved together are called MIXED OPERATIONS problems.

(A) When addition and subtraction are there together

Method: When we have addition and subtraction together in a problem, then first we operate addition and thereafter subtraction.

For Example:

(1) $= 22 - 7 + 2$

$= \underbrace{22+2}-7$

$= \underbrace{24-7}$

$= 17$

(2) $= \underbrace{10+3}-6$

$= 13 - 6$

$= 7$

Exercise 13.1

Solve:

(1) 30 + 7 – 10 **(2)** 24 – 8 + 12

(3) 208 – 75 + 138 **(4)** 317 + 125 – 100

(B) When multiplication and division are there together

Method: When we have division and multiplication together in a problem, then first perform division and after that multiplication.

For Example:

(i) $12 \times 9 \div 3$

$= \underbrace{12 \times 3}$

$= 36$

(ii) $\underbrace{35 \div 7} \times 2$

$= 5 \times 2$

$= 10$

Exercise 13.2

Solve:

(1) $24 \div 6 \times 3$ **(2)** $14 \times 12 \div 3$

(3) $9 \times 15 \div 3$ **(4)** $63 \div 9 \times 2$

(5) $104 \div 13 \times 6$ **(6)** $410 \times 6 \div 3$

(C) When addition, subtraction and multiplication are there together

Method: First of all we solve (do) multiplication. After that solve addition and then subtraction.

Example: (i) $5 + \underbrace{8 \times 2}$

$= 5 + 16$

$= 21$

(ii) $\underbrace{16 \times 3} + 12$

$= 48 + 12$

$= 60$

(iii) $15 - \underbrace{4 \times 3}$

$= 15 - 12$

$= 3$

(iv) $\underbrace{30 \times 5} - 100$

$= 150 - 100$

$= 50$

(v) $5 + \underbrace{8 \times 2} - 4$

$= \underbrace{5 + 16} - 4$

$= 21 - 4 = 17$

(vi) $14 - 6 + \underbrace{12 \times 9}$

$= 14 - 6 + 108$

$= \underbrace{14 + 108} - 6$

$= \underbrace{122 - 6}$

$= 116$

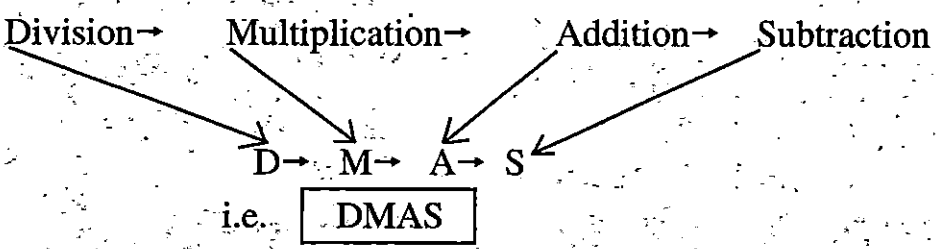
Solve: **Exercise 13.3**

(1) $7+4\times6$ **(2)** $20-3\times5$ **(3)** $26-2\times4+9$

(4) $1+48-12\times3$ **(5)** $15\times5+8-30$ **(6)** $12-5+25\times2$

(D) When addition, subtraction, multiplication and division all the four operations are in the equation.

Method: First of all, we perform division and then multiplication. After that we perform addition and then subtraction. That means the four operation will be perform in the following sequence –



i.e. DMAS

Example:

(1) $8\times\underbrace{10\div5}+5$

$= \underbrace{8\times2}+5$

$= 16+5$

$= 21$

(2) $25-2\times\underbrace{9\div3}$

$= 25-\underbrace{2\times3}$

$= 25-6$

$= 19$

(3) $\underbrace{60\div12}+8\times3$

$= 5+\underbrace{8\times3}$

$= 5+24$

$= 29$

(4) $15+11-6\times\underbrace{4\div2}$

$= 15+11-\underbrace{6\times2}$

$= \underbrace{15+11}-12$

$= 26-12$

$= 14$

Exercise 13.4

Solve:

(1)	$5 \times 3 - 2 + 4$	**(2)**	$16 \div 8 \times 5 + 2 - 7$
(3)	$20 \div 5 + 12 \times 2 - 1$	**(4)**	$42 - 8 \times 96 \div 16 + 15$
(5)	$2 \times 14 \div 7 + 15 - 10$	**(6)**	$64 \div 8 \times 3 + 6 - 15$
(7)	$2 \times 34 \div 17 - 1$	**(8)**	$3 + 15 \times 25 \div 5$

Use Of Brackets:

In previous class we have learnt only one kind of bracket. Now we study about few more kinds of bracket and their sequence of performance.

Example: Solve the following-

(i) $12 + 3\,[48 \div \{36 - (5 \times 4)\}]$

(ii) $25 + [17 - \{2 \times (27 \div 9\}]$

Solution : **(i)** $12 + 3\,[48 \div \{36 - (5 \times 4)\}]$

$= 12 + 3\,[48 \div \{36 - 20\}]$

$= 12 + 3\,[48 \div 16]$

$= 12 + 3 \times 3$

$= 12 + 9$

$= 21$

(ii) $25 + [17 - \{2 \times (27 \div 9)\}]$

$= 25 + [17 - \{2 \times 3\}]$

$= 25 + [17 - 6]$

$= 25 + 11$

$= 36$

From above examples we conclude:

$\Rightarrow$ The sequence of performing different brackets will be-

$( ) \rightarrow \{ \} \rightarrow [ ]$

$\Rightarrow$ The numbers inside the brackets will be solved according to the rule 'DMAS'.

Exercise 13.5

Solve the following:

1. $22 \div \{10 + (8 - 14 \div 2)\}$ **2.** $105 + 2[210 \div \{75 - (13 \times 5)\}]$

3. $280 \div [40 + \{185 - (17 \times 5)\}]$ **4.** $31 + 24 \div 6 - [9 \times 4 - \{67 - (8 \times 7)\}]$

5. $99 + [308 \div \{19 - (48 - 9 \times 4)\}]$ **6.** $72 + 4[136 - 46 \div 23\{60 - (104 \div 13)\}]$

Ans. Exe 13.1

(1) 27 **(2)** 28 **(3)** 271 **(4)** 342

Ans. Exe 13.2

(1) 12 **(2)** 56 **(3)** 45 **(4)** 14

(5) 48 **(6)** 820

Ans. Exe 13.3

(1) 31 **(2)** 5 **(3)** 27 **(4)** 13

(5) 53 **(6)** 57

Ans. Exe 13.4

(1) 17 **(2)** 5 **(3)** 27 **(4)** 9

(5) 9 **(6)** 15 **(7)** 3 **(8)** 78

Ans. Exe 13.5

1. 2 **2.** 147 **3.** 2 **4.** 10 **5.** 143 **6.** 200

Chapter 14

AVERAGE

Concept of Average

Hafeez read 7 pages of the Holy Qur'an on Tuesday, 11 pages on Wednesday and 12 pages on Thursday.

If you asked that, how many pages did he read in these three days? Then your answer will be –

$$7 + 11 + 12 = 30 \text{ pages}$$

But, If you asked the average number of pages did he read daily? Then how can you find it?

To find it, divide the total number of pages read by him in 3 days by total number of days.

Total no. of pages read by him = 30
Total no. of days = 3
$\therefore$ No. of pages, he read daily = $30 \div 3$
= 10

So, the average of 7, 11 and 12 is 10.

Method:

- First of all find the sum of given data, and
- then divide this sum by the no. of data.

Example 1 : Age of 7 students of a class are 11 years, 12 years, 12 years, 12 years, 10 years, 13 years and 14 years. Find their average age?

Solution: Sum of ages of 7 students = 11 + 12 + 12 + 12+ 10 + 13 + 14
= 84 years

Total no. of students = 7

So, Average of their ages = $\frac{84}{7}$ = 12 years.

Example (2): Find the average of 11, 17, 15, 9 and 8.

Solution: Average $= \dfrac{\textit{Sum of the quantities}}{\textit{Total number of quantities}}$

$= \dfrac{11+17+15+9+8}{5} = \dfrac{60}{5} = 12$

Example (3): Monthly fee of 6 students is Rs. 48, Rs.42 Rs. 42, Rs.45, Rs. 45 and Rs. 48. Find average fee of one student.

Solution: Average $= \dfrac{\textit{Total Fee}}{\textit{Total no. of Students}}$

$= \dfrac{48+42+42+45+45+48}{6}$

$= \dfrac{270}{6}$

$= 45$

So, average fee of one student = Rs. 45

Example (4): 12 students of class 5, donate the money for a good deed. The donated money in rupees as follows–

Rs. 25, Rs.20, Rs.20, Rs.15, Rs.37, Rs.32, Rs. 27, Rs.18, Rs.40, Rs.20, Rs.38, Rs.32

(i) Find the average donation of each student.

(ii) How many students donated below average?

(iii) How many students donated above average?

(iv) How many students donated amount equal to the average?

Solution:

Total donation of 12 students $= 25 + 20 + 20 + 15 + 37 + 32 + 27 + 18 + 40 + 20 + 38 + 32$

$=$ Rs. 324

Total no. of students $= 12$

(i) Average donation of each student $= \frac{\textit{Total donation}}{\textit{Total no. of students}}$

$= \frac{324}{12} = \text{Rs. } 27$

(ii) 6 students donated below average

(iii) 5 Students donated above average

(iv) One student donated equal to average

Example (5): In an office 15 employees get Rs. 1550 each, 10 employees get Rs. 1760 each and 5 employees get Rs. 2000 each. Find the average of all the employees of the office.

Solution: Total salary of 15 employees $= 15 \times 1550 =$ Rs. 23, 250

Total salary of 10 employees $= 10 \times 1760 =$ Rs. 17, 600

Total salary of 5 employees $= 5 \times 2000 =$ Rs. 10, 000

Total salary of (15+10+5=30) employees = Rs. 50,850

So, the average salary of each employee $= \frac{50{,}850}{30}$

= Rs. 1695

Example (6): Find the average of $5, 4\frac{1}{6}, 2\frac{2}{3}, 6\frac{1}{6}$.

Solution: Change the given mixed fractions into improper fractions–

$$\frac{5\times6}{1\times6}, \frac{25}{6}, \frac{8\times2}{3\times2}, \frac{37}{6}$$

$$\frac{30}{6}, \frac{25}{6}, \frac{16}{6}, \frac{37}{6}$$

Sum of fractions $= \frac{30}{6}+\frac{25}{6}+\frac{16}{6}+\frac{37}{6}$

$= \frac{108}{6} = 18$

No. of fractions (data) $= 4$

So, Average $= \frac{\textit{Sum of fractions}}{\textit{No. of fractions}}$

$= \frac{\cancel{18}^{9}}{\cancel{4}_{2}} = \frac{9}{2} = 4\frac{1}{2}$

Exercise 14

1. A Hafiz-e-Qur'an completed holy Qur'an in 20 days in Taraveeh. How many Para on average did he read daily.

2. Akram gained 85 marks in Urdu, 80 in Maths, 86 in Science and 65 in Diniyat (Islamic Studies). Find the average of his marks?

3. A cyclist covered 10Km in 2 hours in plain region and 8 Km in 4 hours in hill region. Find his average speed during the whole journey.

4. 5 months expense of a family is given as under

Months	April	May	June	July	Aug
Expense (Rs.)	5,500	5,600	5,000	7,300	7,000

Find monthly average expense of the family.

5. Find the average of following:

(i) $4\frac{1}{2}$, $5\frac{3}{4}$, $2\frac{1}{6}$, $3\frac{7}{16}$ and 7.

(ii) $2\frac{1}{5}$, $3\frac{1}{15}$, 4 and $5\frac{2}{15}$

Ans. Exe 14

(1) $1\frac{1}{2}$ para **(2)** 79 marks **(3)** 3 Kilometer per hour

(4) Rs. 6080 **(5)** (i) $4\frac{3}{5}$ (ii) $3\frac{3}{5}$

Chapter 15

TIME, DISTANCE AND SPEED

Now a days, it is very easy to travel from one place to another. We have different resources of transportation, through which we covere the so long distances in few hours. But it was not so few years ago. In those days people had to travel on foot, or by bullock-cart or on the back of hourse and camel etc. Now, there are very fast means of transportation, which cover long distances in very short time. Generally we use cycle, motor cycle, scooter, care, bus, train and aeroplane etc. to travel from one place to another.

There are three things included to travel from one place to another–

- Time
- Distance and
- Speed

Some relations among Distance, Speed and Time

(i) Speed	$= \frac{\text{Distance}}{\text{Time}}$
(ii) Distance	$= \text{Speed} \times \text{Time}$
(iii) Time	$= \frac{\text{Distance}}{\text{Speed}}$

Speed : The distance covered per unit time by a moving object, is called its "speed."

OR

The ratio of distance covered by object and time taken is known as "speed."

i.e. $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Units of Speed: We know that, the division of distance by time gives speed.

So, $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Unit of speed $= \frac{\textit{Unit of Distance}}{\textit{Unit of time}}$

We know that,
Units of Distance are km. and m. Units of time are Hour, mints and sec.
So, the units of speed may be given as--
km.per hour, km. per mint and km. per sec.

OR

m. per hour, m. per mint and m. per sec.

Example (1): A bus covers 400 Km of distance in 8 hours. Find its speed.

Solution:

Distance $= 400\ Km$

Time $= 8\ Hours$

Speed $= ?$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{400\ km}{8\ Hour}$$

$= 50\ Km$ per hour. Ans

Example (2): Nadeem Walks 3 Km daily. He covers this distance in $\frac{1}{2}$ hour. Find his speed per hour.

Solution:

Distance $= 3\ Km$

Time $= \frac{1}{2}\ hour$

Speed $= ?$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{3}{\frac{1}{2}} = \frac{3\times 2}{1} = 6\ Km\ per\ hour$$

$= 6\ Km/Hr.$

Example (3): Rajdhani Express covers a distance of 504 Km between New Delhi and Kanpur in 4 hour 30 minutes. Find its speed?

Solution: Distance Coverd $= 504\,km.$

$$\text{Time} = 4\ Hours\ 30\ Min.$$

$$= 4\ Hr. + \frac{30}{60} Hr.\ (Change\ Min. into\ Hr.)$$

$$= 4\ Hr. + \frac{1}{2} Hr.$$

$$= 4\frac{1}{2} Hr. \quad = \frac{9}{2} Hr.$$

$$\text{Speed of train} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{504\ Km.}{\frac{9}{2} Hr.}$$

$$= {}^{56}\cancel{504} \times \frac{2}{\cancel{9}}\ Km/Hr.$$

$$= 56 \times 2\ Km/Hr. \quad = \quad 112\ Km/Hr.$$

Changing of Units of Speed :

(1) km. per hour into m.per mint:

$$\text{km. per hour} = \frac{1\,\text{km}}{1\,\text{hour}} = \frac{100\cancel{0}\,\text{m}}{6\cancel{0}\,\text{mint}}$$

$$= \frac{{}^{50}\cancel{100}\,m}{{}_{3}\cancel{6}\,mint.} = \frac{50\,m}{3\,min.}$$

$$= \frac{50}{3}\ \text{m per min.}$$

So, To change "km per hour" into "m. per mint." multiply the given speed by $\frac{50}{3}$.

(2) km. per hour into m. per sec:

$$\text{km. per hour} = \frac{1\,\text{km.}}{1\,\text{hour}} = \frac{1000\,\text{m.}}{60\times60\,\text{Sec.}}$$

$$= \frac{5\cancel{10}\,\text{m.}}{18\cancel{36}\,\text{Sec.}} = \frac{5\,\text{m.}}{18\,\text{Sec.}}$$

$$= \frac{5}{18}\ \text{m per Sec.}$$

So, To change "km per hour" into "m. per sec." multiply the given speed by $\frac{5}{18}$

(3) m. per sec. into km. per hour:

$$\text{m. per sec.} = \frac{1\,\text{m}}{1\,\text{sec.}} = \frac{\left(\frac{1}{1000}\right)\text{km.}}{\left(\frac{1}{60\times60}\right)\text{hr.}}$$

$$= \frac{1}{1000}\times\frac{60\times60}{1}\ \text{km. per hour}$$

$$= \frac{\cancel{36}^{18}}{\cancel{10}_{5}}\ \text{km. per hour} = \frac{18}{5}\ \text{km. per hour}$$

So, To change 'm. per sec.' into 'km per hour' multiply the given speed by $\frac{18}{5}$

So, we conclude that --

- To change 'km/hr' into 'm/sec.' multiply speed by 5/18.
- To change 'm/sec.' into 'km/hr' multiply speed by 18/5.
- To change 'km/hr' into 'm/mint' multiply speed by 50/3.

Now, consider few examples related to change of units:

Example(1): Speed of a car is 45 Km per hour find its speed in m per minute and metre per second.

Solution: **First Method:**

Speed of car = 45 km/hour

$$= \frac{45\,\text{km}}{1\,\text{hour}} = \frac{\overset{15}{\cancel{45}} \times \overset{50}{\cancel{1000}}\,\text{m.}}{\underset{1}{\cancel{60}}\,\text{min.}}$$

$$= \frac{750\,\text{m}}{1\,\text{min.}} = 750\ \text{m/min.}$$

Speed of car = 750 m/min.

Now, change this speed in m/sec. -

Speed of car = 750 m/sec.

$$= \frac{750\,\text{m}}{1\,\text{min.}} = \frac{75\cancel{0}\,\text{m}}{6\cancel{0}\,\text{sec.}}$$

$$= \frac{\overset{25}{\cancel{75}}\,\text{m}}{\underset{2}{\cancel{6}}\,\text{sec.}} = \frac{25\,\text{m}}{2\,\text{sec.}}$$

Speed of car = 12.5 m/sec.

Second Method:

Speed of car = 45 km./hr.

We know that, to change 'km/hr' into 'm/min' multiply speed by $\frac{50}{3}$.

So, speed of car = $45 \times \frac{50}{3}$ m/min.

$$= \frac{{}^{15}\cancel{45} \times 50}{\cancel{3}_{1}} \text{ m/min.}$$

$$= 750 \text{ m/min.}$$

Also, we know that, to change 'km/hr' into 'm/sec.' multiply the speed by 5/18.

So, speed of car = $^{5}\cancel{45} \times \frac{5}{\cancel{18}_{2}}$ m/sec.

$$= \frac{25}{2} = 12.5 \text{ m/sec.}$$

Example (2): Speed of a train is 20 metre per second. Find its speed in Km per hour.

Solution: **First Method:**

Speed of train = 20 m/sec.

$$= \frac{20 \text{ m}}{1 \text{ sec}} = \frac{\left(\frac{20}{1000}\right) \text{km.}}{\left(\frac{1}{60 \times 60}\right) \text{hr.}}$$

$$= \frac{2\cancel{0}}{1\cancel{0}\cancel{0}\cancel{0}} \times \frac{6\cancel{0} \times 6\cancel{0}}{1} \text{ km/hr.}$$

$$= 72 \text{ km/hr.}$$

Second Method:

We know that, to change metre/sec into Km/Hr. multiply by $\frac{18}{5}$.

Speed of train $= 20 \ m/\sec$

$$= {}^{4}\cancel{20} \times \frac{18}{\cancel{5}} \ Km/Hr$$

$$= 4 \times 18 \ Km/Hr.$$

$$= 72 \ Km/Hr$$

Exercise 15.1

(1) An aeroplane covers a distance of 2000 Km in 2 hours and 30 minutes. Find its speed.

(2) A man covers 20 metres in 15-seconds. Find his speed in Km/Hr.

(3) A train takes 6 hours 40 minutes to reach from station A to station B. If the distance between these two stations is 390 Km. Find the speed of the train.

(4) Riyaz and Junaid go to their offices in motor car. Riyaz goes 45 Km in 30 minutes and Junaid goes 2.4 Km in 1 minute. Tell who drives car faster?

(5) Speed of a car is 25 metre per second. Find its speed in Km/Hr.

Finding Time when Speed and Distances are known

We know, $\text{Time} = \dfrac{\text{Distance}}{\text{Speed}}$

Example: Nadeem's school is 400 metres from his home. If he walks 50 metres per minute, how long will he take to reach the school.

Solution:

Distance = 400 m

Speed = 50 m per min.

Time = ?

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{\cancel{400}^{8}}{\cancel{50}_{1}} = 8$$

= 8 minutes

Exercise 15.2

1. Speed of a Jet plane is 900 Km/Hr. How long will it take to cover a distance of 4500 Km?
2. Speed of a cyclist is 6 Km/Hr. What time will he take to reach his village which is 33 Km far?
3. A train runs at a speed of 80 Km/Hr. and the distance between Delhi and Patna is 1000 Km, how long will it take to cover this distance?
4. How long will it take a scooter to cover a distance of 35 Km at a speed of 42 Km/Hr?
5. Akram took part in 5 Km race. If he runs 100 m per minute, how long did he take to cover the distance?

Finding distance when time and speed are known

We know that, Distance = Time × Speed

Remember If Speed is in per minute or per hour the time should also be in minutes or hours accordingly

Example (1): If speed of a bus is 70 Km/Hr. What distance will it cover in 5 hours.

Solution:

$$\text{Distance} = \text{Time} \times \text{Speed}$$

$$= 5 \text{ hour} \times 70 \frac{km}{hr}$$

$$\text{Distance} = 350 \text{ Km}$$

Example(2): Speed of a truck is 60 km/hr. It takes 3 hours 20 minutes in reaching from Ambala to Delhi. What is the distance between Delhi and Ambala?

Solution:

Speed of the truck = 60 km per hour

Time = 3 hours 20 minutes

$= 3 \text{ hours } \frac{\cancel{20}^{1}}{\cancel{60}_{3}} \text{ hours}$

$= 3\frac{1}{3} \text{ hours}$

Distance = Speed × Time

$= 60 \text{ km/hr.} \times 3\frac{1}{3} \text{ hr.}$

$= \cancel{60}^{20} \times \frac{10}{\cancel{3}_{1}} \text{ km.}$

$= 200 \text{ km}$

So, Distance from Ambala to Delhi = 200 km.

Exercise 15.3

1. Speed of a plane is 600 km/hr. It takes 25 minutes to reach Chandigarh from Delhi. Find the distance between these two cities.
2. I take 22 minute to reach my friend's home. If my speed is 75 metre per minute, find the distance of my friend's house from my home.
3. A car runs at a speed of 80 km/hr. How long will it go in 5 Hours 30 minutes?

4. Sajid goes to school on scooter. If the speed of scooter is 35 km/hr. and Sajid takes 20 minutes to reach the school, find the distance of the school from his home.

5. A man travelled for 5 hours by bus and 2 hours by cycle. If the speeds of bus and cycle are 42 km/hr. and 10 km/hr. respectively, find the distance covered by the man.

Amazing!

14622047999 is an interesting number.

When we divide it by 10 we get remainder 9
When we divide it by 9 we get remainder 8
When we divide it by 8 we get remainder 7
When we divide it by 7 we get remainder 6
When we divide it by 6 we get remainder 5
When we divide it by 5 we get remainder 4
When we divide it by 4 we get remainder 3
When we divide it by 3 we get remainder 2
When we divide it by 2 we get remainder 1

Try yourself

Really amazing

Ans. Exe 15.1

(1) 800 km/hr. **(2)** 4.8 km/hr. **(3)** 58.5 km/hr.

(4) Junaid **(5)** 1500 m/min. and 90 km/hr.

Ans. Exe 15.2

(1) 5 hours **(2)** 5 hour 30 minutes **(3)** 12 hour 30 minutes

(4) 50 minutes **(5)** 50 minutes

Ans. Exe 15.3

(1) 250 km. **(2)** 1 km. 650 m

(3) 440 km. **(4)** 11.6 km.

(5) 230 km.

Chapter 16

PROFIT AND LOSS

Normally we purchase articles of daily usage from shops around us. These shopkeepers buy goods from other big shopkeepers or merchants and sell to us. Some times they lose and some times they gain extra money by selling these goods.

Before solving examples about profit and loss, the following points keep in mind very well–

(i) Cost Price (C P)→ The price at which an article purchases.

(ii) Selling Price (S P)→ The price at which an article sold.

(iii) If Selling Price > Cost Price,

then, Profit (gain) = Selling Price (S P) – Cost Price (C P)

or $\boxed{\text{Profit} = \text{SP} - \text{CP}}$

(iv) If Cost Price > Selling Price,

then, Loss = Cost Price – Selling Price

or $\boxed{\text{Loss} = \text{CP} - \text{S P}}$

See the following examples:

Example (1) : A shopkeeper bought a pen for Rs. 10 and sold it for Rs. 12. Did he gain or lose? and how much?

Solution: Cost Price of the pen = Rs. 10

Selling Price of the pen = Rs. 12

Since, Selling price > Cost Price [12 > 10]

So, we say he gained or made profit.

Now, Profit = Selling Price (SP) – Cost Price (CP)

Profit = SP – CP

= Rs. 12 – Rs.10 = Rs. 2

Example (2) : Atif bought a radio for Rs. 425 and sold it to Rashid for Rs. 500. How much did Atif lose or gain?

Solution : C P of Radio = Rs. 425
S P of Radio = Rs. 500

Since, SP > CP,

So, he made profit.

Profit = SP – CP

= Rs. 500 – Rs.425

= Rs. 75

Example (3): A Shopkeeper bought a TV for Rs. 15,000. Due to depreciation in the price of TV, he had to sell it for Rs. 13500. How much did he lose or gain?

Solution: C P of the T V = Rs. 15,000
S P of the T V = Rs. 13,500

Since, CP > SP

So, he suffered loss.

Loss = C P – S P
= Rs. 15000 – Rs. 13500
= Rs. 1500

Exercise 16.1

1. A Shopkeeper bought a bicycle for Rs. 1,350 and sold it for Rs. 1,540. How much did he gain?
2. A merchant bought a sofa set for Rs. 3,520 and spent Rs. 60 on its transportation. He sold it for Rs. 3975. How much did he gain?
3. A fruit seller bought 25 dozen bananas for Rs. 200, and sold it at the rate of Rs. 9 per dozen. Find his profit?

4. A shopkeeper purchased 15 table at the rate of Rs 250 each and 20 chairs at the rate of Rs. 230 each. He sold the chair and the table at the equal rate of Rs. 240 each. Did he gain or lose and how much?

5. A dishonest milkman bought 80*l* of milk at the rate of Rs. 14.50 per litre and added 10*l* of water to it. He sold this adulterated milk at the rate of Rs. 16 per litre. How much did he gain?

(Note: adding water to milk is a crime both in the eyes of Allah and or government. Even if we escape punishment from government we cannot escape punishment in the life Hereafter i.e. Akhirah.)

Finding Loss, when CP and SP are known

Example (1) : A Shopkeeper sold a fan for Rs. 815, which he had purchased for Rs. 875. How much loss did he suffer?

Solution:

CP = Rs. 875

SP = Rs. 815

Loss = ?

Loss = CP – SP

= Rs. 875 – Rs. 815

= Rs. 60

Example (2): Khalid bought a bicycle for Rs. 1525 and spent another 75 rupees on its repair. After some time he sold it for Rs. 1590. Did he lose or gain and how much.

Solution:

C.P. of bicycle = Rs. 1525

expense for repaire = Rs. 75

Net or effective Cost Price = Rs. 1525 + Rs. 75

CP = Rs. 1600

S P = Rs.1590

Since, SP < CP (or CP > SP)

So, Loss = CP – SP

= Rs. 1600 – Rs. 1590 = Rs. 10

Exercise 16.2

1. Zeeshan bought some articles for Rs. 325 and sold it for Rs. 295. How much did he gain or lose?

2. A green grocer bought vegetables for Rs. 120.25 and sold it for Rs.109.75. Find his loss?

3. A fruit merchant bought 25 Kg of mangoes for Rs. 500. Out of these 2 Kg of mangoes were rotten, rest he sold at the rate of Rs. 23 per Kg. How much did he gain or lose?

4. A Shopkeeper purchased 50 bulbs for Rs. 475. He sold 30 of them at the rate of Rs. 9 each and rest 20 at the rate of Rs. 10 each. Did he make profit or suffer loss and how much?

5. A fruit merchant purchased 20 dozen oranges at the rate of Rs. 6 a dozen and sold at the rate of Rs. 12 a score. How much did he gain or lose [1 score = 20]

Ans. Exe 16.1

(1) Rs. 190 **(2)** Rs. 395 **(3)** Rs. 25

(4) Rs. 50, Profit **(5)** Rs. 280

Ans. Exe 16.2

(1) loss, Rs.30 **(2)** loss; Rs. 10.50 **(3)** Profit, Rs. 29

(4) Loss, Rs. 5 **(5)** Profit, Rs. 24

Chapter 17

POSTAL SERVICES

Messages and informations are sent from one place to another for various purposes. This service is rendered by "Department of Posts and Telegraph", which is under direct control of Central Government. Now some private companies are also doing this service. These are called 'Courier Services'.

Due to recent development of science new and faster means of communication have emerged.

Ordinary letters sent inland are normally delivered within a week. By Speed post or Courier these are delivered within a day or two. Telephone, Fax, e-mail etc. are faster means of communication and send messages within seconds to any part of the world. Of these E-mail is the least expensive and fastest means of communication. You can send E-mail to any part of the world by computer and telephone.

Foreign mail is sent by air or ship. Air mail is very expensive. So letters are normally sent by Air mail but heavy parcels and bundles ar sent by ship which is less expensive.

Postal Tariff is not always the same but keep changing from time to time. It usually changes from April every year when new financial year starts. Proposal of change in Postal Tariff is made in the Budget and when passed by the Parliament it comes into effect.

Ordinary Post

For ordinary post we use Post Card, Inland Letter Card, Envelop etc. These may be purchased from Post Office at fixed rates. In case of Post Cards and Inland Letter, we write letter on these. If we want to write lengthy letters or keep extra papers we use envelop and affix appropriate stamps according to the weight of the envelop lest it should become bearing and the person who receives it will have to pay double the ammount of stamp not affixed on it. Printed Books, Newspapers, Magazines etc. are allowed to affix stamps at concessional rates.

Postal Tariff as per 2012

Post Card	50 P
Inland letter	Rs. 2.50
Envelop (up to 20 gr.)	Rs. 5.00

Post Office also sell Revenue Stamp (these are pink coloured stamp of fixed value usually Re.1). These are not used for postal purposes, instead are affixed for cash receipts. If the weight of envelop is more than 20 gm, then for every excess 20 gm or part of it affix more Rs. 5 stamp.

Postal Tariff normally Change every year

Example (1) : What will be total cost of 10 Post Cards, 15 Inland letters and 20 Envelops?

Solution: Cost of 10 Post Cards $= 10 \times 50$

$= 500$ P

$= 5.00$ rupees

Cost of 15 Inland L. C. $= 2.5 \times 15$

$= 37.50$ rupees

Cost of 20 Envelops $= 20 \times 5$

$= 100$ rupees

Total Cost $=$ Rs. 5.00 + Rs. 37.50 + Rs. 100.00

$=$ Rs. 142.50

Example (2): Ahmed sent a letter to his father in an envelop weighing 55gr. How much stamp did he affix?

Solution : Weight of Envelop = 55 gr.

We know that, stamp of Rs. 5 affix for every excess 20gm or part of it.

So, Stamp affixed for 1st 20 gr. = Rs. 5

„ „ „ next 20 gr. = Rs. 5

„ „ remaining15 gr. = Rs. 5

Stamp affixed for (20 + 20 + 15) gr. = Rs. (5 + 5 + 5)

= Rs. 15

Exercise 17.1

Do the following problem as per current postal rates.

1. Find the total cost of 8 Post Cards, 3 Inland letters and 7 envelops.
2. How many number of Post Cards can be bought for Rs. 20? How many rupees or paise will be left.
3. Weight of a postal envelop alongwith the letter kept in it is 65 gr. How much additional stamp will be affixed on it. (Asssume Postal Envelop Comes for Rs. 5.00)
4. What will be the total cost of 13 Post Cards and 8 envelops?
5. Editor of a newspaper gave Rs. 300 to his worker and asked him to purchase 40 envelops, 10 Inland letter and 25 Post Cards. How many rupees did the worker return to the Editor?
6. Markazi Maktaba Islami Publishers posted bills to 75 booksellers, in postal envelops. How much did they spend on postage?
7. A school sent call letters to 50 applicants for interview by postal envelops. How much did the school spend on postage?

8. Salim sent an article for a children's Magazine by ordinary post. The weight of the envelop was 30 gr. How much stamp did he affix on it?

9. Rafiq sent post cards instead of envelops to his 10 relatives. How much did he save?

10. The weight of a letter kept in an ordinary envelop is 65 gm. How much stamp is to be affixed on it?

Telegram

Telegram is a fast means of sending urgent messages. A prescribed form is issued by telegram office on which sender's name and address, recipient's name and address and message in minimum words is written. In our country telegram in only English or Hindi language are accepted. Charges of telegram depend on the number of words.

Telegrams are of two types:

1. Ordinary and 2. Urgent or express

Urgent or Express telegrgrams are charged double. On marriage or other joyful occasion or for certain occasions and events the Department of Posts & Telegraph have prepared standard phrases with serial numbers. These messages can be sent by simply quoting this serial number in the space for 'message'. Thus the whole message is treated as a single word and is sent on less expense.

These phrases can be noted from Telegraph Office. Some diaries also provide this knowledge.

Telegram Tariff:

Ordinary	Express
For First 10 words Rs. 3.50 For every additional word Rs. 0.50	Twice the charge of ordinary telegram

Phonogram

Telegram can also be sent through phone. In this case message is sent by phone. This is called phonogram. For phonogram additional Rs. 2.00 is to be paid which is included by the department in the telephone bill.

Money Order

Besides letters money can also be sent by post. For this Money Order Form is used. In this form the name and address of recipient, the amount to be sent and name and address of the sender is filled. At a fixed commission rate the money is delivered to the addressee. The space for message be also provided in the form.

Money Order Tariff (2012)

Re 1/- for every Rs. 20 or part thereof.
(or Rs. 5 for every Rs. 100 or part thereof)

Note: Money order is allowed only upto the amount of Rs. 5000.

Exercise 17.2

1. Shakil sent an ordinary telegram of 13 words to his father informing his success. How much did he spend?

2. Tarique sent an express telegram of 15 words congratulating his friend on his success. What amount did he pay to the telegram office?

3. Bilal's father sent Rs. 500.00 to his son for his educational expenses, by money order. How much commission did he have to pay?

4. Suhail sent an express telegram of 20 words condoling the demise of his friend's mother. How much did he spend?

5. Manager of a magazine Money Ordered Rs. 200/- each to 5 prize winners. How much commission did he pay on M.O.?

6. An organisation sent Rs. 500/- each to the 6 winners of essay competetion by Money Order. How much commission did they pay?

7. An Examination Board sent Rs. 1000 each to the 10 meritorious examinees by M.O. How much commission did it pay?

Ans. Exe 17.1

(1) Rs. 46 paise 50 **(2)** 40 Post-Cards **(3)** Rs. 15

(4) Rs. 46 paise 50 **(5)** Rs. 62 paise 50 **(6)** Rs. 375

(7) Rs. 250 **(8)** Rs. 10 **(9)** Rs. 45

(10) Rs. 20

Ans. Exe 17.2

(1) Rs. 5 **(2)** Rs. 12 **(3)** Rs. 25 **(4)** Rs. 17

(5) Rs. 50 **(6)** Rs. 150 **(7)** Rs. 500

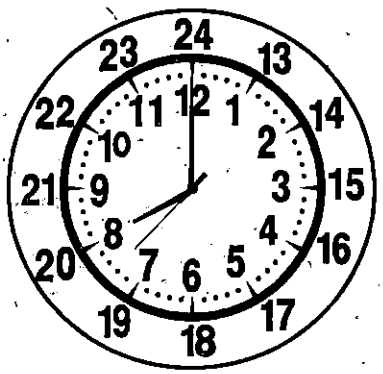
Chapter 18

RAILWAY TIME TABLE

Rails and buses are used on large scale in our country for transportation of travellers. For travelling long distances inside country people prefer railways. For short journeys, buses are used. There is a wide network of railways in India. Around ten thousand trains run daily and an estimated one crore ten lakh people travell in these trains daily. To provide information regarding timing of trains arrival and departure for such a large network, department of railways publishes Railway Time Table on regional basis. Railway Time Tables are available in normally English and Hindi languages: Time Tables in Urdu are available for certain regions.

In railway time table you can find details of not only trains from one place to another but also their arrival and departure time, distance between stations, fare, number of seats/ berths reserved at certain places, facilities of catering and details of rules and regulations etc.

In order to get correct information from Time Table some points must be taken care of. To see the time table of train, bus and aeroplane, 24 hour clock is used to differentiate between day and night time.



See the picture of 24-hour clock above and tell what is the time now? you will reply it is 8 O'clock.

The hour hand points 8 and minute hand points 12. At day time we shall say its 8 O'clock in the moring and at night we shall say it's 8 O'clock at night. After midnight till noon (i.e. from 12.01 to 12.00 noon) we say ante-meridian (a.m.)

The time from 12:01 noon to 11:59 at night is called post meridian (p.m.)

If we offer Fajr prayer at 5 O'clock in morning, then we say it 5 a.m. similarly, If we offer Isha prayer at 8 O'clock in night, then we say it 8 p.m.

After 12 O'clock in the noon we call p.m. as 1 p.m. (1 O'clock of day). 2 p.m. is 2 O'clock of day and so on.

In order to avoid confusion of day and night in Railways, Buses and Airways Time Table of 24-hour clock is used. The day starts at 12 midnight (also called 00.00 hours) and ends the next day at the same i.e. after exactly 24 hours.

From 1 O'clock at night till 12 O'clock at noon it is 1, 2, 3, ... 12 hours and after 12 in the noon instead of repeating 1, 2, 3, O'clock again, it starts with 13, 14,15,.....24 or 00 hours.

e.g.

10 hours = 10 O'clock in the day

12 hours = 12 O'clock in the day

13 hours = 1 O'clock in the day

20 hours = 8 O'clock at the night

23 hours = 11 O'clock at the night

00 hours = 12 O'clock at the night

(also called midnight)

1 hour = 1 O'clock at the night

If Rajdhani Express for Howrah leaves New Delhi at 00.45 Hours, it means it leaves New Delhi 45 minutes past 12 at night.

If Jammu Tawi Express leaves Howrah at 18:30 Hours. It means the train leaves at 6:30 in the evening.

If Neelanchal Express leaves New Delhi at 07:15 Hours it means the train leaves New Delhi 15 minutes past 7 in the morning.

Example: Write all the five Prayer Times according to 12 - Hour clock and 24 - Hour clock.

Solution: This example can solve by making following chart-

S.N.	Prayer	Time as per 12 Hour clock	Time as per 24 Hour clock
1	Fajr	5:30 a.m.	05:30 Hours
2	Zuhr	1:30 p.m.	13:30 Hours
3	Asr	5:30 p.m.	17:30 Hours
4	Maghrib	7:00 p.m.	19:00 Hours
5	Isha	9:00 p.m.	21:00 Hours

Note: These timings for Delhi in the month of September

You might have noticed that time from midnight till 12 noon are the same in both 12-Hour clock and 24-Hour clock, but after 12 noon till 12 in the night the time in the 24-Hour clock is 12 more than the time in a 12-Hour clock.

Note: The timings of prayers are always according to the 12 hour clock.

Exercise 18.1

(1) Make a chart of your following daily routine activities and show timing according to both 12 hour and 24 hour clock. Also, write am./p.m. in 12 hour clock timings –

(i) Wake up at ..... Hours or ..... a.m./p.m.
(ii) Recite Holy Qur'an after Fajr Salat
(iii) Exercise
(iv) Breakfast
(v) Study/Home work
(vi) Go to School
(vii) Return from School
(viii) Dinner Time
(ix) Go to bed

2. Change the following 24 hour clock timings according to 12 hour clock timings –

Time as per 24 hour clock	Time as per 12 hour clock
17:00 Hours	5:00 p.m.
20:00 Hours	
22:00 Hours	
14:30 Hours	
16:50 Hours	
19:20 Hours	

3. Match according to 24-Hour clock:

Table A	Table B
(i) 2:30 p.m.	(a) 17:20
(ii) 1:10 p.m.	(b) 14:30
(iii) 11:20 p.m.	(c) 13:10
(iv) 5:20 pm.	(d) 00:40
(v) 12:40 a.m.	(e) 23:20

4. Complete the table as per 24-Hour clock:

19:00	22:30		14:20	16:50		23:00
7:00 pm		6:00 pm			5:20 pm	

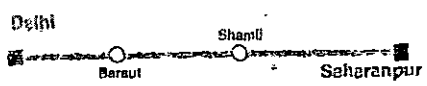
Do You Know?

Total length of railway lines in India is 75,204 Km and total number of stations is 8,000

Indian Railways have 7,681 Engines, 39,852 coaches and 2,14,760 wagons for carrying goods.

Railway Timetable

The adjacent picture is a part of railway time table, in which the details of trains between New Delhi and Saharanpur railway stations are given.



84

Delhi Saharanpur Express	TRAIN NAME				Saharanpur - Delhi Express
4545	Train Number				4546
II	Class of accommodation				II
	From	Table No.		To	
Daily	Dep.	Days of Operation		Arr.	Daily
17.05	Km. d	Delhi		a	10.25
17.18	7 d	Delhi Shahdara		d	10.06
17.31	16 d	Noli		d	09.57
17.53	30 d	Khekra		d	09.32
18.12	40 d	Baghpat Road		d	09.04
18.34	56 d	Baraut		d	08.34
19.04	81 d	Kandhla		d	08.02
18.28 19.33	95 a d	Shamli		d a	07.45 07.40
21.10	166 a	Saharanpur		d	06.15
Daily	Arr.	Days of Operation		Dep.	Daily
	To	Table No.		From	

Note: The table Number is always mentioned at the top of every table. What is the number of this given table?

The number of given table is 84. Caption of the table (i.e. Delhi to Saharanpur) is also mentioned in the table. The name of train is given in the first box from left. Just under this box the train no. is given and after that the arrival and departure times of trains are mentioned.

The downward arrow (↓) indicate the route from Delhi to Saharanpur and upward arrow (↑) indicate the route from Saharanpur to Delhi.

The letter 'a' means the arrival time of train and letter 'd' means the departure time of train. The middle part of the table shows the name of main stations, where the trains stops. The distance between two stations is also given in the table. These distances are calculated from the starting station.

Do You Know?

The railway lines are of three types according to the distance between them:

(1) Broad Guage (B.G.) → 1676 *mm.* or 1.676 *m.*

(2) Meter Guage (M.G.) → 1000 *mm.* or 1 *m.*

(3) Narrow Guage (N.G.) → 762 *mm.* or 0.762 *m.* & 610 *mm.* or 0.610 *m.*

Exercise 18.2

(A) Study the Table 84 and answer the following questions:

(1) What is the number of Delhi-Saharanpur Express?

(2) What is the number of Saharanpur-Delhi Express?

(3) When does Delhi-Saharanpur Express depart from Delhi?

(4) When does Delhi-Saharanpur Express arrive at Saharanpur?

(5) What is the distance between Delhi and Saharanpur?

(6) How long does the train take to reach Delhi from Saharanpur?

(7) Find the distance between Delhi and Kandhla.

(8) When does Delhi-Saharanpur Express arrive at Kandhla?

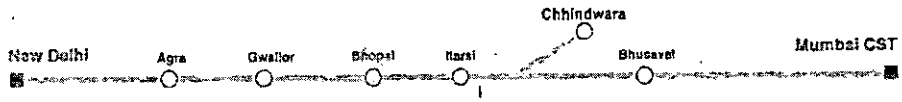
(9) For How long does Delhi-Saharanpur Express stop at Shamli station.

(10) What is the arrival and departure time of Delhi-Saharanpur Express at Shamli station? Also show the time in a.m. / p.m.

(11) What is the time of arrival and departure of Saharanpur-Delhi Express at Shamli station? Also show the time in a.m. / p.m.

(12) At what distance is shamli from Delhi?

2



Km	TRAIN NAME		Firozpur Mumbai Punjab Mail	New Delhi Bhopal Shatabdi Express	New Delhi Bhopal Shatabdi Express	Nizamuddin Jhansi Taj Express	Nizamuddin Ernakulam Mangala Lakshadweep Express	Nizamuddin Bhusaval Gondwana Express	Allahabad Lokmanya Tilak (T) Express	New Delhi Agra Cantt. Intercity Express	Agra Lokmanya Tilak (T) Leshkar Express	Bareilly Lokmanya Tilak (T) Express	Amritsar Dadar Express	Nizamuddin Habibganj Bhopal Express	Habibganj Lokmanya Tilak (T) Express	Jhansi Chhindwara Patalkot Express	Gwalior Chhindwara Express	Haridwar Lokmanya Tilak (T) AC Express
	Train Number		2138	2002	2002A	2280	2618	2406	1070	4212	2182	4314	1058	2156	2154	1103	1102*	2172*
	Class of accommodation		1A,2A,3A SL,II,P	EC,CC P	EC,CC P	CC 2S,II	2A,3A SL,II,P	2A,3A SL,II	2A,3A SL,II	CC 2S,II	2A,3A SL,II	2A,3A SL,II	2A,3A SL,II	1A,2A,3A SL,II	2A,3A SL,II	3A SL,II	3A SL,II	1A,2A,3A
	From Table No.		39						47			55A	15A					75A
	Days of departure at originating station		Daily	Except F	F	Daily	Daily	F,Su	W,M	Daily	Sa	Sa	Daily	Daily	F	M, W	Tu, F	Tu, F
0	New Delhi	a	05.00	06.15	06.15					17.40			20.20					
		d	05.25										20.50					
10	Nizamuddin	a	...	...	...	07.10	09.20	15.25		17.58			21.05	21.00				23.30
		d	...	...	...					18.00			21.07					00.10
31	Faridabad	d	06.00	...	...	07.32	09.40	...		18.29			21.27					
145	Mathura	a	07.47	07.34	07.45	08.08	11.22	17.38		20.34			23.45					
		d	07.50	07.35	07.46	08.11	11.25	17.40		20.36			23.55					
195	Raja-ki-Mandi	d	08.32	...	...	08.52	...	...		21.38		18.40	00.40	...				
199	Agra Cantt.	a	08.50	08.12	08.27	10.07	12.20	18.47		21.50	23.50	19.00	00.55	23.35				03.05
		d	08.55	08.17	08.32	10.15	12.25	18.50				19.10	01.05	23.38				03.10
251	Dhaulpur	d	09.32	...	...	10.52	...	...					01.43	...				
317	Gwalior	a	10.35	09.36	09.51	11.55	14.00	20.22			01.50	20.50	03.00	01.10			21.35	
		d	10.40	09.39	09.54	12.00	14.05	20.25			01.55	20.55	03.08	01.13				
339	Datia	a	11.44	...	...	13.03	...	...					04.20	...				
		d	11.46			13.05							04.22					
414	Jhansi	a	12.25	10.48	11.03	13.40	15.25	21.45	00.10		03.25	22.30	04.55	02.33		23.50	23.40	05.45
		d	12.35	10.56	11.11		15.55	21.57	00.30		03.35	22.40	05.05	02.43			23.50	06.05
504	Lalitpur	d	13.46	...	...		...	23.00	01.32		...	...	06.48			00.53	00.53	
587	Bina	a	14.50	...	...		17.45	00.05	02.50		05.20	02.30	08.50	04.35		02.30	02.30	
		d	14.55	...	...		17.50	00.15	02.55		05.25	02.35	08.55	04.37		02.35	02.35	
652	Vidisha	d	15.55	...	...		...	01.15	...		...	...	10.14	05.40		03.30		
705	Bhopal	a	16.55	14.05	14.20		19.45	02.15	05.00		08.15	04.25	11.15	06.35		04.25		10.30
		d	17.00				19.55	02.25	05.10		08.20	04.30	11.20	06.40		04.30		10.40
711	Habibganj	a	17.10				...	...	05.20		08.33	04.40	11.30	07.05	18.20	04.40	04.40	
		d	17.12				...	...	05.22		08.35	04.42	11.32			04.42	04.42	
779	Hoshangabad	d	18.15					03.35	...		...	...	12.45		19.15	05.42	05.42	
796	Itarsi	a	18.45				21.45	04.05	08.00		10.05	06.50	13.20		19.55	06.50	06.50	
		d	18.50				21.50	04.10	08.05		10.10	07.00	13.30		20.00	07.00	07.00	
	Amla	d														10.00	10.00	
	Chhindwara	a														13.20	13.20	
872	Harda	d	19.50						09.15		11.10	08.05	14.32		20.50			
960	Khandwa	a	21.40				00.10		11.25		13.00	10.00	16.40		22.25			
		d	21.45				00.15		11.30		13.05	10.05	16.45		22.30			
1049	Burhanpur	d	22.35				01.00		12.25		14.05	11.00	17.45		...			
1103	Bhusaval	a	23.40				02.05	15.50	13.40		15.00	12.00	18.40		00.15			16.50
		d	23.45				02.10		13.45		15.10	12.05	18.50		00.20			16.55
1128	Jalgaon	d	00.10								15.40	12.30	19.20		...			
1175	Pachora	d											19.55		...			
1230	Chalisgaon	d	01.10										20.45		...			
1267	Manmad	a	02.05				04.35		16.15		17.35	14.48	21.45		...			
		d	02.10				04.40		16.20		17.40	14.50	21.50		...			
1390	Nasik Road	d	03.10				05.40		17.20		18.40	15.50	23.00		...			
1306	Devlali	d	03.20										23.10					
1411	Igatpuri	a	04.25				06.40		18.30		19.50	17.00	00.40		04.35			
		d	04.30				06.45		18.35		19.55	17.05	00.45		04.40			
1494	Kalyan	a	06.20				08.30		20.30		21.45	19.00	02.50		06.25			
		d	06.25				08.35		20.35		21.50	19.05	02.55		06.30			
1514	Thane	d	...						21.00		22.10	19.25	03.15					
1530	Lokmanya Tilak (T)	a							22.00		22.45	20.00			07.30			23.45
1539	Dadar	a	07.10										04.00					
		d	07.15															
1549	Mumbai CST	a	07.35															
	Days of arrival at destination station		Daily	Except F	F	Daily	Daily	Sa,M	Th,Tu	Daily	Su	Su	Daily	Daily	Sa	Tu, Th	W, Sa	W, Sa
	To Table No.						26	via 34A	via 6A									

TAG 19

* Date of introduction will be notified later.

(B) Study the Table No.2 and answer the following questions:

(1) Tell the time of arrival and departure of train no. 2002 Delhi-Bhopal Shatabdi Express at Agra Cantt. Also write these times in am. or pm.

(2) What is the distance of Bhopal from New Delhi?

(3) Tell the name and number of the train running between New Delhi and Agra Cantt.

(4) What is the distance of Mumbai from New Delhi?

(5) What is the distance of Mumbai from Agra Cantt?

(6) Tell the name of station and time of arrival where the New Delhi-Agra Cantt. Intercity Express stops. Also, write this time in a.m. or p.m.

(7) Tell the name of originating station and time of departure of Nizamuddin-Habibganj-Bhopal Express. What is its arrival time at Habibganj?

(8) What is the name of train No. 2406?

(C) Study the Table No. 39, and answer the following questions:

(1) Name the trains running between New Delhi or Delhi and Firozpur. Also write their numbers.

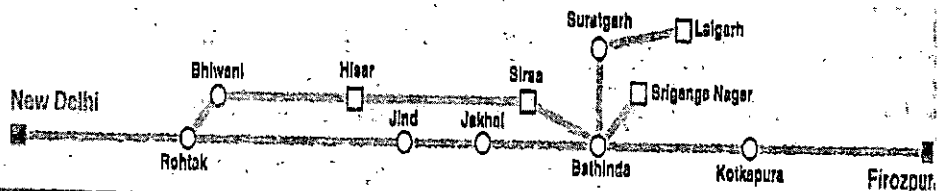
(2) What is the distance between New Delhi and Bhatinda? How far Firozpur from New Delhi?

(3) When does Shri Ganga Nagar-Delhi Express leaves Shriganga Nagar and when does it reaches Delhi?

(4) How long does Punjab Mail take to reach Firozpur from New Delhi?

(5) For how long does the train no. 9024, Janta Express stops at Bhatinda and New Delhi enroute Firozpur-New Delhi?

39



Delhi Sarai Rohilla Sri Ganga-nagar AC Express	Gorakh-pur Hisar Gorakh-dham Express	Howrah Sriganga-nagar Uttaran Abtq Toofan Express	Mumbai CST Firozpur Punjab Mail	Tilak Bridge Sirsa Haryana Express	Delhi Bathinda Kisan Express	Mumbai Central Firozpur Janata Express	Delhi Sriganga-nagar Express	Kanpur Bikaner Kalindi Express	Guwa-hati Lalgarh Avadh Assam Express	Hazur Sahib Nanded Sriganga-nagar Express	TRAIN NAME	Sriganga-nagar Hazur Sahib Nanded Express	Lalgarh Guwa-hati Avadh Assam Express	Firozpur Mumbai CST Punjab Mail	Sriganga-nagar Howrah Uttaran Abtq Toofan Express	Sirsa Tilak Bridge Haryana Express	Firozpur Mumbai Central Janata Express	Sriganga-nagar Delhi Express	Bathinda Delhi Kisan Express	Bikaner Kanpur Kalindi Express	Hisar Gorakh-pur Gorakh-dham Express	Sri Ganga-nagar Delhi Sarai Rohilla AC Express
24553	2555	3007	2137	4085*	4519	9023	2491	4723	5609	2495	Train Number	2496	5610	2138	3008	4086**	9024	2482	4520	4724	2556	24554
1A 2A 3A	1A 2A 3A SL P	3A SL R	1A 2A 3A SL P	CC 2S R	CC 2S R	SL R	CC E	SL R	2A 3A SL R P	2A 3A SL R	Class of accommodation	2A 3A SL R	2A 3A SL R P	1A 2A 3A SL R	3A SL R	CC 2S R	SL R	CC 2S R	CC 2S R	SL R P	1A 2A 3A SL R	1A 2A 3A
	22A	1A	2A			3A		25A	18A	9A	From Table No. To	9	18	2	1		3			25	22	
Tu,Th, Su	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Su	Days of departure at originating station	Su	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Tu,Th,Sa
Delhi Sarai Rohilla Dep 22.50	06.55 06.10	19.40 20.10	21.15 21.50	16.15 16.20		12.45 13.15				01.15 01.40	0	New Delhi	23.50 23.20		05.25 05.00	07.45 07.05	09.45 09.43	13.05 12.35				20.25 20.10	Delhi Sarai Rohilla arr 06.35
					14.55		13.10	05.45 06.20	15.50 16.25		0	Delhi		07.50 07.20					13.40	14.15	22.00 21.30		
23.55 23.58	07.57 08.00	21.50 21.55	23.18 23.23	20.10 20.13	16.35 16.40	14.55 15.00	14.35 14.38	08.17 08.20	17.55 18.05	02.55 02.58	69	Rohtak	22.00 21.57	05.35 05.32	03.25 03.22	05.00 04.50	07.58 07.55	10.40 10.35	11.58 11.55	12.35 12.30	19.50 19.45	18.35 18.33	05.19 05.17
	08.45 09.05			21.10 21.30	17.55 18.00			09.40			117	Bhiwani					07.00 06.30			11.25 11.05	18.16	17.45 17.30	
	10.00			22.45 22.46	19.02 19.05						177	Hisar					05.08 05.05			09.32 09.27		16.35	
				00.40	20.30 20.35						259	Sirsa					03.45			08.13 08.08			
00.48 00.50		22.55 23.00	00.15 00.20			16.05 16.10	15.50 15.53		19.10 19.20		132	Jind		04.44 04.42	02.30 02.27	03.50 03.30		09.40 09.35	11.05 11.00				04.31 04.29
		23.32 23.34	00.47 00.49			16.42 16.44	16.00 16.02		19.47 19.49		163	Narwana		03.54 03.52	01.54 01.52	02.47 02.45		08.58 08.54	10.29 10.27				
02.00 02.02		00.20 00.35	01.25 01.30			17.20 17.25	16.35 16.38		20.25 20.30	04.52 04.55	264	Jakhal	20.03 20.00	03.23 03.20	01.17 01.14	02.10 02.05		08.20 08.16	09.58 09.55				03.35 03.35
04.45 04.50		03.15 04.05	03.40 03.50		22.20	19.40 19.55	18.15 18.20		22.05 23.35	08.18 08.28	302	Bathinda	16.55 16.45	02.00 01.30	23.40 23.30	00.15 23.20		08.35 08.29	08.30 08.25	08.55			00.40 00.30
07.40		07.10					20.40			10.55	429	Sriganga Nagar	14.30			20.60			05.55				22.00
									01.10 01.15		390	Hanumangarh		23.25 23.20									
									02.32 02.37		440	Suratgarh		22.30 22.25									
									06.00		516	Lalgarh		19.45									
			04.35		20.50						345	Kotkapura			22.27			05.11					
			05.40		22.20						392	Firozpur			21.45			04.30					
W,F,M	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Tu	Days of arrival at destination station	F	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily	M,W,F

* 4085 Tilak Bridge dep. 18.05 hrs.
S Date of introduction will be notified later.

** 4086 Tilak Bridge arr. 09.55 hrs.

Ans. Exe 18.1

(2) 8 p.m, 10 p.m, 2:30 p.m, 4:50 p.m, 7:20 p.m,

(3) (i) →b, (ii) →c, (iii) →e, (iv) →a, (v) →d

(4) 10:30 p.m, 18:00, 2:20 p.m, 4:50 p.m, 17:20, 11 p.m.

Ans. Exe 18.2

(A)

(1) 4545 **(2)** 4546 **(3)** 17:05 **(4)** 21:10

(5) 166 km **(6)** 4 hours 10 min. **(7)** 81 km

(8) 19:04 **(9)** 5 minutes **(10)** 19:28 or 7:28 p.m.
19:33 or 7:33 p.m.

(11) 7:40 a.m..
7:45 a.m.

(12) 95 km

(B)

(1) 8:12 a.m. arrival at Agra Cantt., 8:17 a.m. departure.

(2) 705 Km.

(3) New Delhi-Agra Cantt. Intercity Express, No. 4212

(4) 1548 Km.

(5) 1349 Km.

(6)

Stations	Time of Arival
H. Nizamuddin	17:58 or 5:58 p.m.
Mathura	20:34 or 8:34 p.m.
Agra Cantt.	21:50 or 9:50 p.m.

(7) Depart at 9:00 p.m. from H. Nizamuddin, and its arrival at Habibganj is 7:05 a.m.

(8) Nizamuddin-Bhusawal Gondwana Express.

(C) **(1)** 2137 – Mumbai-Firozpur Punjab Mail,
9023 – Mumbai Firozpur Janta Express

(2) 302 km, 392 km

(3) 5:55 am Departure from Shriganga Nagar, Arrival at Delhi 13:40

(4) 7 hours 50 minutes, **(5)** 15 minutes & 30 minutes respectively

Chapter 19

PERCENTAGE

Concept of percentage or percent

The word percent is made of two words **per** and **cent**. The word per means 'every' and cent means 'hundred'. So, percent means for every hundred. To clarify it, see the following example.

If we say Abdullah obtained 65 percent marks in mathematics then it mean Abdullah obtained 65 marks out of 100 marks. Similarly, when we say 70 percent of Indians do farming, it means of every 100 persons 70 persons do farming.

Symbole of percent = %

Exercise 19.1

1. Fill in the blanks in the following questions (First question has solved):

(i) 70 out of 100 means 70 percent -----70%

(ii) 61 out of 100 means 61 percent ----- .....

(iii) ..... out of 100 means 72 percent ----- .....

(iv) ..... out of 100 means .... ----- 23%

(v) $2\frac{1}{2}$ rupees tax on every 100 rupees means ..... tax .....

2. Read and write in words:

(i) 12% (ii) 35% (iii) 15.5%

(iv) 0.5% (v) 43.25%

Changing percent into fraction

Rule: In order to change percent into simple fraction, we divide the given percent by 100 and then simplify the obtained fraction.

Consider the following examples:

(1) $25\ \% = \frac{25}{100} = \frac{1}{4}$

(2) $50\ \% = \frac{50}{100} = \frac{1}{2}$

(3) $75\ \% = \frac{75}{100} = \frac{3}{4}$

(4) $80\% = \frac{80}{100} = \frac{4}{5}$

Exercise 19.2

1. Change the following percent into simple fractions:

(i) 15 % **(ii)** 45 % **(iii)** 65 %

(iv) 92 % **(v)** 100 %

Changing of fractions into percent

Rule: To change fractions into percent, we multiply the given fraction by 100.

For Examples:

(1) $\frac{2}{5} = (\frac{2}{\cancel{5}} \times \overset{20}{\cancel{100}})\ \% = (2 \times 20)\ \% = 40\%$

(2) $\frac{3}{4} = (\frac{3}{\cancel{4}} \times \overset{25}{\cancel{100}})\ \% = (3 \times 25)\ \% = 75\%$

Exercise 19.3

Change the folowing fractions into percent:

1. $\frac{1}{2}$ **2.** $\frac{3}{5}$ **3.** $\frac{1}{25}$ **4.** $\frac{3}{75}$ **5.** $\frac{9}{20}$

How to find percent of a given quantity

Example (1): Find out 45% of 20.

Solution: 45% of 20 $= \frac{45}{100} \times 20 = \frac{9\cancel{45} \times \cancel{20}^{1}}{\cancel{100}_{5_1}} = 9$

Example(2): Find 60% of 15.

Solution: 60 % of 15 $= \frac{60}{100} \times 15 = \frac{3\cancel{60} \times \cancel{15}^{3}}{\cancel{100}_{5_1}} = 9$

Exercise 19.4

Find the following

(1) 20 % of 80 **(2)** 10% of 45 Kg

(3) 12 % of 75 **(4)** $6\frac{1}{4}$ % of 1200 m

(5) 25 % of 150 **(6)** 2 % of 12

(7) $33\frac{1}{3}$ % of 2700

Changing percent in decimal fraction

You know that, 25% means $\frac{25}{100}$

i.e. $25\ \% = \frac{25}{100} = \frac{1}{4} = 0.25$

$$4\overline{)100}\ .25,\quad \frac{8}{20},\quad \frac{20}{\times}$$

Similarly, $50\ \% = \frac{50}{100} = \frac{1}{2} = 0.5$

$30\ \% = \frac{30}{100} = \frac{3}{10} = 0.3$

Exercise 19.5

Change the following into decimal fraction:

(1) 12% **(2)** 15.5% **(3)** 18% **(4)** 9%

(5) 40%

Changing decimal fraction into percent

Rule: To change a decimal fraction into percent, we multiply it by 100. You have already know the easy method to multiply a decimal by 100. According to it, only replace the decimal point two place to right hand side in the given decimal fraction. For example:

(i) $0.5 = 0.5 \times 100\ \% = 50\%$

(ii) $0.192 = 0.192 \times 100\% = 19.2\ \%$

Exercise 19.6

(1) 2.5 **(2)** 4.05 **(3)** 0.93 **(4)** 0.050 **(5)** 41.05

Expressing Rupees, Paise, Metric scales as percent

You know that,

1 paisa = one hundredth part of 1 rupee

i.e. 1 paise $= \frac{1}{100} = 1\%$

Similarly, 2 paise $= \frac{2}{100} = 2\%$ of 1 rupees

15 paise $= \frac{15}{100} =$ 15 % of 1 rupee

50 paise $= \frac{50}{100} =$ 50 % of 1 rupee

You know that, 1 cm is one hundredth part of 1 metre

So, 1 cm = $\frac{1}{100}$ m or 1 % of 1 metre

3 cm = $\frac{3}{100}$ m or 3 % of 1 metre

8 cm = $\frac{8}{100}$ m or 8 % of 1 metre

34 cm = $\frac{34}{100}$ m. or 34% of 1 m.

Similarly, we know that,

1 Kg = 1000 g

$\therefore 1\,g = \frac{1}{1000}kg = (\frac{1}{1000} \times 100)\% = 0.1\%$ of 1 kg.

1 g = 0.1 % of 1 kg
2 g = 0.2 % of 1 kg
3 g = 0.3 % of 1 kg

Similarly, we know that,

$1\,l$ = 1000 ml

or $1\,ml = \frac{1}{1000}\,l$

$1\,ml = (\frac{1}{1000} \times 100)\% = 0.1\%$ *of* 1 *lit.*

1 ml = 0.1 % of 1 l
2 ml = 0.2 % of 1 l
4 ml = 0.4 % of 1 l
25 ml = 2.5 % of 1 l

To Find rate of percent

$$\text{Rate } \% = \frac{\textit{Given quantity}}{\textit{Total quantity}} \times 100$$

Example (1): What percent is 6 of 24

Solution: $\text{Rate}\% = \frac{\cancel{6}^{1}}{\cancel{24}_{4_1}} \times \cancel{100}^{25}$

$= 25$

So, 6 is 25% of 24.

Example (2): Abdullah scored 18 marks out of 30 in Arabic. What is his percentage in Arabic?

Solution : $\%$ of marks $= \frac{\cancel{18}^{6}}{\cancel{30}} \times 10\cancel{0}$

$= 60\ \%$

So, Abdullah scored 60% marks in Arabic.

Exercise 19.7

1. Fill in the blanks:

(i) 35 paise = ... % of 1 rupee.

(ii) .....paise = 75% of 1 rupee.

(iii) .....% of 1 metre = 38 centimetre.

(iv) 42 gm = ... % of 1 kg.

(v) 58 ml = ...% of 1 lit.

2. What percent is 7 of 35.

3. Shazia obtained 60 marks out of 75 in Mathematics. Find the percentage of her marks.

4. There are 48 Students in a class. On Monday due to rains only 32 students were present. Find the percentage of the present students.

5. In a class there are 30 boys and 20 girls. Find the percentage of girls?

6. The cost of wheat increased from Rs. 600 per quintal to Rs. 700 per quintal. Find percent increase.

Ans. Exe 19.1

1. **(ii)** 61% **(iii)** 72, 72% **(iv)** 23, 23 percent

(v) $2\frac{1}{2}$ percent, $2\frac{1}{2}$ %

2. **(i)** Twelve percent **(ii)** Thirty five percent
(iii) Fifteen point five percent **(iv)** Zero point five percent
(v) Forty three point two five percent

Ans. Exe 19.2

1.

(i) $\frac{3}{20}$ **(ii)** $\frac{9}{20}$ **(iii)** $\frac{13}{20}$ **(iv)** $\frac{23}{25}$ **(v)** 1

Ans. Exe 19.3

(1) 50% **(2)** 60% **(3)** 4% **(4)** 4% **(5)** 45%

Ans. Exe 19.4

(1) 16 **(2)** 4.5 Kg. **(3)** 9 **(4)** 75 m. **(5)** 37.5

(6) 0.24 **(7)** 900

Ans. Exe 19.5

(1) 0.12 **(2)** 0.155 **(3)** 0.18 **(4)** 0.09 **(5)** 0.4

Ans. Exe 19.6

(1) 250% **(2)** 405% **(3)** 93% **(4)** 5% **(5)** 4105%

Ans. Exe 19.7

1. **(i)** 35 **(ii)** 75 **(iii)** 38 **(iv)** 4.2 **(v)** 5.8

(2) 20% **(3)** 80% **(4)** 66.6% **(5)** 40% **(6)** 16.66%

Chapter 20

ZAKAT AND USHR

"Zakat" is one of the five Pillars of Islam (fundamentals of Islam). Zakat means to purify and to flourish. Qur'an lays very much emphasis on paying (giving) Zakat. Every person who possesses $7\frac{1}{2}$ tolas (i.e. 85 gm) of gold or $52\frac{1}{2}$ tolas (i.e. 595 gm) of silver or wealth worth any one of these for one whole year is termed as "Sahibe-Nisab". Every such person has to give 2.5% of his total wealth to poor and needy muslims. Zakat cannot be given to Non-Muslim.

The 'Zakat' applicable on agriculture production is called "Ushr". If agricultural production is obtained by natural rain or river i.e. without much irrigation, then Ushr is $\frac{1}{10}$ of the production (i.e. 10%). If agriculture is based on irrigation then Ushr is $\frac{1}{20}$ of the production (i.e. 5%).

Exercise 20

1. A man has to give Zakat at the rate of $2\frac{1}{2}$% on Rs. 7500. How much Zakat will he give?
2. A man saved Rs. 30,000 in a year and his wife has 60 g of gold. How much Zakat will he give if 10g of gold costs Rs. 25000.
3. A man gave Rs 625 in Zakat. How much amount did he have for the whole year?
4. A man harvested paddy along the riverside and produced 270 quintals of paddy. How much 'Ushr' will he give?
5. A farmer grows wheat by irrigation and produces 35 quintals of wheat in his field. How much wheat will he give in Ushr?

Ans. Exe 20

(1) Rs. 187.50 **(2)** Rs. 4500 **(3)** Rs. 25000

(4) 27 quintals **(5)** 1.75 quintals

Chapter 21

INTEREST

Interest is the amount to which a borrower has to pay at the time of paying (returning) his debt in addition to the borrowed amount.

For example, if Mohan borrows Rs. 5000 from a bank and after two years he returns Rs. 5500 to the bank, he paid Rs. 500 in addition to the actual borrowed amount (Rs. 5000). This extra or additional mount of Rs.500 is called Interest.

Some Important terms:

Principal (P) → The money borrowed or lent.

Interest (I) → It is the additional money paid to the lender.

Rate (R) → Interest for 1 year per Rs. 100.

Time (T) → The period for which the money is borrowed.

Amount (A) ⇒ The sum of money borrowed and the additional money paid to the lender.

Amount = Principal + Interest

or $\boxed{A = P + I}$

Simple Interest

If the product of Principal, Rate and Time is divided by 100, then the quotient so obtained is called "Simple Interest".

$$\text{Simple Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

or $$\text{S. I.} = \frac{P \times R \times T}{100}$$

$$\boxed{P = \frac{\text{S. I.} \times 100}{R \times T}} \quad \boxed{R = \frac{\text{S. I.} \times 100}{P \times T}} \quad \boxed{T = \frac{\text{S. I.} \times 100}{P \times R}}$$

Example(1): A man borrowed Rs. 2500 at an interest rate of 20% per annum. How much interest will he paid after 2 years.

Solution:

Principal = Rs. 2500

Rate = 20% per annum

Time = 2 years

$$\text{Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$= \frac{2500 \times 20 \times 2}{100}$$

Interest = Rs. 1000

Example (2): Shubrati borrowed Rs. 5600 from a credit society at simple interest rate of $18\frac{1}{2}\%$ per annum. How much amount will he pay after $2\frac{1}{2}$ years.

Solution:

Principal = Rs. 5600

Rate = $18\frac{1}{2}\% = \frac{37}{2}\%$

Time = $2\frac{1}{2}$ year = $\frac{5}{2}$ years.

$$\text{S. I.} = \frac{PRT}{100}$$

$$= \frac{5600 \times \frac{37}{2} \times \frac{5}{2}}{100}$$

$$= \frac{\overset{28}{\cancel{5600}} \times 37 \times 5}{\underset{14}{\cancel{100}} \times \cancel{2} \times \cancel{2}}$$

= Rs. 2590

So, Amount = Principal + Interest

= Rs. 5600 + Rs. 2590

= Rs. 8190

Exercise 21

1. Rahul invested Rs. 1500 in a finance company with a simple interest rate of 15% per annum. What amount will he get back after $5\frac{1}{2}$ years.

2. Solve the problem as per table given hereunder and find the interest and amount:

S. No.	Principal (In Rs.)	Time in years	Rate of Interest(p.a.)	Interest	Amount
(i)	1600	3	8 %		
(ii)	4500	5	14½ %		
(iii)	3900	2	3 %		
(iv)	5100	3	17 %		
(v)	6300	2	14 %		

3. Mohan borrowed Rs. 5000 for the repaire of his house at simple interest rate of 12½ % p.a. If he returned the borrowed amount after 2 years, how much did he pay?

4. Imran borrowed Rs. 7500 for farming from Cooperative Bank at the rate of 12 ½ % per annum (p.a.). How much amount will he pay after 2 ½ years?

5. Asha borrowed Rs. 10,200 for buying a refrigerator. How much amount will she pay after 3 years and 6 month if interest rate is 17%p.a.?

Ans. Exe 8.6

1. Rs. 2737.50

2. **(i)** Interest = Rs. 384
Total amount = Rs.1984

(ii) Interest = Rs. 3262.50
Total amount = Rs.7762.50

(iii) Interest = Rs. 234
Total amount = Rs.4134

(iv) Interest = Rs. 2601
Total amount = Rs.7701

(v) Interest = Rs. 1764
Total amount = Rs.8064

3. Rs. 6250

4. Rs.9843.75

5. Rs. 16269

Chapter 22

TEMPERATURE

In different seasons you use tea, coffee or other drinks according to weather. We can know whether these things are cold or hot by touching them. But how hot or cold is something? It is very difficult to say so by simply telling that something is very hot or very cold. There should be some exact measure to tell about the hotness or coldness of an object. Often we want to know exactly how hot or how cold is something. For example a doctor should know the correct temperature of our body in order to prescribe the medicine. Measure of coldness or hotness is given in terms of the temperature of the body. Hotness or coldness is directly related to the temperature of the body. The more the temperature of the body, the more hot it is.

You have often heard in weather bulletin the minimum and maximum temperature of different places. e.g. one day in the month of June the minimum temperature of Delhi was 36°C and maximum temperature was 42°C.

Thermometer

The instrument which record the coldness or hotness (temperature) of any body is called "thermometer".

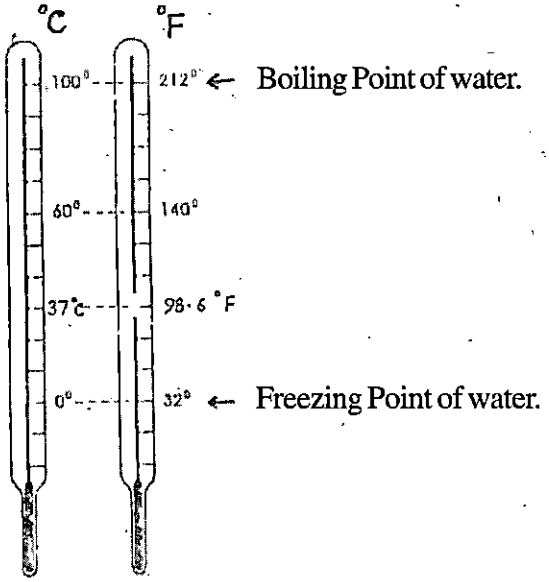
There are two types of scales available for temperature measurement:

(1) Celsius (Centigrade) Scale and

(2) Fahrenheit Scale

The temperature at Celsius Scale is represented as °C and read as "degree celsius or degree centigrade." Similarly, at Fahrenheit Scale, temperature is represented as °F and read as "degree Fahrenheit."

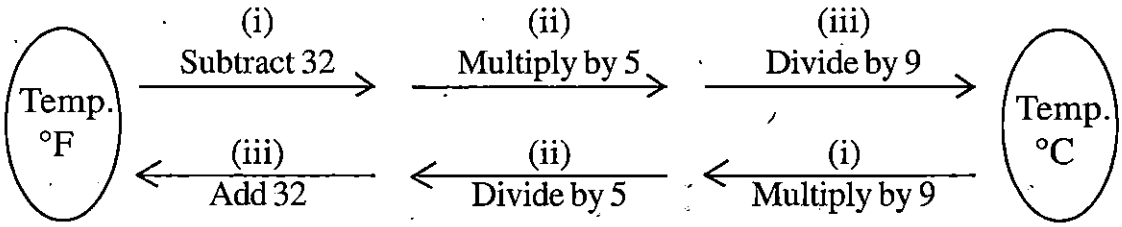
Now, observe the difference between these two scales of temperature as given hereunder:



	Celsius Scale	Fahrenheit Scale
Freezing Point of water	0°C	32°F
Boiling Point of water	100°C	212°F

Interconversion of °C and °F

The following flow-chart shows the steps of interconversion of given temperature in one scale into another scale:



Example (1): Change 50°C into °F.

Solution: Step I: Multiply by 9 $= 9 \times 50 = 450$

Step II: Divide by 5 $= \frac{450}{5} = 90$

Step III: Add 32 $= 90 + 32$

$= 122°F$

Example (2): Change 122°F into °C

Solution: Step I : Subtract 32 $= 122 - 32$

$= 90$

Step II : Multiply by 5 $= 90 \times 5 = 450$

Step III : Divide by 9 $= \frac{450}{9} = 50$

$= 50°C$ Ans.

Exercise 22.1

(1) Which instrument is used to measure temperature?

(2) Tell the boiling point of water in both °C and °F.

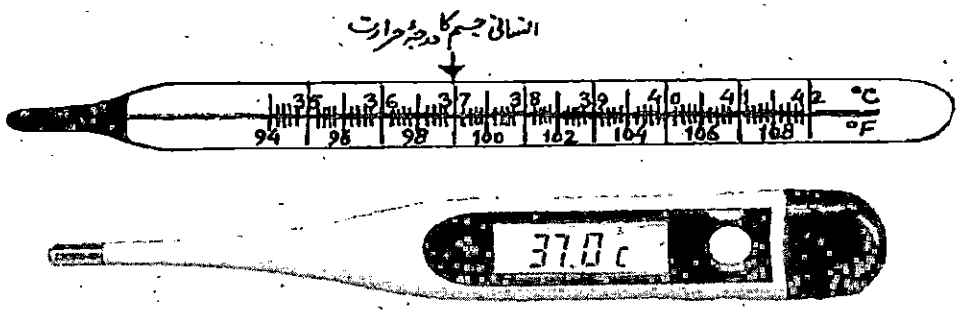
(3) Change the following centigrade temperatures into Fahrenheit scale.
(i) 10°C (ii) 20°C (iii) 30°C (iv) 50°C

(4) Change the following Fahrenheit temperatures into Celsius scale:
(i) 203°F (ii) 113°F (iii) 95°F (iv) 98.6°F

Clinical Thermometer

Doctors use Clinical Thermometer to measure the temperature of our body.

This is in Fahrenheit scale and marks from 94°F to 108°F are given on it.



Digital Thermometer

How to Use Thermometer: To measure the temperature of a patient the doctor place the thermometer in the mouth of the patient or under the armpit for two minutes. The temperature is recorded by the expansion of the mercury filled in it. The mark upto which the mercury expands is noted, this gives the temperature of the body.

[**Note:** The temperature recorded by placing the thermometer under the armpit is slightly lower than the temperature recorded by placing the thermometer in the mouth (or oral temperature)]

Before recording the temperature of any person the mercury is brought down to 95 mark or below 98 mark by jerking it gently once or twice.

Now, a such thermometer be invented through which we can measure the body temperature by putting it on fore-head only. This thermometer is in the shape of strip (bandage), which shows the temperature in numerals.

Remember

(1) Normal temperature of a healthy man is 98.6°F or 37°C. Normal temperature of children is a bit higher.

(2) When a man is suffering from fever his temperature becomes more than 98.6°F or 37°C.

(3) An adult man's temperature can not rise above 105°F or 40.5°C, and that of children above 107°F or 41.6°C.

Exercise 22.2

Match correctly:

A.	temperature of frozen water	(i)	98.6°F
B.	temperature of boiling water	(ii)	122°F
C.	temperature of healthy man	(iii)	212°F
D.	50°C	(iv)	32°F

DO YOU KNOW?

– 40° temperature is same in both Celsius and Fahrenheit scales.

i.e. $-40°C = -40°F$

Explanation:

StepI : Multiply by 9 $= -40 \times 9 = -360$

StepII : Divide by 5 $= \frac{-360}{5} = -72$

StepIII : Add 32 $= -72 + 32 = -40°F$

Ans. Exe 22.1

[1] Thermometer **[2]** 212° F, 100°C

[3] **(i)** 50° F **(ii)** 68° F **(iii)** 86° F **(iv)** 122° F

[4] **(i)** 95° C **(ii)** 45° C **(iii)** 35° C **(iii)** 37° C

Ans. Exe 22.2

A ⟶ (iv), **B** ⟶ (iii), **C** ⟶ (i), **D** ⟶ (ii)

Chapter 23

BILL AND RECEIPT

Bill/ Cash Memo

When we purchase goods from a shop and make payment, the shopkeeper issues a receipt which is called CASH MEMO. This cash memo bears the following details:

- Name and address of shop/firm
- Name and address of customer or buyer
- Cash Memo number
- Date of purchase
- Detail of purchase
  - (a) Name of article
  - (b) quantity
  - (c) rate per unit
  - (d) amount
  - (e) total amount
- Signature of shopkeeper

(A) Observe the following sample of a cash memo.

CASHMEMO Tel: 26789635

Nafees Cloth Stores, Delhi

Name of Customer : Mr. Ghulam Rabbani
Address : 46, Zakir Bagh, N. Delhi.

Rcpt. No. 4278
Date: 15.10.09

S.N.	Particulars	Rate		Qunt.	Amount	
		Rs.	P		Rs.	P.
1.	Shirt Piece	70	00	2 Pc	140	00
2.	Pant Piece	120	00	2 Pc	240	00
3.	Dupatta	25	00	3 Pc	75	00
4.	Scarf	40	00	5 m	200	00
In Words: Six hundred fifty five only				**Total**	**655**	**00**

Signature of shopkeeper

From the above cash memo we get the following information:

1.	Name of shop	Nafees Cloth Store, Delhi
2.	Receipt No	4278
3.	Date of issuing receipt	15-10-09
4.	Name of customer	Ghulam Rabbani
5.	Address	46, Zakir Bagh, N.Delhi
6.	Rate of Shirt piece	Rs. 70 per piece
7.	Rate of Pant piece	Rs. 120 per piece
8.	Rate of Dupatta	Rs. 25 per piece
9.	Rate of Cloth for scarf	Rs. 40 per metre
10.	Cost of 2 pieces of Shirt	Rs. 140.00
11.	Cost of 2 pieces of Pant	Rs. 240.00
12.	Cost of 3 Dupattas	Rs. 75.00
13.	Cost of 5 m. of scarf cloth	Rs. 200.00
14.	Total amount	Rs. 655.00
15.	Total amount in words.	Rs. Six hundred fifty five
16.	Signature of shopkeeper in the end.	

(B) We also get receipt when we pay rent of a house or shop or give donation to an institution or a charitable organisation. On this reciept the name and address of the institution or organisation, receipt no., name and address of doner and amount both in figures and in words are written.

See the following receipt:

FALAH-E-AAM TRUST, LUCKNOW

Phone: 5764393

Rcpt. No. 2371 Dated: 15.10.09

Received a sum of Rs. 1000/- One thousand only from Mr. Abu Zafar as donation/~~Zakat~~ by cash/~~cheque~~/ draft

Rs. 1000.00 Sig. of Receiver

We get the following information from the above receipt.

1.	Name of the organisation	:	Falah-e-Aam Trust, Lucknow
2.	Receipt No.	:	2371
3.	Date of issue	:	15.10.09
4.	Name of Doner	:	Abu Zafar
5.	Amount of donation	:	Rs. 1000.00 (both in figures and words)

Signature of receiver in the end.

Exercise 23.1

Following is a sample / Specimen of a cash memo. Read it carefully and tell what information do you get from it.

CASHMEMO Tel: 27465868

Ameen General Store

Bhopal

Name of Customer : Ehtisham Haider Rcpt. No. 435

Address : Date: 15.10.09

S.N.	Particulars	Rate		Qunt.	Amount	
		Rs.	P		Rs.	P.
1.	Sugar	30	00	3 Kg	90	00
2.	Tea (leaves)	180	00	½ Kg	90	00
3.	Soap cake	9	00	2 cakes	18	00
4.	Bulbs	10	00	1 Pc	10	00
In Words: Two hundred eight only.				**Total**	**208**	**00**

Signature of shopkeeper

Credit Memo

When we do purchasing but do not make payment immediately, the shopkeeper issues credit memo instead of cash memo. (Cash Memo is only for purchase by cash). Besides other usual details, the due amount is written on Credit Memo and signature of customer is also taken on it. See the specimen of a credit memo given here under.

CREDIT MEMO

Tel: 263 6351

ALISHAN PROVISION STORES, LUCKNOW

Name : Mr. Reyaz Shah Khan
Address : Moulvi gunj, Lucknow

Bill. No. 138
Date: 15.10.09

S.N.	Particulars	Rate Rs.	Rate P	Qunt.	Amount Rs.	Amount P.
1.	Wheat	10	00	40 Kg	400	00
2.	Rice	18	00	10 Kg	180	00
3.	Kabli Gram	30	00	½ Kg	15	00
				Total	**595**	**00**

Due amount. Five hundred ninty-five only

Signature of Customer *Signature of shopkeeper*

When the amount is realised by the shopkeeper he writes this on the credit memo itself or issues a reciept for cash payment as following

Receipt

ALISHAN PROVISION STORES, LUCKNOW

Tel : 2636351

Rcpt. No. 575 Dated: 20:10.09

Received a sum of Rs. 595/- (Five hundred ninty five) only) from Mr. Riyaz Shah Khan toward outstanding payment against Bill No 138 dated 15.10.09

Sig. of Receiver

Preparing Bill

Bill is prepared by entering all the relevant information on the Bill Memo/ Credit Memo. Cost of each item purchased by the customer is found by multiplying the quantity by its rate. The sum of the cost of (all) every (the) item(s) is the amount due on the customer.

For example:

Abdul Rasheed purchased the following items from a provision store.

Sugar	3 Kg	at the rate of	30.00 rupees	per Kg.
Rice	5 Kg	at the rate of	20.00 rupees	per Kg.
Soap cake	6 cakes	at the rate of	7.00 rupees	per cake.

Method of preparing Bill

1. Enter the name of customer – Mr. Abdul Rasheed
2. Enter address – 15, D Block A.F. Enclave , New Delhi-25
3. Enter date – 15 . 10. 09
4. Enter name of every item in the 'Particulars' column.
5. Enter rate in the 'Rate' Column.
6. Enter quantity in the 'Quantity' Column.
7. Enter amount in the 'Amount' column. (find amount by multiplying quantity with rate per unit).
8. Enter the sum of amount after adding all the enteries in the 'Amount' column.
9. Signature of the shopkeeper at the end.

The 'Bill' prepared by above procedure will look as under:

CASH MEMO Tel: 263 11883

MAMAJI PROVISION STORES, DELHI

Bill. No. 3040

Name : Mr. Abdul Rasheed Date: 15.10.09

Address : 15-D Abul Fazl Enclave, New Delhi

S.N.	Particulars	Rate		Qunt.	Amount	
		Rs.	P		Rs.	P.
1.	Sugar	30	00	3 Kg	90	00
2.	Rice	20	00	5 Kg	100	00
3.	Soap Cake	7	00	6 Kg	42	00
In words: Two hundred thirty two only.				**Total**	**232**	**00**

Signature of shopkeeper

Exercise 23.2

1. Prepare a Cash Memo as per the following details.

(i) Name of customer - Akmal Khan

(ii) Address - 45, Jamia Nagar, N. Delhi

(iii) Date - 16.10.09

(iv) Readymade shirts 2 Pc at the rate of Rs. 75.00 per piece.

(v) Towels 3 Nos. at the rate of Rs. 35 per towel.

(vi) Handkerchiefs 5 Nos. at the rate of Rs. 15 per piece.

CASH MEMO

BABA READYMADE STORES

Bill. No. 370 Tel: 26388471

Name : .....

Address : ..... Date: .....

S.N.	Particulars	Rate		Qunt.	Amount	
		Rs.	P		Rs.	P.
In words:				**Total**		

Signature of shopkeeper

2. Prepare a Credit Memo using the following details.

(i) Name and address of customer : Khalid Saifullah, Principal, Urdu Primary School, Agra

(ii) Date of purchase : 16.10.09

(iii) Detail of purchase with rates :

(a) Test Tubes 16 Pieces (Pc.) at the rate of Rs. 5 per Pc.

(b) Beaker 4 Pieces (Pc.) at the rate of Rs. 55 per pc.

(c) Potassium per Magnate 2 packets at the rate of Rs. 40 per packet (250 gm)

(d) Spirit lamp 3 pieces at the rate of Rs. 60 per pc.

Credit Memo

ABUL KALAM SCIENCE MATERIAL STORE, AGRA

Bill. No. 503 Tel: 364219

Name : .....

Address : ..... Date: .....

S.N.	Particulars	Rate		Qunt.	Amount	
		Rs.	P		Rs.	P.
				Total		

Due amount:

Sign of shopkeeper *Signature of Customer*

3. Issue a Cash Reciept for the above bill if the outstanding dues was paid on 20.10.09

Receipt

ABUL KALAM SCIENCE MATERIAL STORE, AGRA

Tel : 364219

Rcpt. No. 710 Dated: .....

Received a sum of Rs.....: (in words) from Mr. .....toward outstanding payment against Bill No .....dated .....

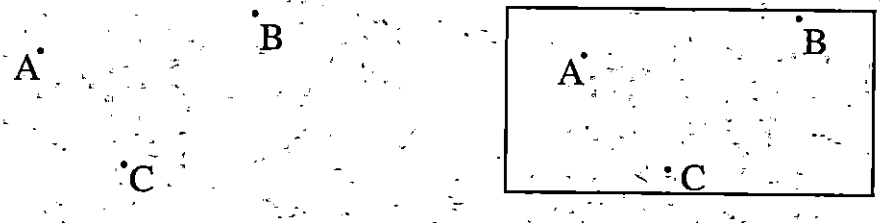
Sig. of shopkeeper

Chapter 24

GEOMETRY

Point, Plane and Line

Point : A mark made by a sharp pointed pen or pencil on a paper is called a point. If you prick a pin on any soft object as paper, wood you get a point. Position of every point is fixed. Points are represented by capital letters as A, B, X, Y, O, P etc.



Note : Point does not have length, breadth or thickness. It is as small and as sharp as possible. It only locates position.

Exercise 24.1

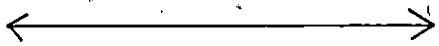
1. Mark two points on your copy (exercise book) and name them.

2. Read the name of points in the given figure.

3. Mark various points on your note book and name them A, B, C, D, E, F.

Line

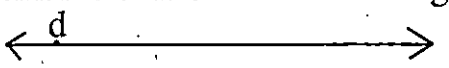
Mark a point on your copy. Now mark more points on both the sides of initial point and think of these points extending both sides infinitely. The shape so formed is called LINE.



This is shown by a straight line with two arrow heads point at the two opposite ends. These arrow show endlessness of the extending line.

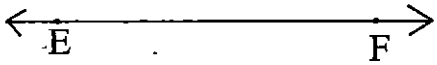
Naming a Line

A line named by small letter. See the following figure:



The name of this line is line 'd'

Another method of naming a line is by marking two points on a line and labelling them by two capital letters.



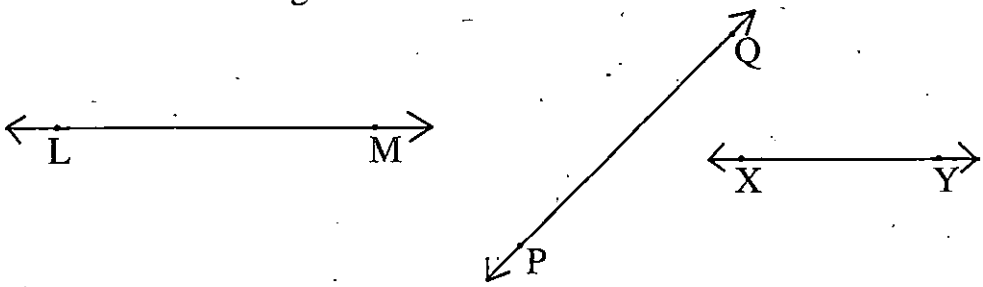
We read it line 'EF' and write it as $\overleftrightarrow{EF}$ or $\overleftrightarrow{FE}$.

Exercise 24.2

1. Draw a line and name it by small letters.

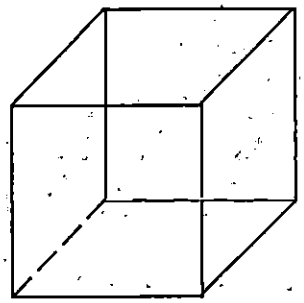
2. Draw a line and name it by two points.

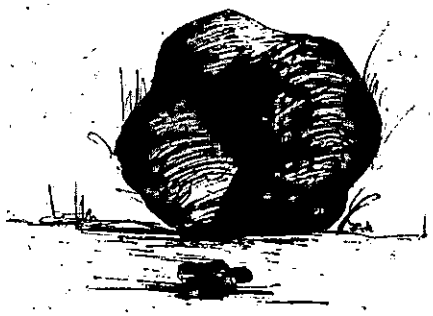
3. Name the following lines:



Plane

See the following figures carefully





Take a stone, a looking glass (mirror) and a piece of wood. Move your hand over these objects. How do you feel? Is the surface of looking glass is the same as the surface of a stone or wood. Some surfaces are smooth and some rough.

Similarly some surfaces are spread along length and breadth as surface of a table and desk. These surfaces are 'Plane'. Plane is spread infinitely in all directions.

Every surface of a cube is Plane. There are 6 planes in a cube.

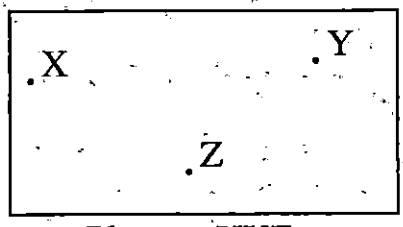
There is only one plane in a football.

Like a line, we see only a part of a plane as it is spread endlessly in all directions.

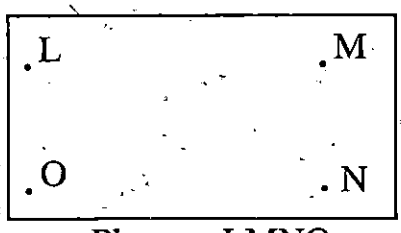
Generally, we represents plane by a rectangle or parallelograme.

Naming a Plane:

Plane is named by three or more points with the condition that, these points are not in a straight line.



Plane — XYZ



Plane — LMNO

Exercise 24.3

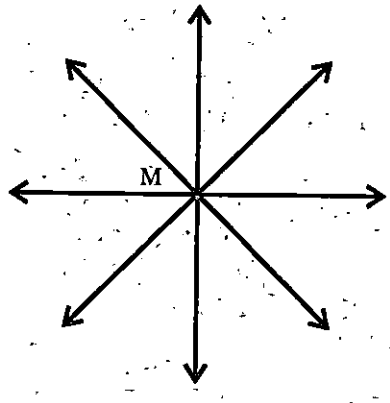
1. Draw a plane on your note book and name it as RST.
2. Draw a plane A B C D.

Incidence Properties of lines in a Plane

Property 1: An infinite number of lines can be drawn through a given point.

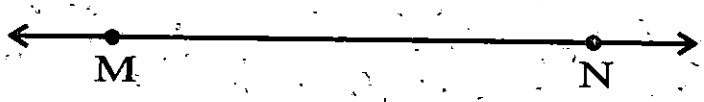
Exaplanation: Mark a point 'M' on your note book. Now draw a line through point 'M'. Draw some more lines passing through point 'M'.

Can you tell, that how many lines can be drawn? Your answer will be 'indefinite'.



Property 2: Two points determine a unique line.

Exaplanation: Mark two point 'M' and 'N' on a paper. Now draw a line passing through these two points. You can observe that, only one line can be drawn passing through these two points.



Property 3: Two lines in a plane either intersect each other at exactly one point or are parallel.

Explanation: Relationship between two lines, on a plane. Two lines drawn in a plane have only two kinds of relations.

See the following figures:

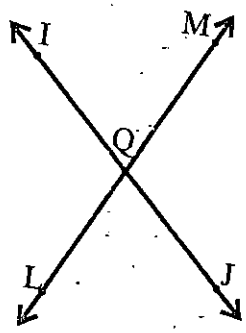


Fig-I

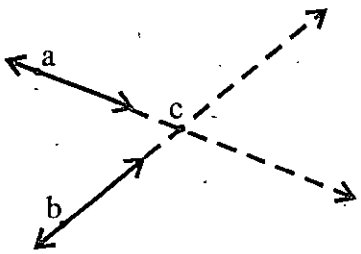


Fig-II

Fig-III

Figure I :- In this figure line IJ and LM cut each other at point Q. This point is called point of intersection.

Figure II :- In this figure line a cuts line b at point point c, when these lines are extended.

Figure III :- In this figure lines 'e' and 'f' never cut each other.

These lines are called Parallel lines.'

So, we can say the two lines in a plane will either cut each other at one point or will be parallel.

Collinear and non-collinear points

You have seen that infinite number of lines can be drawn through a point whereas only one line can be drawn through any two points in a plane.

Now we shall see how many lines and of what type can be drawn through three points on a plane.

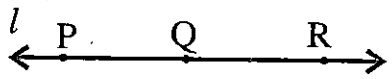


Figure I

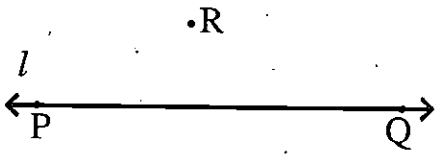


Figure II

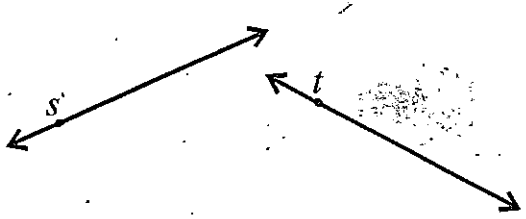
From the above figures it is clear that point R will be either on the line or out side the line. In the fig-I the points P, Q, R are in a line. So, these three points are called collinear points.
But in the fig-II the three points are not in a line and hence these points are called non-collinear points.

Exercise 24.4

1. Take two points I and J on your note book and draw a line passing through these points. How many more line can be drawn through these points.

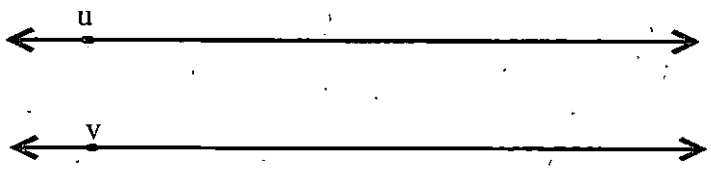
2. Mark a point K on your note book and tell how many lines can be drawn passing through this point?

3.



Are lines 's' and 't' parallel? If not, why?

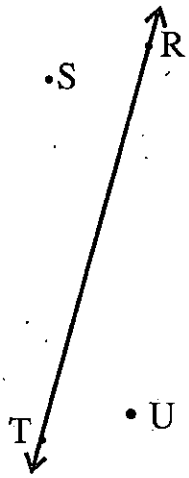
4.



Lines 'u' and 'v' are in the same plane. Do they intersect each other?

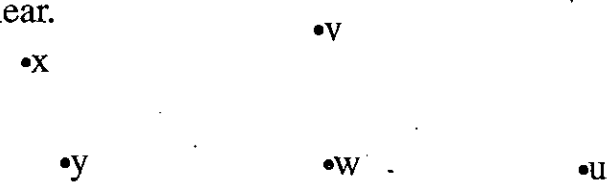
5. If the two lines in a plane do not intersect each other. what is the relation between these two?

6. See the figure and name the collinear and non-collinear points.



7. Take points A, B, C, D and E on a line 'a' such that these points are collinear.

8.



With the help of scale, tell whether the following points are collinear or not?

(i) u, w, y (ii) w and x

(iii) u, w and x (iv) v and w

9. How many lines can be drawn through 5 collinear points?

10. How many maximum points of intersection can be there for four lines in a plane. Show diagramatically.

11. Tick mark (✓) the correct statement(s).

(i) In Mathematics line means only straight line.

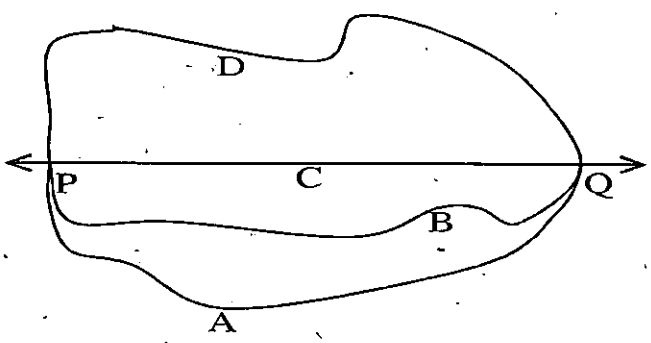
(ii) Two straight lines in a plane always intersect each other at two points.

(iii) Two different lines can be drawn through two given points.

(iv) Five points can be collinear (with the condition) if any three points are on the same line.

Line Segment

'Segment' means part. So, line segment is a part of line. There are various paths to reach from point P to Q in the following figure.



Which is the shortest path? Of course, it is path 'C' or PCQ.

So, PQ is a line segment. P and Q are the two pole points of this line segment.

Exercise 24.5

1. Take two points M and N on your note book and draw a line segment.
2. See the following figure (i) and name line segments in it.

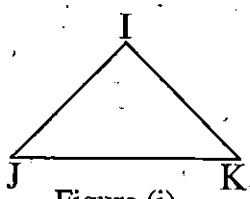


Figure (i)

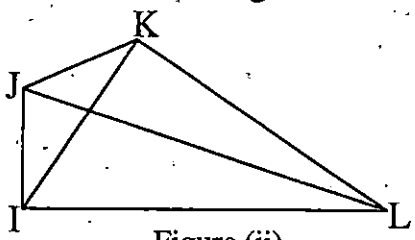


Figure (ii)

3. How many line segments are there in the figure (ii)?
4. What is the difference between line and line segment?

Comparing line segment

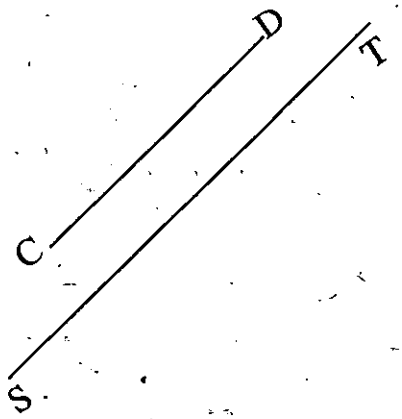
See the following line segments CD and ST and tell which one is longer.

You will definitely say the line segment ST is longer than line segment CD and you told this by simple observation. There are two more methods by which we can compare two or more line segments.

(1) By observation

(2) By divider

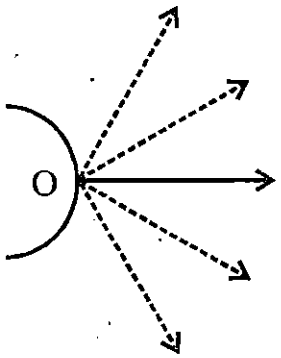
(3) By measuring with scale



Ray and angle

Ray: You might have observed (light) rays coming from the sun or a torch. can you tell what is ray in geometry?

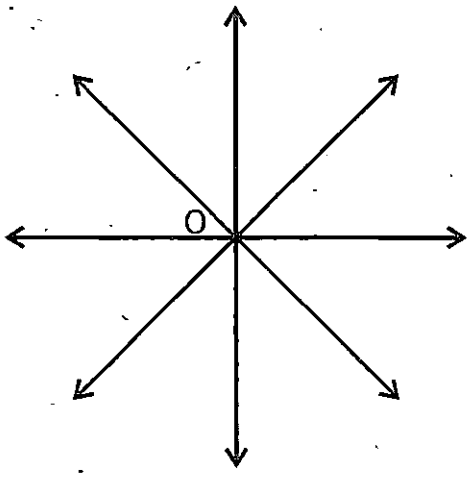
In the given figure –
The source point of rays is represented by 'O'. The rays coming from point 'O' are extended infinitely.
The arrow mark shows its endlessness.



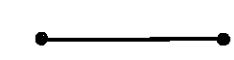
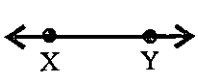
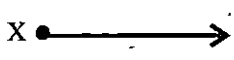
Thus ray is a kind of line which extends endlessly in a specific direction

Activity:

Take a point O on your note book and taking it as source make rays in all directions. How many such rays can be drawn? Of course infinite number of rays! can you measure the length of rays? No. Because rays extend endlessly and there is no end point. Can you take rays on a paper? No. Rays can only be represented by drawing and cannot be taken on paper.

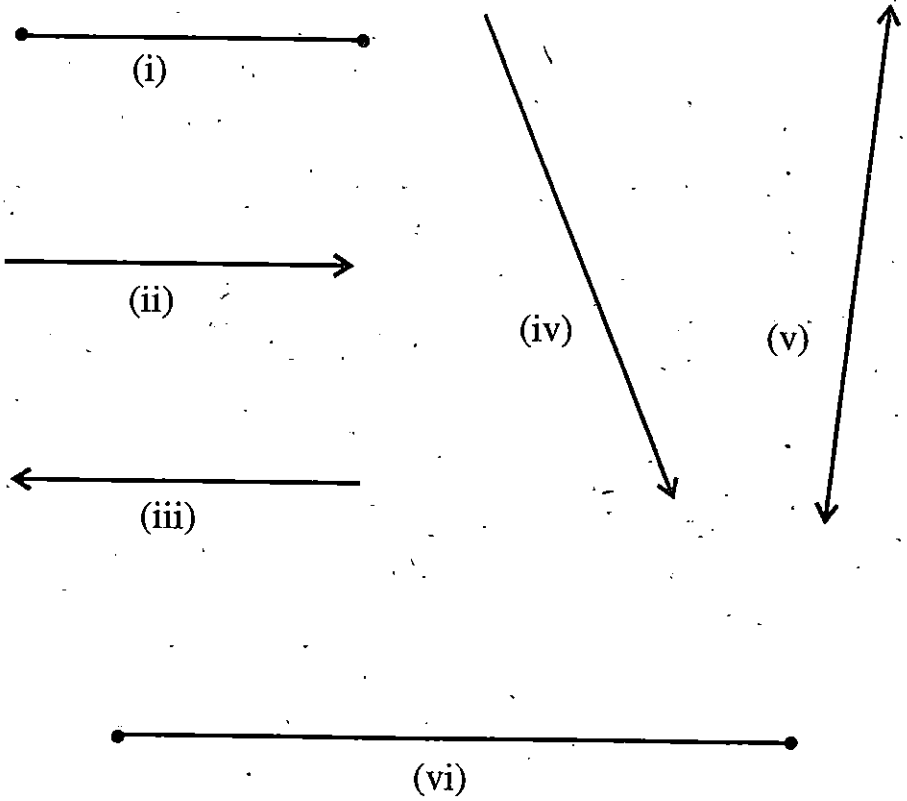


Comparison of line, line segment and rays.

Line segment	line	ray
Line segment can be taken on paper	line cannot be taken on paper, can only be represented by drawing	ray cannot be taken on paper, can only be represented by drawing
Line segment has a definite length	line has no definite length, it extends endlessly in both directions.	ray has no difinite length, it extends endlessly in one direction.
line segment has two end points (or poles)	line has no end point (pole)	ray also have only one end point (pole)
 represent the segment	 represents a line	 represents a ray

Exercise 24.6

Name the following as rays, line, or line segment as the case may be by letters.



Ans. Exe 24.2

(3) LM, PQ, XY

Ans. Exe 24.4

(1) No any more line **(2)** infinite (Uncountable)

(3) No, because, they may be intersect each other at a point on producing.

(4) No **(5)** Parallel line **(6)** Collinear points ⇨ T,R
Non-collinear points ⇨ U, S

(8) **(i)** Yes **(ii)** Yes **(iii)** No **(iv)** Yes

(9) One **(10)** One

(11) **(i)** True **(ii)** False **(iii)** False **(iv)** False

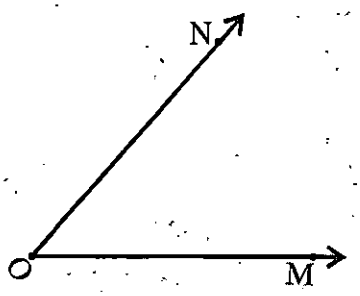
Ans. Exe 24.5

(2) I J, J K, IK **(3)** 6 line segments

Chapter 25

ANGLE

Angle: The union of two rays with a common end point is called an angle.

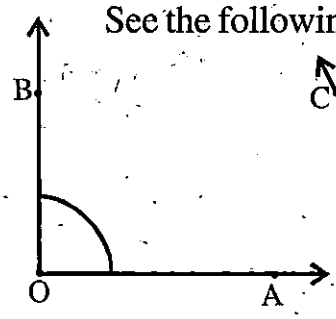


See the above figur:

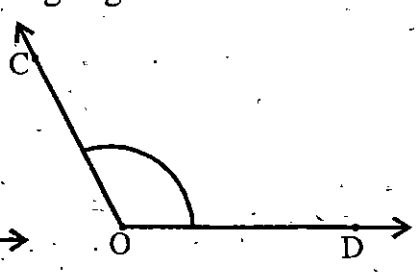
The two rays having a common end point. This common point is called "Vertex" of the angle. The rays form an angle are clled the 'sides' (or arms) of angle.

To represent an angle, we use capital letters. In the given figure (above), the angle may be identified with three letters as angle MON or angle NOM. Notice that, the letter at vertex is always between the other two letters. The symbol used for angle is '$\angle$'. So, the angles can be written as $\angle$ MON. or $\angle$ NOM. The angle may also be written as $\angle$O, its vertex letter.

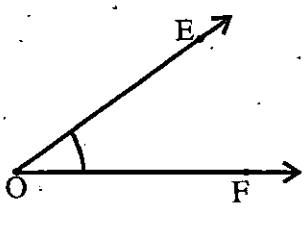
See the following angles and name them:



(i)



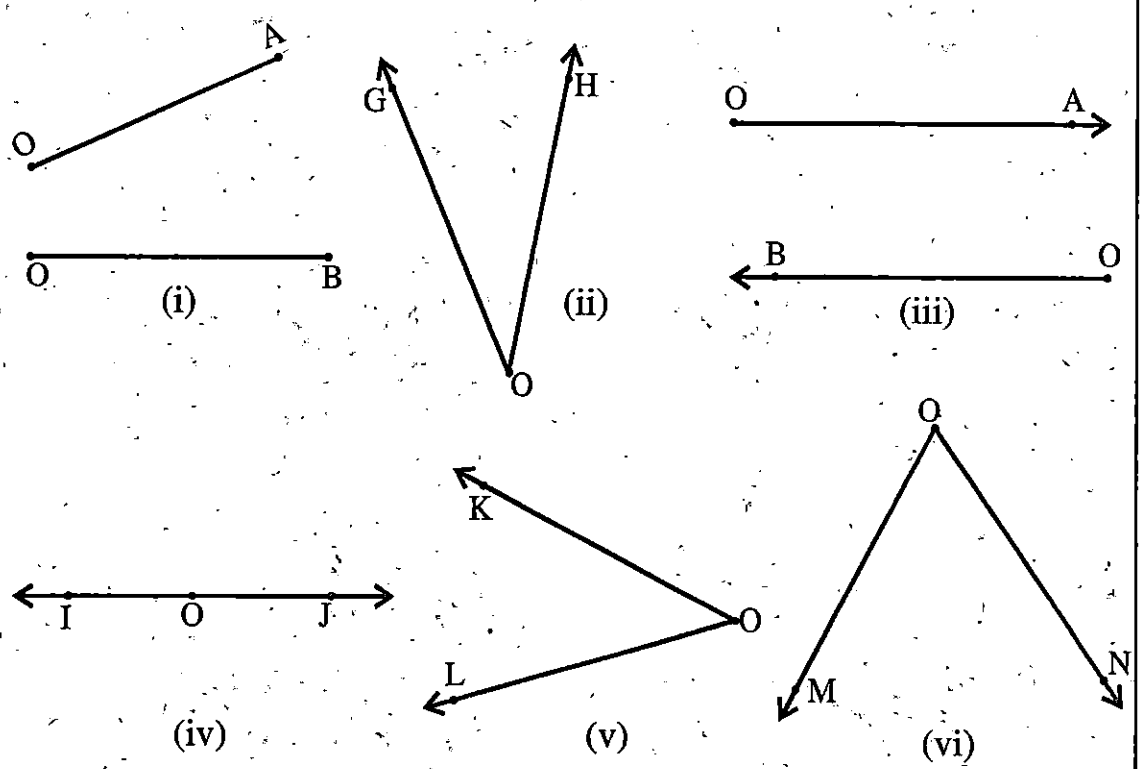
(ii)



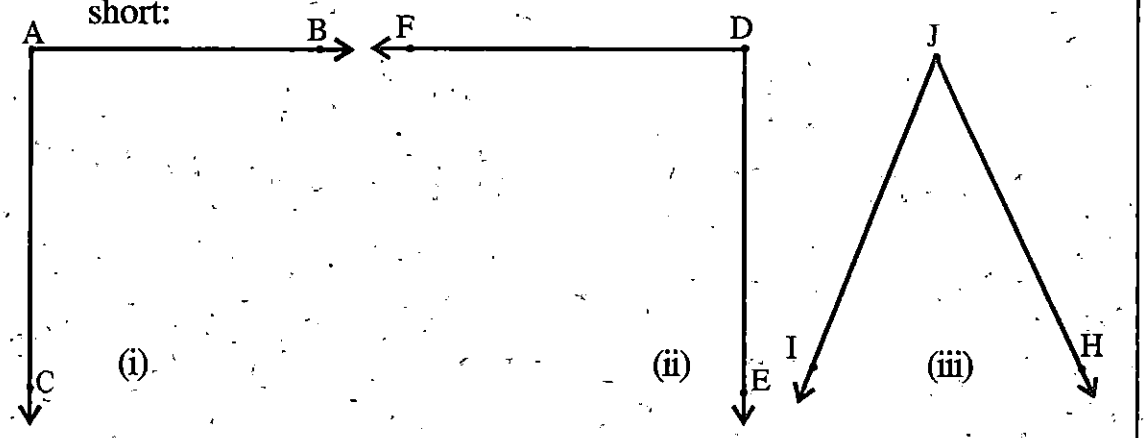
(iii)

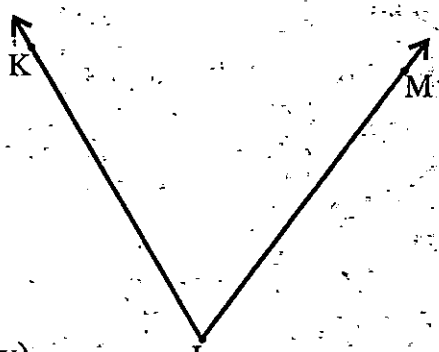
Exercise 25.1

1. See the following figures carefully and name the angles:

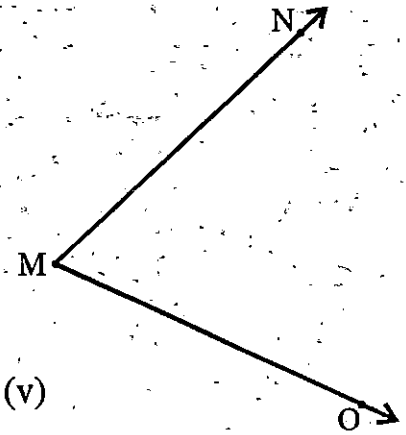


2. Name the vertex of the following angles and then name these angles in short:



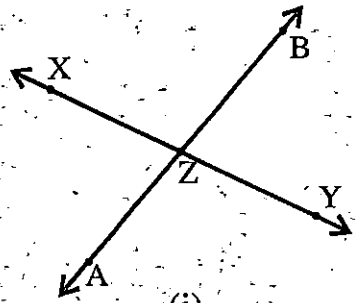


(iv)

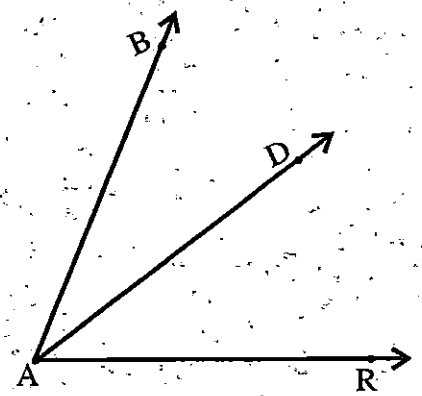


(v)

3. Name all the angles formed in the following two figures:



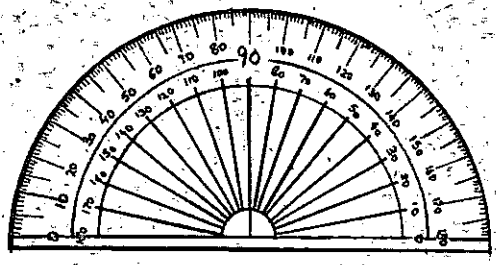
(i)



(ii)

Measuring an angles

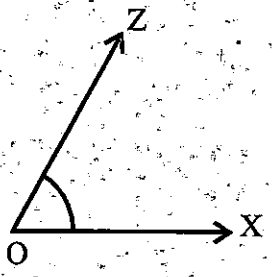
The unit of measure of angles is "Degree", which is symbolized as '°'. We use protractor to measure an angle. Observe protractor in your geometory box. Its shape is as follows:



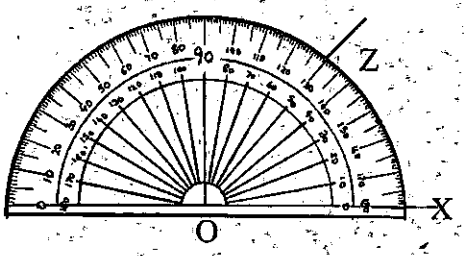
You can observe that this semi circle (or half circle) is divided into 180 parts. Each part represents 1° (one degree). The line joining 0 and 180 is straight line(or base line) its centre is the centre of protractor.

Such protractors are used to measure angles.

Consider, You have to measure ∠ XOZ. To measure this angle, the following proceedure will be adopted:



Step1- Place vertex of angle at the centre of the protractor. In the figure vertex O of ∠ ZOX is placed at the centre of protractor.



Step 2- Pair one ray of the angle with 0 (zero) on the protractor's scale.

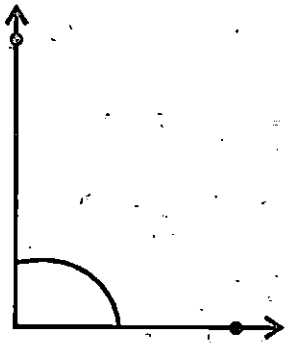
In the figure $\overrightarrow{OX}$ is paired with 0 (zero) in the inner scale.

Step 3- Pair other ray of the angle with a number between 0° and 180° on the same scale used in step 2. In the fig ray $\overrightarrow{OZ}$ is paired with 50° on the inner scale.

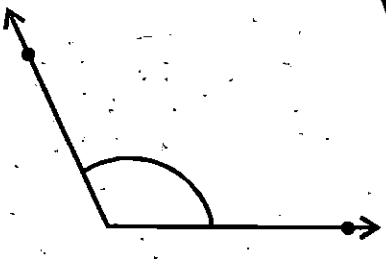
Hence, ∠ ZOX = 50°

Exercise 25.2

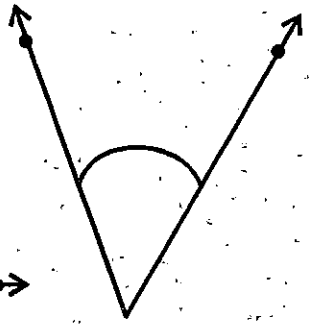
1. Name and Measure the following angles:



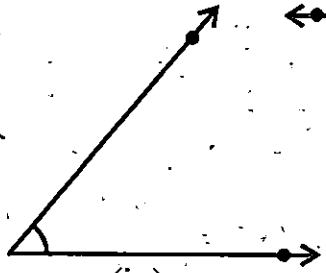
(i)



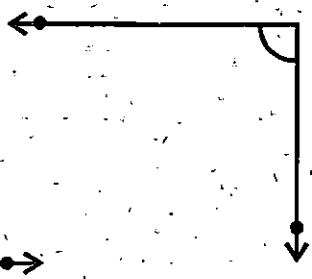
(ii)



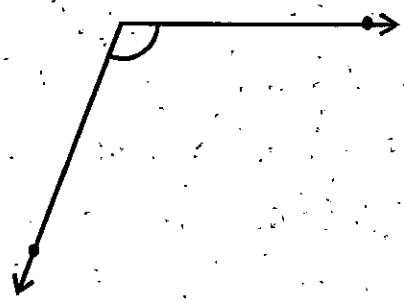
(iii)



(iv)



(v)



(vi)

Making or Drawing an angle

Assume you have to draw an angle of 60°.

Procedure:

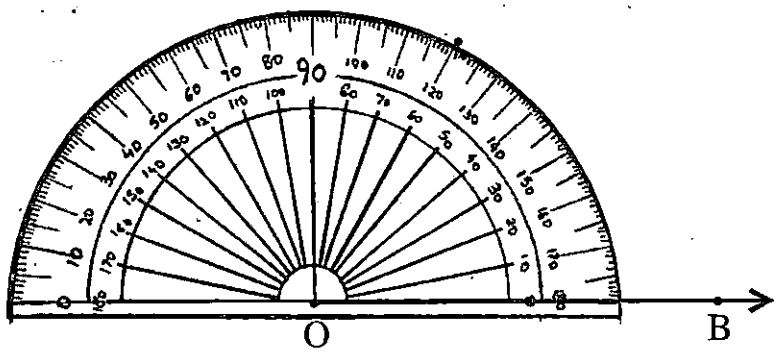
Step 1- Draw a ray $\overrightarrow{OB}$ as the base of the angle.

Step 2- Place the protractor such that its centre will fall on the point 'O' and its horizontal edge on 'OB'.

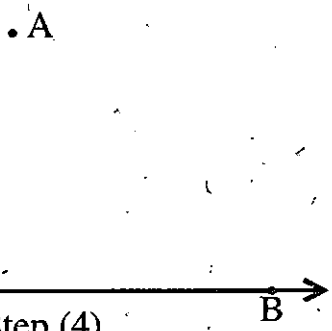
Step 3- Now find 60th division on the same scale as step 2. from the zero point.

Step 4- On that division make a mark with pencil and name it 'A'.

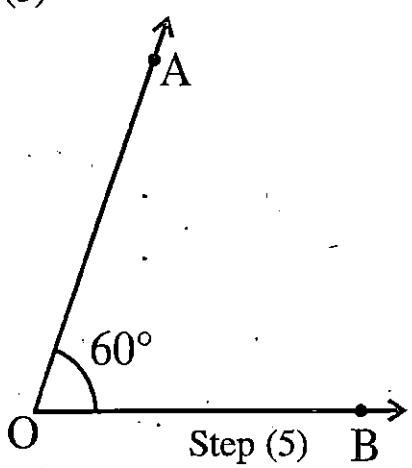
Step 5- Now remove the protractor and join 'A' to 'O'.
Then $\angle$ AOB is the required angle of 60°.



Step (2)& (3)



Step (4)



Step (5)

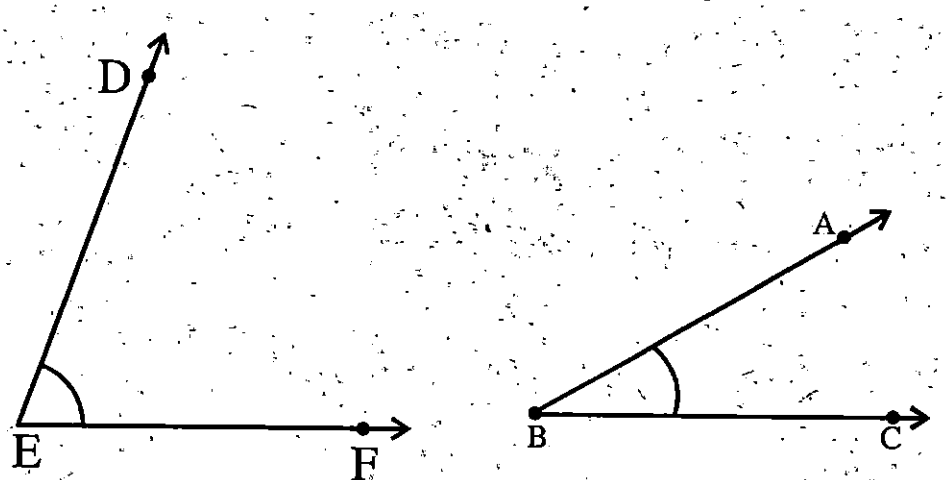
Exercise 25.3

Draw the angles of following measures by using protractor:

(1)	40°	**(2)**	30°	**(3)**	90°
(4)	45°	**(5)**	75°	**(6)**	85°
(7)	100°	**(8)**	110°	**(9)**	165°

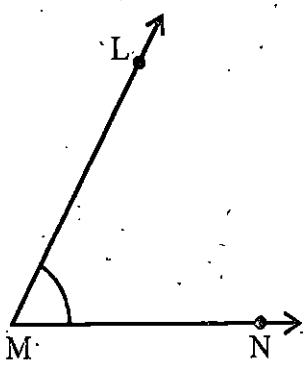
Comparing angles

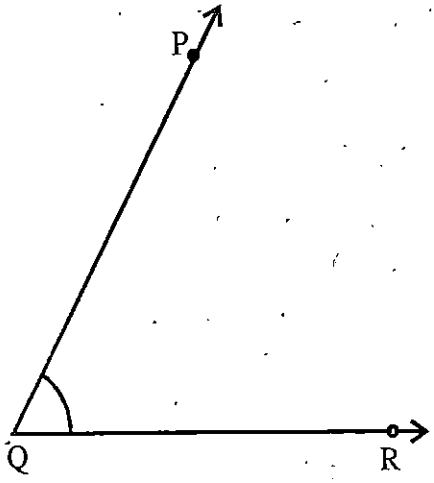
Consider the following two angles ∠ABC and ∠DEF



Measure the above angles by protractor. You will find that ∠ABC is 30° and ∠DEF is 70°.

Thus ∠DEF is greater than ∠ABC



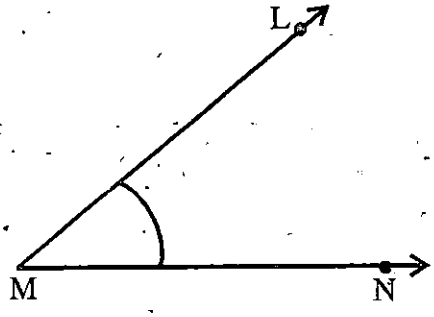


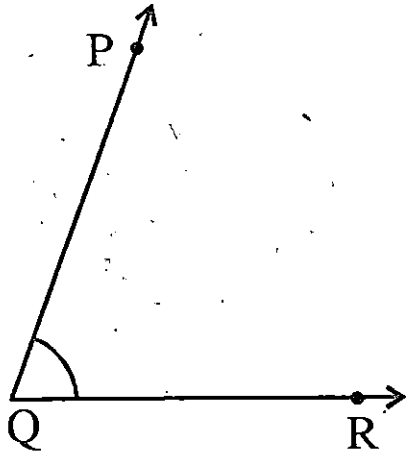
Now measure the above two angles by protractor. You will find that the above two angles are of the same measure (60°). It shows that the measure of angles do not depend on the length of arms.

Exercise 25.4

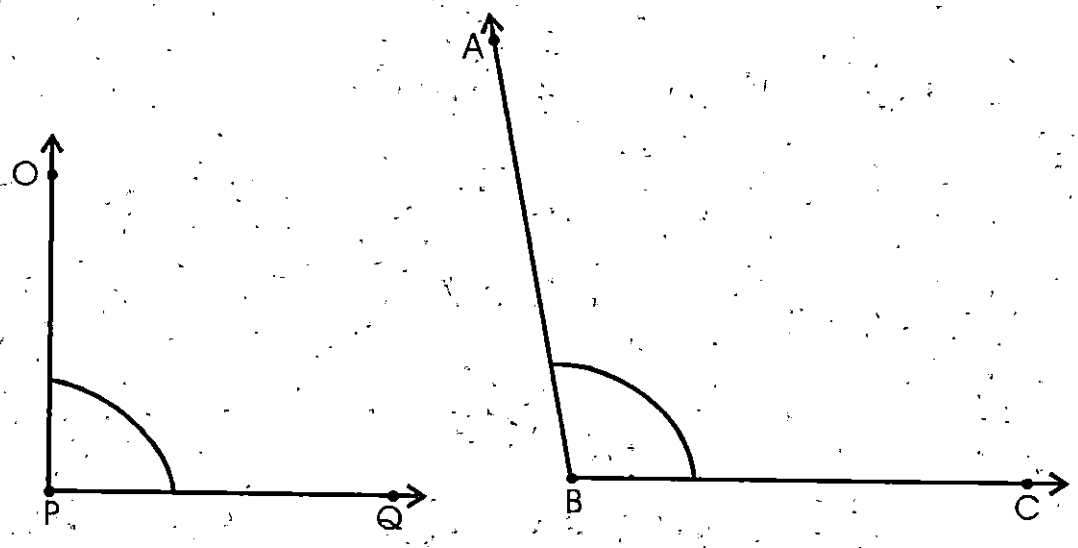
Name the greater angle in the following pairs of angles:

1.

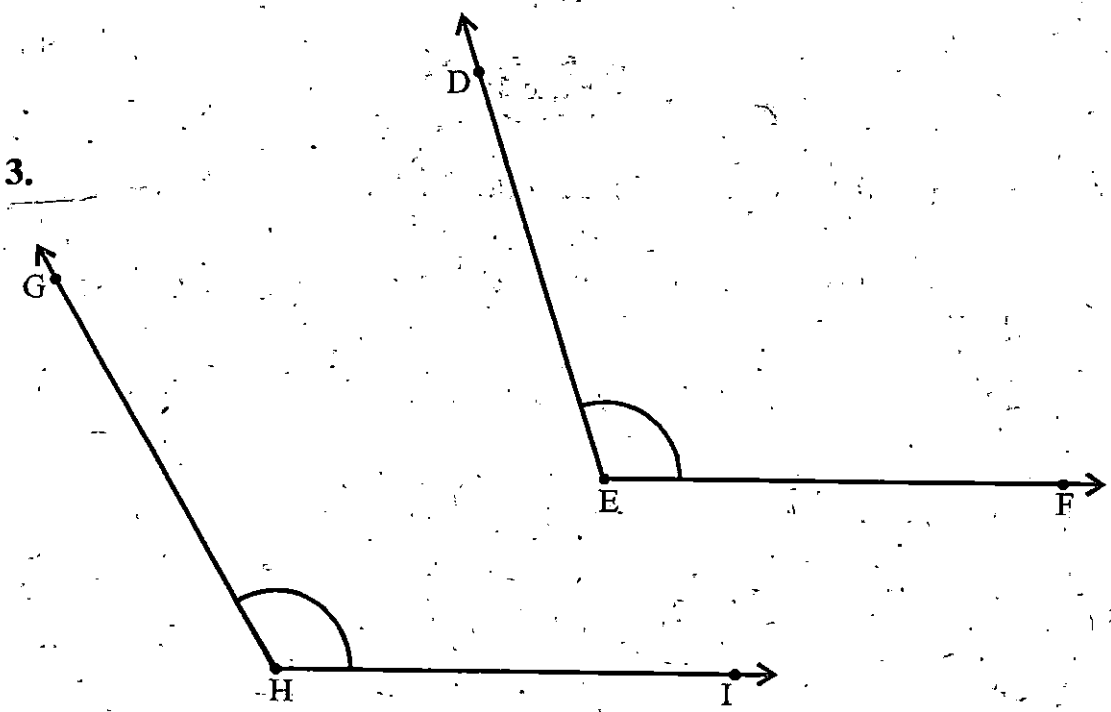




2.



3.



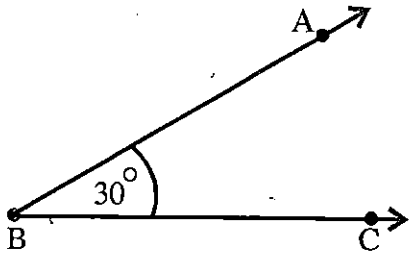
Kinds of angles

On the basis of measurements, the angle are of five types:

1. Acute angle :

Angles of measure less than 90° are called acute angles.

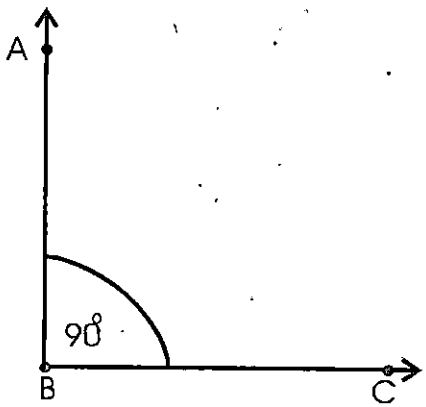
$\angle ABC = 30°$



2. Right angle:

Angle of measure 90° is called right angle.

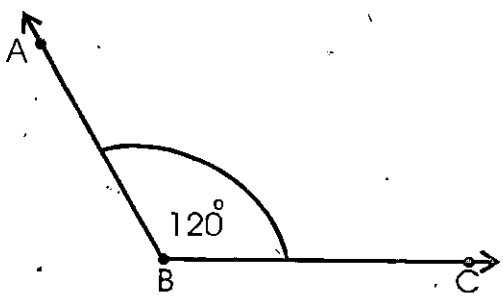
$\angle ABC = 90°$



3. Obtuse angle :

Angles of measure more than 90° but less than 180° are called obtuse angles.

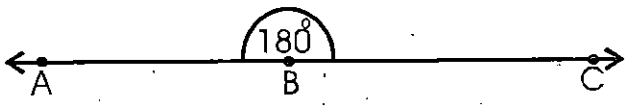
$\angle ABC = 120°$



4. Straight angle :

Angle of measure 180° is called straight angle.

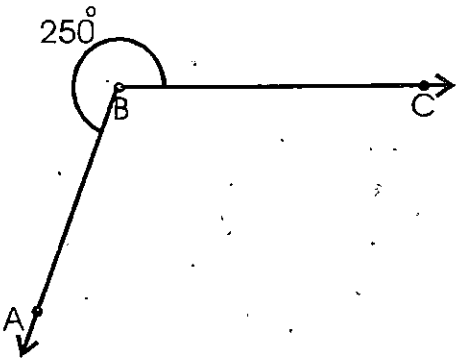
$\angle ABC = 180°$



5. Reflex angle :

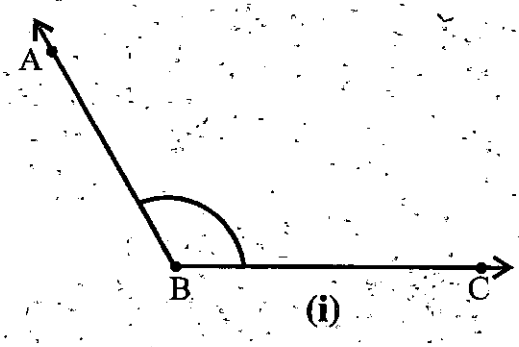
Angles of measure more than 180° and less than 360° are called reflex angles.

$\angle ABC = 250°$

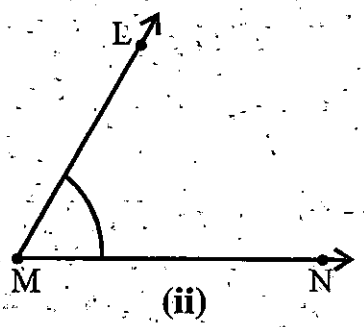


Exercise 25.5

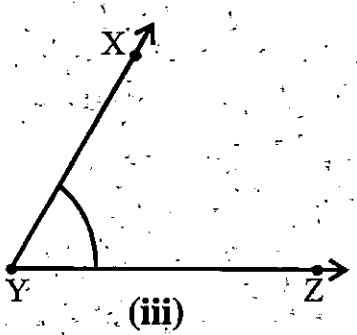
1. Identify the different kinds of angles and name them in the following angle:



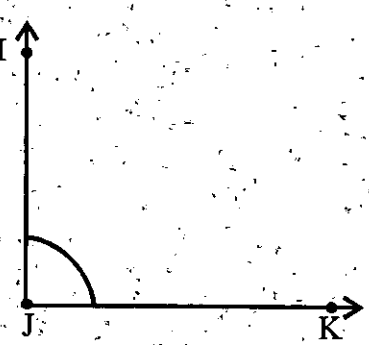
(i)



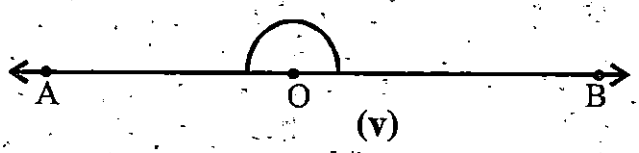
(ii)



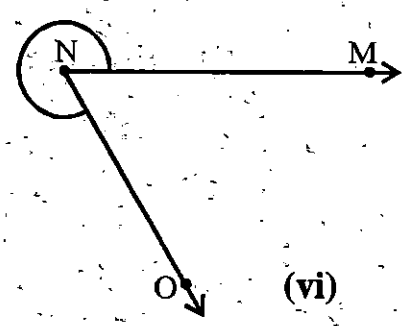
(iii)



(iv)



(v)



(vi)

Ans. Exe 25.1

[1] (ii) ∠GOH (iv) ∠IOJ (V) ∠KOL (vi) ∠MON

[2] (i) A, ∠BAC (ii) D, ∠EDF (iii) J, ∠IJH

(iv) L,∠KLM (v) M, ∠NMO

[3] (i) ∠XZA, ∠XZY, ∠BZX, ∠BZY, ∠AZY, ∠AZB.

(ii) ∠BAD, ∠BAR, ∠DAR,

Ans. Exe 25.2

1.

(i)	90°	(ii)	125°	(iii)	50°
(iv)	50°	(v)	90°	(vi)	110°

Ans. Exe 25.4

(1) ∠PQR, (2) ∠ABC, (3) ∠GHI

Ans. Exe 25.5

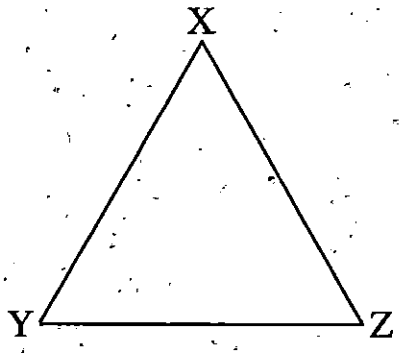
1.

(i)	Obtuse angle	(ii)	Acute angle	(iii)	Acute angle
(iv)	Right angle	(v)	Straight angle	(vi)	Reflex angle

Chapter 26

TRIANGLE

A shape enclosed by three line segments is called Triangle. These line segments are called sides of triangle. Thus a triangle has 3 sides. In the following triangle the three sides are XY, YZ and ZX. Also, there are three angles in a triangle.



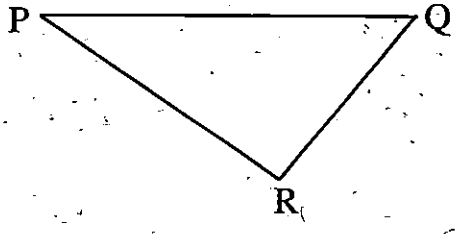
In this triangle, the three angles are $\angle X$, $\angle Y$ and $\angle Z$. There are three vertices, X, Y and Z, which are non-collinear.

A shape formed by three sides in a plane, such that every side touches the other two sides, is called a triangle.

Triangle is represented by the symbol 'Δ'

Exercise 26.1

1. Name the sides of ΔPQR
2. Name the vertices of ΔPQR
3. Name the angles of ΔPQR



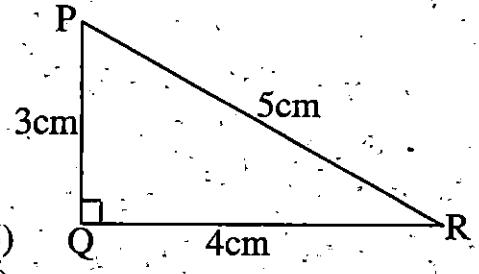
Properties of a Triangle

Property (1): In a triangle, the sum of any two sides is always greater than the third side.

For Example: Consider in a ΔPQR,

PQ = 3 cm.
QR = 4 cm.
PR = 5 cm.

Now, PQ+QR = 3+4 = 7 (>5)
or QR+RP = 4+5 = 9 (>3)
or PQ+RP = 3+5 = 8 (>4)

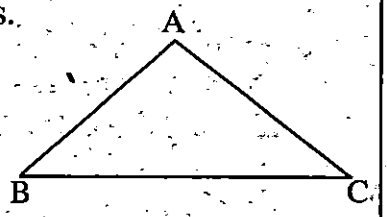


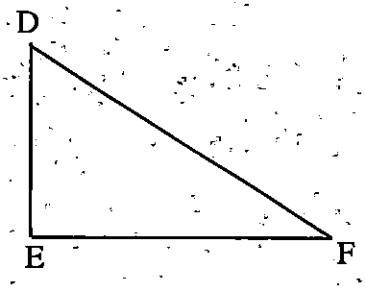
Property (2): The sum of the angles of a triangle is 180°. This property is known as "Angle sum property" of triangle.

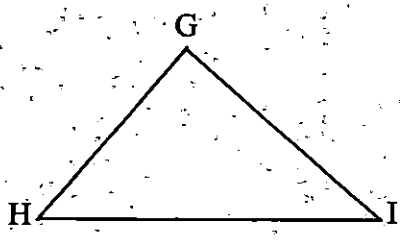
For Example: Consider, three triangles, ΔABC, ΔDEF and ΔGHI. Measure all the angles of these three triangles.

Now, Find the sum of all the three angles of every triangle separately.

You, Observe that, the sum of all angles of every triangle is 180°.







i.e. For ΔABC, ΔDEF and ΔGHI,

$\angle A + \angle B + \angle C = 180°$

& $\angle D + \angle E + \angle F = 180°$

& $\angle G + \angle H + \angle I = 180°$

Exercise 26.2

1. Tell which set of three angles can form a triangl:

(i) $\angle A = 40°$ $\angle B = 50°$ $\angle C = 90°$

(ii) $\angle P = 65°$ $\angle Q = 70°$ $\angle R = 75°$

(iii) $\angle X = 20°$ $\angle Y = 55°$ $\angle Z = 95°$

(iv) $\angle L = 30°$ $\angle M = 60°$ $\angle N = 90°$

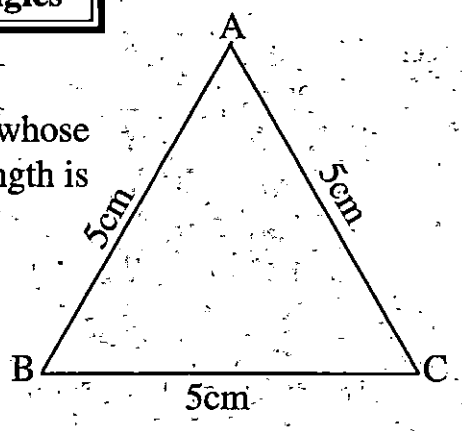
2. (i) If in ΔABC, $\angle A = 50°$, $\angle B = 60°$, then find $\angle C$

(ii) If in ΔPQR, $\angle Q = 45°$, $\angle R = 90°$, then find $\angle P$

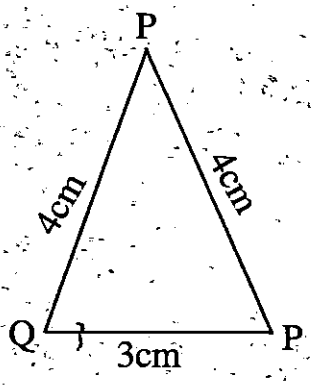
Kinds of Triangles

(A) On the Basis of their Sides:

(1) Equilateral Triangle :- A triangle whose all the three sides are of the same length is called an equilateral Triangle.

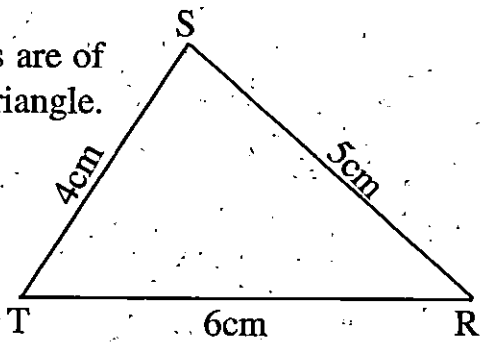


(2) Isosceles Triangle :- A triangle whose any two sides are equal is called Isosceles triangle.



(3) Scalene Triangle :-

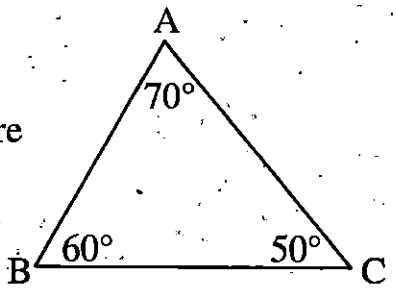
A triangle whose all the three sides are of different length is called a scalene triangle.



(B) On the Basis of their angles:

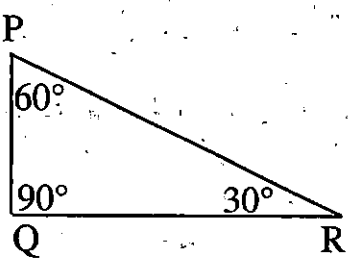
(1) Acute angled triange :-

A triangle whose all the three angles are acute is called "Acute angled triangle."



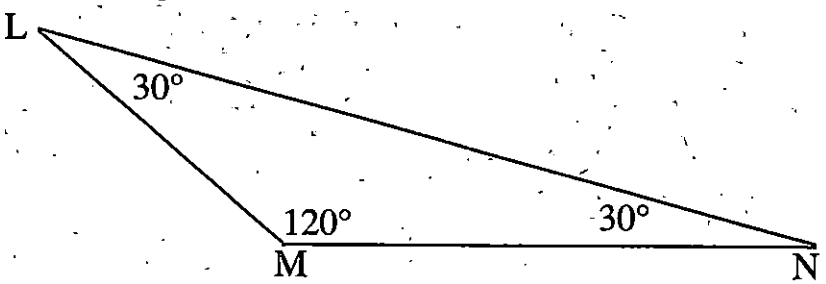
(2) Right angled triangle:-

A triangle whose one of the angles is 90° or Right angle is called "Right angled triangle."



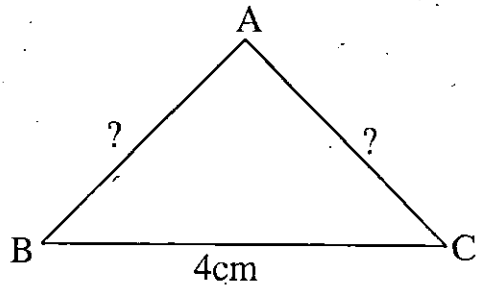
(3) Obtuse angled triangle:-

A triangle in which one of the angles is obtuse is called "Obtuse angled triangle".



Exercise 26.3

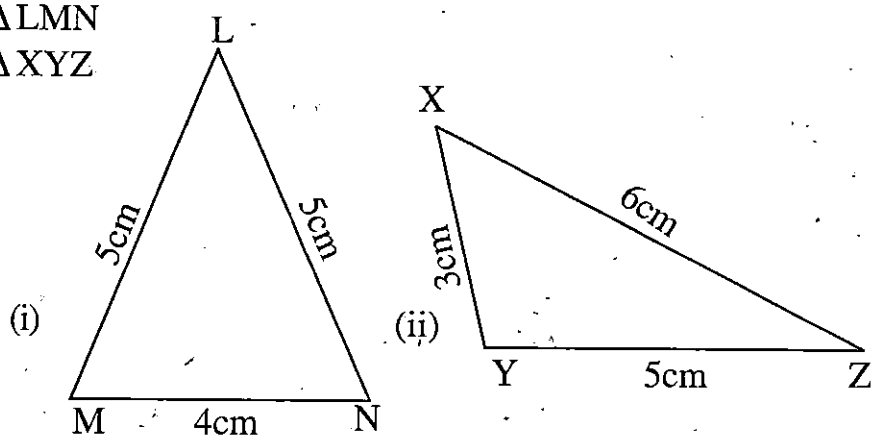
(1) ΔABC is an equilateral triangle. If one of its sides is 4cm find the other two sides.



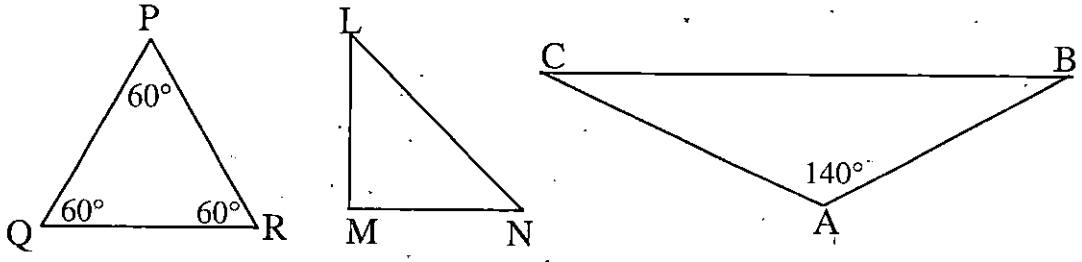
(2) See the following triangles and tell their kind:

(i) ΔLMN

(ii) ΔXYZ



(3) Tick Mark (✓) the correct statements and cross out (×) the wrong statements.



(i) ΔPQR is an acute angled/ obtuse angled triangle.

(ii) In ΔLMN, one of the angles is 90°, hence it is a acute angled/right angled triangle.

(iii) ΔABC is an obtuse / acute angled triangle.

Ans. Exe 26.1

(1) PQ, QR, PR **(2)** P, Q, R **(3)** $\angle P$, $\angle Q$, $\angle R$

Ans. Exe 26.2

(1) **(i)** and **(iv)**

(2) **(i)** $\angle C = 70°$

(ii) $\angle P = 45°$

Ans. Exe 26.4

(1) AB = AC = 4 cm.

(2) (i) Isosceles triangle

(ii) Scalene triangle

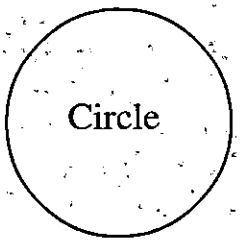
(3) (i) Acute angled triangle

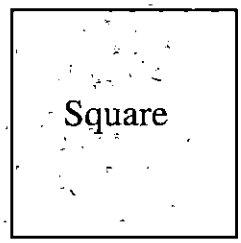
(ii) Right angled triangle

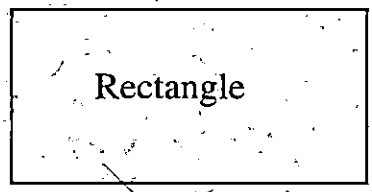
(iii) Obtuse angled triangle

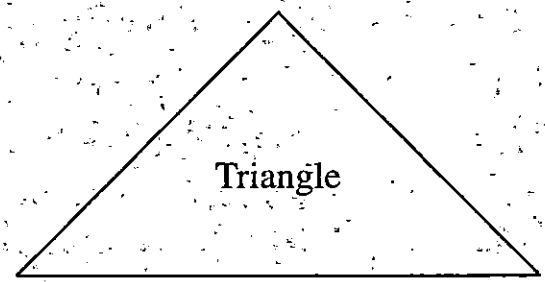
Chapter 27

AREA

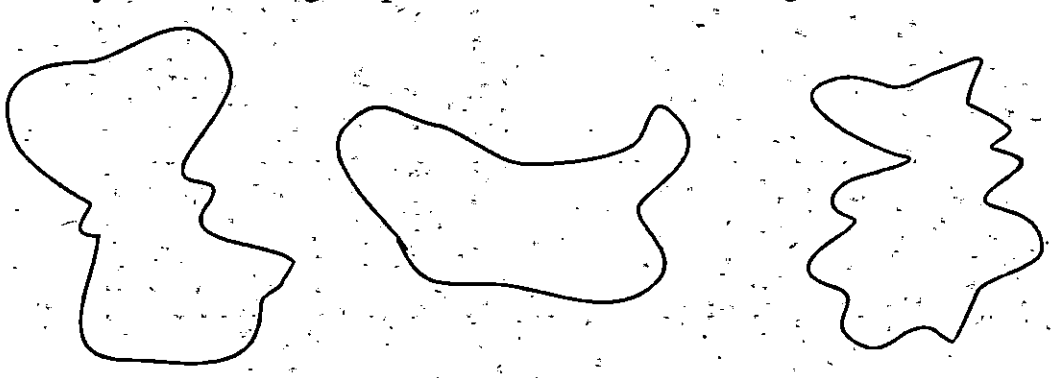






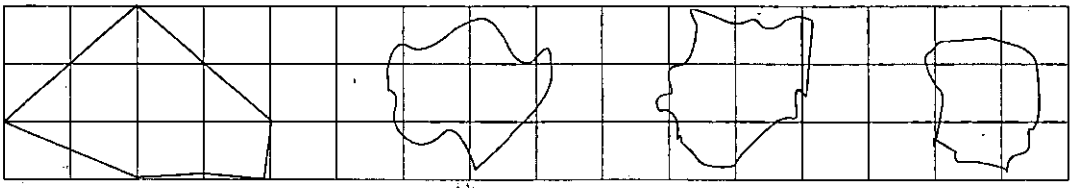


You already know the above shapes. These are all closed figures. Similarly the following shapes are also closed but irregular.



When we draw these figures on a paper, they cover some space. The space covered by these closed figures on a plane is called AREA.

How did you calculate that, which of the following figures cover the maximum or minimum area? Obviously, you can find the area by counting the squares inside the closed figure.



Unit of Area:

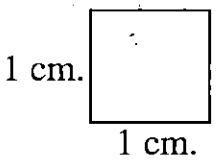
By observing above figures, tell about following:

(i) In which figure there are minimum squares?

(ii) In which figure there are maximum squares?

To know the area we must know the number of square.

In fact, square is the unit by which we represent area of an object. In the following figure the side of the square is 1cm. The space covered by this square is 1 square cm. So, we can say that, the area of this figure is 1 square cm. Here the unit of area is square cm. If a square has side of 1 m, then its area will be 1 square m. (or 1 m^2.).



If the unit of length is m, cm or feet, then the unit of area would be square metre, square cm or square feet respectively.

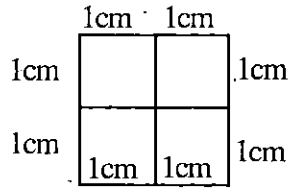
The area of an irregular shape is estimated according to complete and incomplete squares covered by it. (squares covered less than half are omitted)

Method of finding area

(1) By counting squares

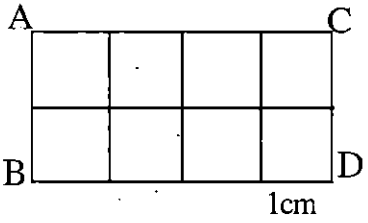
The total number of squares of a unit will be the area of the shape.

In the following shape there are four squares of 1cm, hence its area is 4 square cm (or 4 cm^2)



How many squares are there in the adjacent figure?

Evidently, there are 8 squares of 1cm, so the area of this rectangle is 8 square cm. (or 8 cm^2.)



Exercise 27.1

1. Count the squares and find area of every shape:

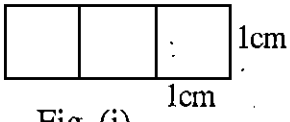


Fig. (i)

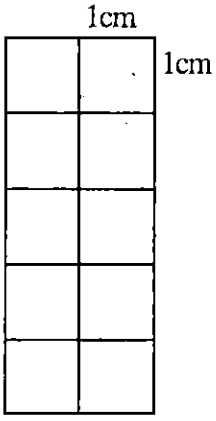


Fig. (iii)

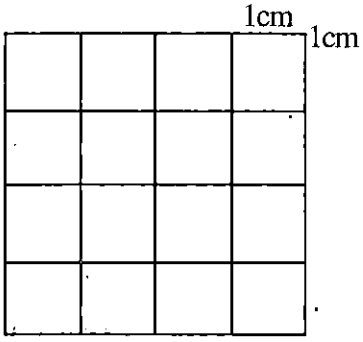
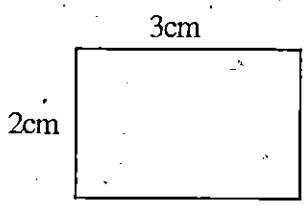


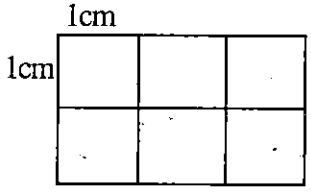
Fig. (ii)

2. By using formula:-

It is a figure of a rectangle. Its length is 3cm. and breadth is 2 cm. If squares of 1cm are drawn in it, 6 squares will be drawn. There will be 3 squares along the length and 2 squares along the breadth of the rectangle.

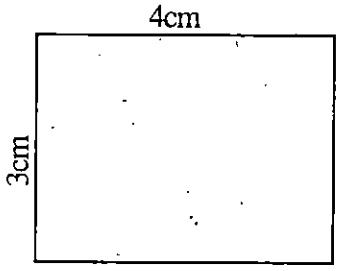


We can obtained the total number of squares in rectangle by multiplying them together.



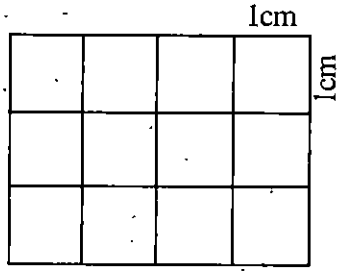
Total No. of squares = $3 \times 2 = 6$

Similarly the following figure is also a rectangle. Its length and breadth is 4 cm and 3cm. respectively. If squares of 1 cm. are drawn in it, then there will be 4 squares along length and 3 squares along breadth of rectangle.



So, the total number of squares = $4 \times 3 = 12$

By considering above examples, it is clear that, the area of rectangle may be obtained by multiplying its length and breadth together.



Area of rectangle = length × breadth

Simply, we can say that,

The product of length and breadth of a rectangle is called its area.

Note: The units of length and breadth should be same.

Example 1 : A rectangular field has length 15m and breadth 10m. Find the area of field.

Solution : Length of field (L) = 15m

Breadth of field (B) = 10m.

So, Area of field = length × Breadth

= 15m × 10m.

= 150 square meter or 150 m^2.

Example 2 : Rashid wants to use 1sq.ft. tiles in the floor of their room. If the length and breadth of room is 9 ft. and 6 ft. respectively. Then find the number of required tiles.

Solution : Length of room = 9 ft.

Breadth of room = 6 ft.

So, Area of room = 9 ft. × 6 ft

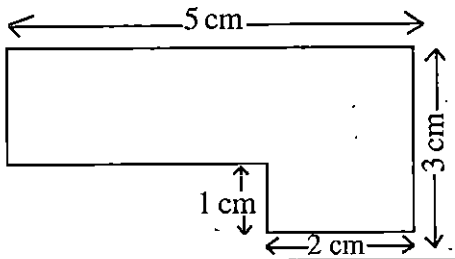
= 54 square ft. or 54 ft^2.

Area of 1 tile = 1 square ft.

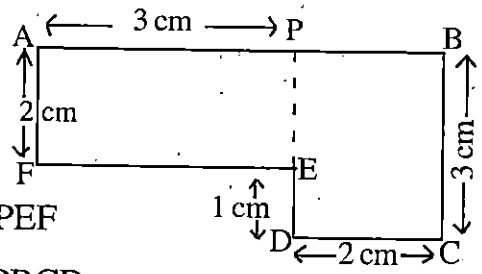
$$\text{Thus, the number of tiles required} = \frac{\text{Area of room}}{\text{Area of 1 tile}}$$

$$= \frac{54 \text{ sq. ft.}}{1 \text{ sq. ft.}} = 54$$

Example 3 : Find the area of given figure--



Solution : First of all, divide the given figure in two rectangular shapes as follows --



Area of figure = Area of rect. APEF
+ Area of rect. PBCD

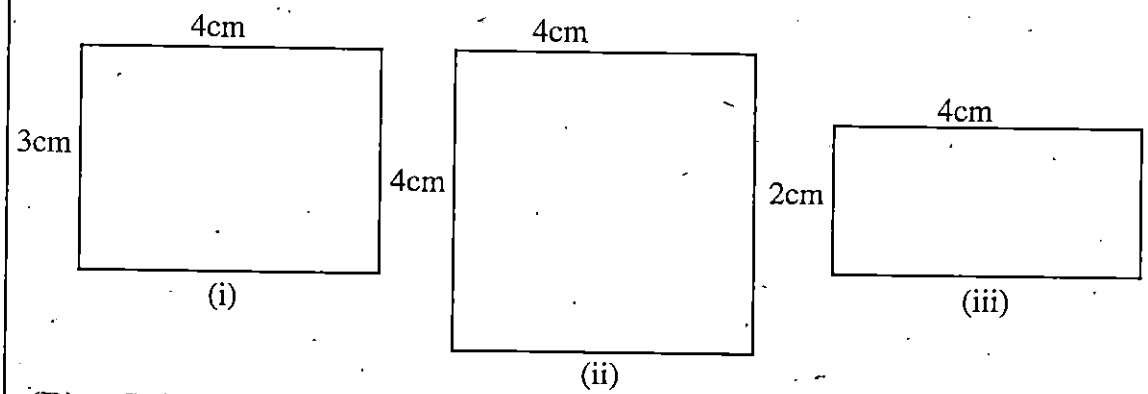
$= (3\times2) + (3\times2)\ cm^2$

$= 6+6\ cm^2$

$= 12\ cm^2$

Exercise 27.2

(A) Find the area of the following:



(B) Solve:

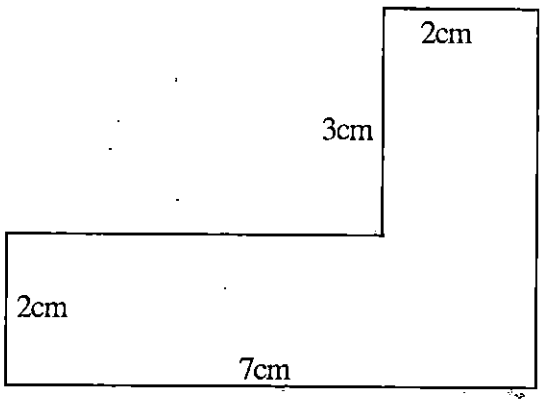
(i) Length and breadth of a rectangle are 15cm and 12cm respectively. Find its area.

(ii) Lenght and breadth of a rectangular piece of land are 8m and 6m respectively. Find its area.

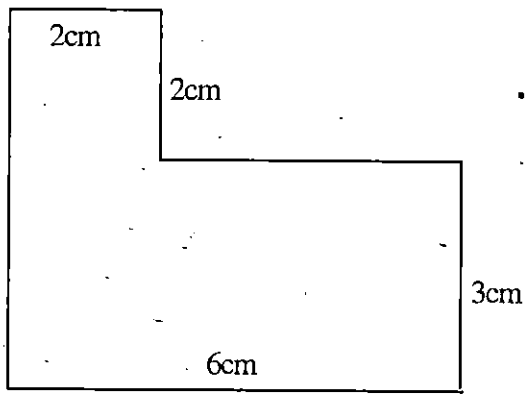
(iii) A rectangular field measures 15m by 10m. Find its area. Also find the cost of field at the rate of Rs. 5000 per m^2.

(iv) Length and breadth of a rectangular room are 20 feet and 12feet respectively. How many tiles of 1 sq feet will be required for its floor.

(C) Find area of the following figures:



(i)



(ii)

Ans. Exe 27.1

[1] **(i)** 3 square cm **(ii)** 16 square cm **(iii)** 10 square cm

Ans. Exe 27.2

(A) **(i)** 12 sq. cm **(ii)** 16 sq. cm **(iii)** 8 sq. cm

(B) **(i)** 180 sq. cm **(ii)** 48 sq. meter

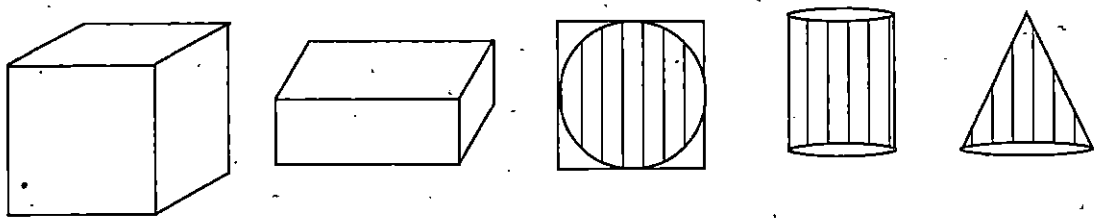
(iii) 150 sq. meter, Rs. 7,50,000 **(iv)** 240 Tiles

(C) **(i)** 20sq. cm **(ii)** 22 sq. cm.

Chapter 28

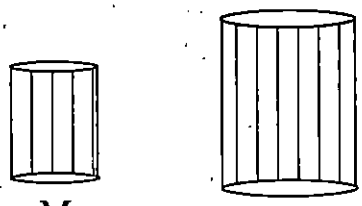
VOLUME

(A) See the following figures:

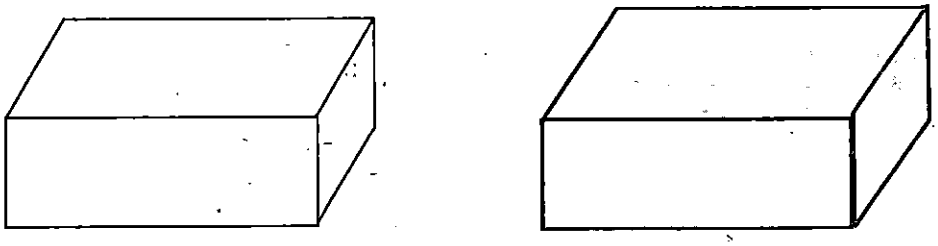


All of the above objects cover (occupy) some space. Can you tell which of the above objects occupies maximum space?

For the sake of convenience let us consider two objects of the same shape. Here are two cylinders M and N. It is clear that cylinder N will occupy more space than cylinder M.



M N



O P

Similarly in the above figures of two cuboids,

Cuboid O is hollow but P is solid. Will the two cuboid occupy the same space? Of course yes!

It means the space occupied by an objects does not depend upon its hollowness.

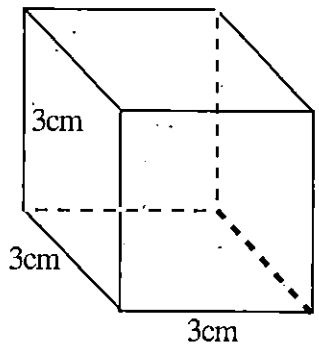
The space occupied by a solid object is called its volume

In case of area its only the space occupied by an object on the surface or plane and volume is the space occupied by an object along its length, breadth and height (depth).

In our daily life we use so many such articles which have length, breadth and height or thickness as a match box, a packet of biscuit, a brick etc. (compare it with a thin sheet of paper, surface of a table etc.)

Cube:- A solid object with same length, breadth and height is called a cube.

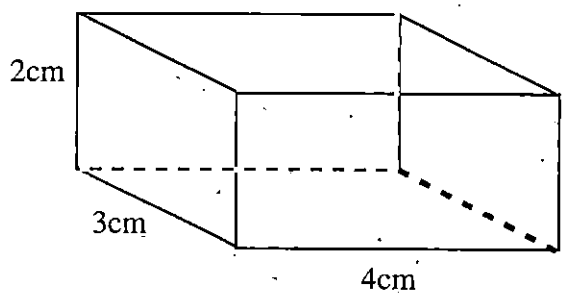
In the adjacent figure (i), it is a cube of side 3 cm. each.



(i)

Cuboid:- An object whose length breadth and height are not equal is called cuboid.

In the adjacent figure (ii), it is a cuboid having length, breadth and height as 4cm, 3 cm and 2 cm respectively.



(ii)

Exercise 28.1

1. Find the object of more volume among the following pairs:

(i) Lemon and water melon

(ii) Brick and match box

(iii) Hollow and solid ball of the same size.

UNIT OF VOLUME

As we express length in cm, m or feet, area in square cm, square m or square feet, similarly we require a unit to express volume.

If you try to fill a box with cubes, it will completely fill the box without leaving any space but if you try filling the box by cuboids, there are two possibilities:

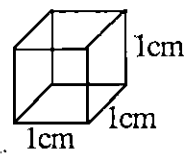
(I) may be the cuboids fully fill the box without leaving any space and

(II) may be some space is left unfilled.

If you try to fill a box by cylindrical or spherical or conical object you can never completely fill the box.

The standard unit of volume is taken as cube.

1 cube cm (1cubic cm or $1cm^3$) means a such cube, whose length, breadth and height is 1 cm. respectively.



Measurement of Volume :- Volume can be measured by two methods–

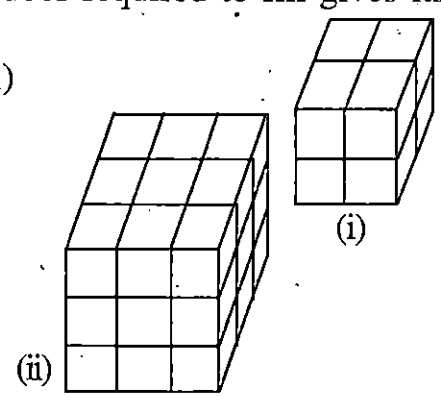
1. By counting cubes
2. By formula

1. Finding volume by counting cubes:

To find the volume of a cube or cuboide, filled it completely by cubes of 1cm. The total number of cubes required to fill gives its volume.

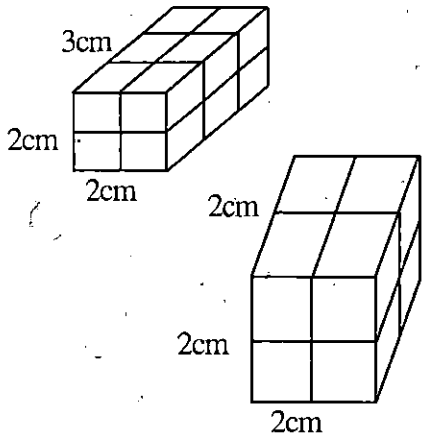
Count the number of cubes in figure (i)
These are 8.
Hence its volume = 8 cubic cm.

Similarly the number of cubes in figure (ii) is 27.
Hence its volume is 27 cubic cm.
($27\ cm^3 = 27$ centimeter cube)



It is neither always easy nor practical to find the volume by this method.

2. Finding Volume by formula



See the adjacent figure of a cuboid. Its length, breadth and height are 3cm, 2cm and 2cm respectively. Number of cubes along the length = 3

Number of cubes along breadth = 2 and number of cubes along height = 2

Their product $= 3 \times 2 \times 2 = 12$

So, its volume $= 12 \text{ cm}^3$

Similarly, in the adjacent cube of lentgh, breadth and height 2cm each.

The volume of cube $= 2 \times 2 \times 2$

$= 8$ cube cm

$= 8 \text{ cm}^3$

By observing above examples, we conclude that,

Volume of cuboid = Lenth × Breadth × Height
or $V = l \times b \times h$
and Volume of cube = $(\text{Side})^3$

(*Note:* Unit of l, b and h must be the same)

Example 1 : Zeeshan has prepared a cuboidal wooden box for Qur'an Majeed. If its length, breadth and height is 50 cm, 30 cm and 20 cm, then find the volume of box.

Solution : Length of box = 50 cm

Breadth of box = 30 cm

Height of box = 20 cm

So, the volume of box $= 50 \text{ cm} \times 30 \text{ cm} \times 20 \text{ cm}$

$= 30{,}000$ cubic cm or $30{,}000 \text{ cm}^3$

Example 2 : Length, breadth and height of a metallic box is 1m, 60 cm and 50 cm respectively. How many small boxes of volume 150 cm^3 can be kept in it.

Solution : Length of box = 1m = 100 cm

Breadth of box = 60 cm

Height of box = 50 cm

So the volume of metallic box = 100 cm × 60 cm × 50 cm.

= 3, 00, 000 cubic cm

= 3,00,000 cm^3.

Volume of 1 small box = 150 cm^3.

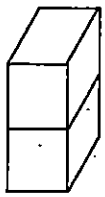
Hence, the number of small boxes = $\frac{\text{Volume of metallic box}}{\text{Volume of 1 small box}}$

= $\frac{3,00,000\ cm^3}{150\ cm^3}$

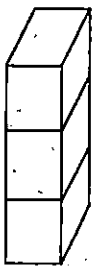
= 2,000

Exercise 28.2

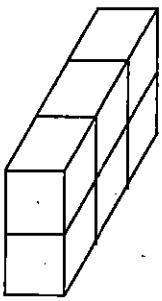
1. Find the volume of the following figures:



(i)

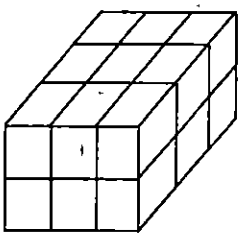


(ii)

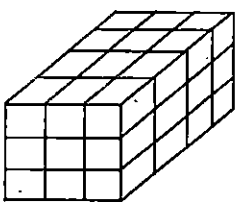


(iii)

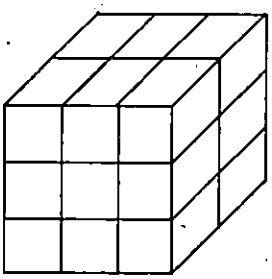
2. Which of the following figures have same volume:



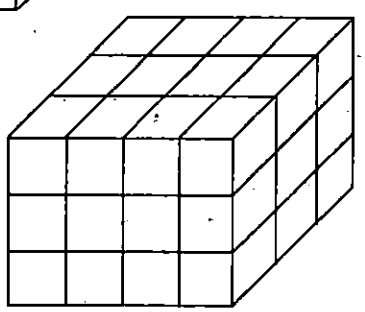
(i)



(ii)



(iii)



(iv)

3. Find the volume of a cube whose one side is 10 cm.

4. Find the volume of a cuboid measures 15cm by 5cm by 10cm.

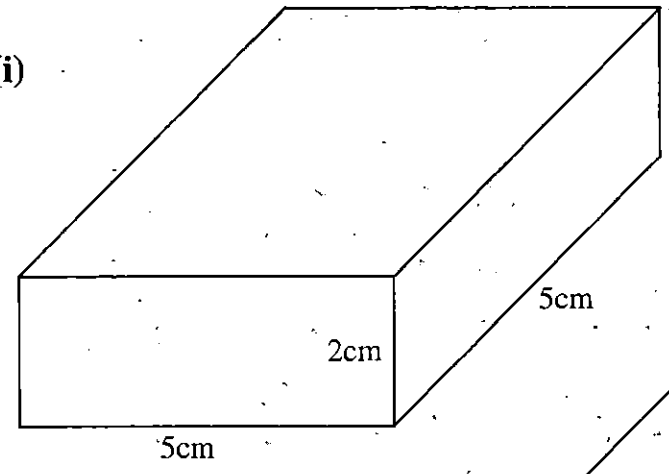
5. Length, breadth and height of a cuboid are 1m, 2m and 300 cm respectively. Find its volume.

6. Take a brick, measure its length, breadth and height in cm and then find its volume.

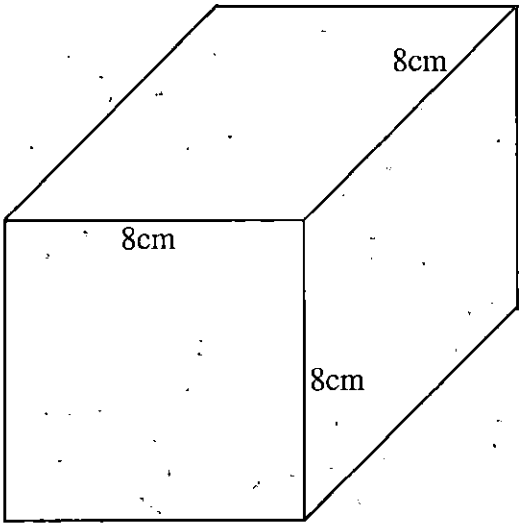
7. Length, breadth and height of a box are 40cm, 30cm and 30cm respectively. How many soap cakes each of volume 60 cm^3 can be kept in it?

8. Find volume of the following figures:

(i)



(ii)



Ans. Exe 28.1

1. (i) Water melon

(ii) Brick

(iii) Both have same volume

Ans. Exe 28.2

(1) (i) 2 cm^3 (ii) 3 cm^3 (iii) 6 cm^3

(2) (i) and (iii), (ii) and (iv)

(3) 1000 cm^3 **(4)** 750 cm^3 **(5)** 6 m^3

(7) 600 soap cakes **(8)** (i) 50 cm^3 (ii) 512 cm^3