(B 103)

Open Basic Education (Adult)

MATHEMATICS

Level - B (Equivalent to Class 5)

विद्याधनम् सर्वधनं प्रधानम्

National Institute of Open Schooling

A 24-25, Institutional Area, Sector-62, Noida-201309 (U.P.)

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A Word With You

Dear learner,

An initiative has been taken by the Government of India to provide life-long learning to neo-literates in the society after the success of Adult Education Programme. This program is designed for the age group of 15-35 years from the deprived section of the society, who have achieved or want to achieve basic education. It is specially designed for those people who have failed to get formal education and interested to take the opportunity of lifelong learning. It has been imagined to create a learning society by developing all aspects of personality like individual, social, commercial and intellectual. National Literacy Mission and National Institute of Open Schooling have taken first step in this direction and issued about 2.35 Crore of certificate in basic literacy assessment.

Efforts have been made to introduce an equivalency programme for those who are interested to continue secondary education through non-formal education. The neo literates will get opportunity to learn at equivalency centers through distance education.

Self Learning Materials have been prepared for three levels i.e. Level 'A', 'B' and 'C' (equivalent to Class 3, 5 and 8 respectively) for this programme by National Institute of Open Schooling. This learning material will create learning attitude in learner with information seeking aptitude. Learning environment is created here by joining hands with scientific technology.

You must have read the SLM of Mathematics at Level A. In the same way, the SLM for level 'B' (equivalent to Class 5) have been prepared. Every topic has been connected with practical life. This book teaches, studying and writing numbers from 1001 to 1,00,00,000, position of digits, comparisons of numbers, increasing and decreasing number, making small and big numbers basic operations, addition, subtraction, multiplication and division with its rules, solving its problems, fractions, decimals, measurement system, length, weight, current, temperature, time and money with volume and area. This book gives us knowledge about circles and its various aspects.

It has been taken into account that adult learners have more life experience in comparision with formal schooling students. They learn a lot of things from social reaction like making budget, calculating interest on loan, add, multiply, divide, subtract measurement etc. However, they are unable to present it practically.

Proper attention is given to the capabilities and abilities of learners. It has been taken care that they get help immediately when study the self learning material. The structure and language has been used in such a way that learner understand it after learning in open and distant learning system. Some questions have been provided after every lesson. Let us revise, Practice and Do it yourself have been given to assess self-knowledge by the learner. A sample question paper has been provided in the end. A self equivalent test has been given after every three chapter. Learner can assess his knowledge and remove his hesitation.

A special thank to every intellectual who has helped in making this book interesting and useful. I fully believe that learners will like this book and will learn a lot from it. I wish for their bright future ahead. Any suggestions for improvement in the book are welcome.

Curriculum Development Committee

Contents

1

NUMBERS

From this lesson, you will learn

- Reading and writing of numbers from 1001 (one Thousand one) to 1,00,00,000 (one crore) in digits and words.
- To understand the place value of digits in numerals.
- To write the numerals in expanded form.
- Comparing the numerals and writing them is ascending and descending order.
- Framing smallest and greatest four digit numbers with the help of given digits.

Till now, you have learnt reading and writing numbers upto 1000 (One Thousand) in digits and words. You know that there are 10 basic digits, 0 and 1 to 9 for counting and writing numbers/numerals. We read and write numbers with the help of these digits. You have learnt that we got 10 by adding 1 to 9 and similarly further reading and writing of numbers.

Example:

9+1=10 = One Ten or ten ones

99+1=100= One Hundred = Ten tens = One Hundred ones

999+1=1000= One Thousand or Ten Hundred or one hundred tens or one thousand ones

1000 is the least number of four digits. In the number 1000, first digit from right is Ones, second Tens, third Hundreds and fourth is called Thousands.

Thousands	Hundreds	Tens	Ones
1	0	0	0

We had also learnt smallest and greatest number of one, two and three digits, as shown below:

Number	Smallest Number	Greatest Number
One digit	1	9
Two digit	10	99
Three digit	100	999

1.1 Let us understand to write and to read numbers from 1000 to 9999

During our daily use, selling comoditis, buying seeds and despositing money in banks, we need to use numbers larger then 1000.

Hence, we need to understand numbers beyond 1000. By adding 1-1 in each number starting from 1000, we get numbers beyond 1000.

For example:

1000+1=1001	One Thousand One
1001+1=1002	One Thousand Two
1002+1=1003	One Thousand Three
1003+1=1004	One Thousand Four
1004+1=1005	One Thousand Five
1005+1=1006	One Thousand Six
1006+1=1007	One Thousand Seven
1008+1=1009	One Thousand Nine
1009+1=1010	One Thousand Ten

We can also write them like

1001	1002	1003	1004	1005	1006	1007	1008	1009	1010

Let us read and understand numbers from 1011 to 1100

1011	1012	1013	1014	1015	1016	1017	1018	1019	1020
1021	1022	1023	1024	1025	1026	1027	1028	1029	1030
1031	1032	1033	1034	1035	1036	1037	1038	1039	1040
1041	1042	1043	1044	1045	1046	1047	1048	1049	1050
1051	1052	1053	1054	1055	1056	1057	1058	1059	1060
1061	1062	1063	1064	1065	1066	1067	1068	1069	1070
1071	1072	1073	1074	1075	1076	1077	1078	1079	1080
1081	1082	1083	1084	1085	1086	1087	1088	1089	1090
1091	1092	1093	1094	1095	1096	1097	1098	1099	1100

Similarly further numbers can be written-

1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Further with the help of four digits, these numbers can be written up to 9999.

2000	3000	4000	5000	6000	7000	8000	9000	9999

There are four digits in 9999. This is the last number of four digits. Hence, this is the greatest number of four digits.

Remember:

1000 is the smallest number of four digits.
9999 is the greatest number of four digits.

Let us see what have you learnt 1.1

1. Write the below given numbers in words as shown in (i)

(i) 2918 Two Thousand Nine Hundred Eighteen.

(ii) 5274 _____

(iii) 7126 _____

(iv) 6042 _____

(v) 9009 _____

(vi) 6560 _____

(vii) 8784 _____

(viii) 2789 _____

(ix) 3569 _____

(x) 7079 _____

2. Write the numbers in digits:

(i) Five Thousand Three Hundred Forty Two ☐

(ii) Six Thousand Seven Hundred Thirty Five ☐

(iii) Four Thousand Twenty Six ☐

(iv) Nine Thousand Seven ☐

(v) Three Thousand Two Hundred Forty one ☐

(vi) Seven Thousand Fifty Nine ☐

(vii) Nine Thousand Five Hundred Sixty Nine ☐

(viii) Seven Thousand Three Hundred Seventy Nine ☐

3. Fill in the blanks:

(i) 1199+1 = ☐

(ii) 6709+1 = ☐

(iii) 8099+1 = ☐

(iv) 5999+1 = ☐

(v) 8999+1 = ☐

(vi) 6099+1 = ☐

(vii) 9998+1 = ☐

(viii) Smallest number of four digits ☐

(ix) Greatest number of four digits ☐

4. Fill in the blanks:

4501			4504			4507			4510
7591			7594			7597			7600
8991				8995				8999	

1.2 Let us understand numbers beyond 9999

Adding 1 to 9999, we get 10, 000. We call this Ten Thousand, because for Thousand we write three zeros with one. This is the smallest five digit number.

Ten Thousand	Thousands	Hundreds	Tens	Ones
1	0	0	0	0

As you have learnt earlier by adding 1-1 to number 10000 and beyond, we write numbers upto 100,00,000 (One Crore).

Attention

9,999+1 = 10,000 (Ten Thousand) Smallest Number of five digits

99999+1 = 100,000 (One Lakh) Smallest number of six digits

999,999+1 = 10,00,000 (Ten Lakh) Smallest Number of seven digits

99,99,999+1 = 1,00,00,000 (One Crore) Smallest Number of eight digits

Remeber:

Number of digits	Smallest Number	Greatest Number
Four digits	1,000	9,999
Five digits	10,000	99,999
Six digits	1,00,000	9,99,999
Seven digits	10,00,000	99,99,999

One crore is the smallest number of eight digits.

Let us read and write number in digits and words:

In digits	In words
9,00,548	Nine Lakh Five Hundred Forty Eight
89,00,058	Eighty Nine Lakh Fifty Eight
6,75,040	Six Lakh Seventy Five Thousand Forty

In words	In digits
Fifty Six Lakh Forty Seven Thousand	56,47,000
Eighty Thousand Seven Lakh Nine	87, 00, 009
Forty Six Thousand Four Hundred Eight	46,408

Attention

- While reading and writing numbers, we never read or write the place where is zero. Ones, Tens, Hundreds and thousands and Lakh & Ten Lakhs digits are to be read & written together.

  Example:

  In 96,00,039 (Ninety Six Lakh Thirty Nine). We have only written Ninety Six Lakh and Thirty Nine, where there are zero, we have not read & written those place.

- While writing a number in digits, we place zero on a place, which is not written in words.
Example : One Crore, Seventy Six Lakh Four Hundred Forty Two, we have not written in words Ten Thousand and Thousand place, hence we write '0' in their place.

Crore	Ten Lakh	Lakhs	Ten Thousand	Thousands	Hundreds	Tens	Ones
1	7	6	0	0	4	4	2

Let us see, what you have learnt 1.2

1. Write in words:

(i) 70, 400 _____

(ii) 98, 990 _____

(iii) 1,00,976 _____

(iv) 4, 40, 005_____

(v) 19,51,699 _____

(vi) 40, 50, 407 _____

2. Write in digits:

(i) Thirty Thousand Four Hundred Thirty _____

(ii) Eighty Thousand One Hundred _____

(iii) Seven Lakhs, Six Thousand Six Hundred Ninety _____

(iv) Five Lakh Seventy Thousand Seven Hundred Five _____

(v) Fifty Lakh Sixty Thousand Seven Hundred Five _____

(vi) Eighty Seven Lakh Nine Thousand Six Hundred Nine _____

(vii) Seven Lakh Nine Thousand Six Hundred Nine_____

3. Fill in the blanks:

(i) 9, 999+1 = _____

(ii) 99, 999+1 = _____

(iii) 9,99,999+1 = _____

(iv) 99, 99, 999+1 = _____

(v) Largest number of Seven digits _____

(vi) Smallest number of Eight digits _____

4. Write the numbers in order in the blanks space:

(i)	44,559		44,561		44,563
(ii)	9,99,999		10,00,001		10,00,003
(iii)	99,99,995		99,99,997		99,99,999

1.3 Let us understand the place of digits in numbers

In a given number, each digit has a separate place. **Example -** Ones, Tens, Hundreds, Thousands etc. The place value of a digit is known as per the place where the digit is placed in the number.

Example - In the number 5964, the digit 9 is at the hundreds place, hence the place value of 9 is 9 hundreds or 900.

Place value of 9 in 5964 is 9 hundreds or 900.

Remember

Place value of zero is zero at all the places.

Example:

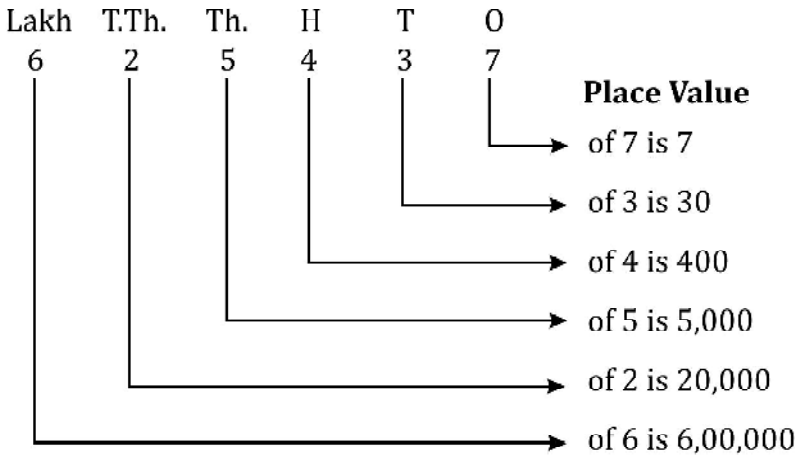
Th.	H	T	O
5	9	0	8

Place value of 8 = 8 ones = 8
Place value of 0 = 0 Tens = 0
Place value of 9 = 9 Hundreds = 900
Place value of 5 = 5 Thousands = 5000

We can also understand as explained in the example given below.

Place value of digits of number 18,342

Number 18,342	**T.Th**	**Th.**	**H**	**T**	**O**
Place Value of 1	1	0	0	0	0
Place Value of 8		8	0	0	0
Place Value of 3			3	0	0
Place Value of 4				4	0
Place Value of 2					2



1.4 Let us understand the expanded form of numbers

Adding the place values of digits of a number gives the number and writing the place value with a sign of addition among them is called the Expanded form of the number.

Example:

In the number 75,406
Place value of 7 = 70,000
Place value of 5 = 5,000
Place value of 4 = 400
Place value of 0 = 0
Place value of 6 = 6

75406	T.Th.	Th	H	T	O
Place value of 6					6
Place value of 0				0	0
Place value of 4			4	0	0
Place value of 5		5	0	0	0
Place value of 7	7	0	0	0	0
Number	7	5	4	0	6

75,406 = 70,000 + 5,000 + 400 + 0 + 6
↓ ↓
Number Expanded form

Look at and understand

Number 87,965	T.Th.	Th.	H	T	O
Place Value of 8	8	0	0	0	0
Place value of 7		7	0	0	0
Place value of 9			9	0	0
Place value of 6				6	0
Place value of 5					5

Expanded form of 87,965 = 80,000 + 7, 000+ 900+60+5

Let us see what you have learnt 1.3

1. Write the place value in the blanks:

(i) Place value of 9 in the number 8159632 = _____

(ii) Place value of 9 in the number 9265437 = _____

(iii) Place value of 4 in the number 865432 = _____

(iv) Place value of 0 in the number 8076954 = _____

(v) Place value of 7 in the number 659417 = _____

(vi) Place value of 8 in the number 6975874 = _____

2. Write in expanded form:

(i) 3,95,432 = _____+_____+_____+_____+_____+_____

(ii) 79,31,925 = _____

(iii) 4,69,587 = _____

(iv) 99, 99, 999 = _____

(v) 6,95,482 = _____

3. Write the numbers in the blank box:

(i) 50,000 + 700 + 30 = ☐

(ii) 8,00,000 + 9000 + 70 = ☐

(iii) 70, 00, 000 + 500,000 + 7000 + 5 = ☐

1.5 Let us learnt compare numbers

Hari Ram wanted to construct his house. He asked the rate of brick from the Muneem of brick owner. Munnem told him that is a trolly in which the number of bricks can be taken 2290 and in a truck it will be 3100 in one trip. Hari Ram will have to subtract these two numbers to know which vehicle can carry more bricks.

In the same way we have to compare, two or more than two numbers to know the more or less of two or more numbers.

Attention

We compare the numbers to know more or less for two or more numbers.

You know that 5 is larger number than 3, we write it as 5 > 3.

You had learnt that

- We use the sign '>' for a larger number.
- We use the sign '<' for a smaller number.
- We use the sign '=' to equal numbers.
- In the the signs '<' and '>' the arrow sign is towards the smaller number.

Example

5 > 3 can also be written 3 < 5. In both cases the sign of arrow is towords 3. Hence, 3 is smaller than 5.

While comparing 6 and 6, we write 6 = 6, as both numbers are same or equal.

Attention

While comparing numbers, the numbers, the number with more number of digits is greater.

Example :

For comparing 90 and 8, we write 90 > 8, as there are two digits in 90 and only digit in 8.

Similary:

While comparing 954 and 89 —

We write 954 > 89, as there are three digits in 954 and two digits in number 89.

When the number of digits are same in two numbers, for example in comparing 89 and 64 - we compare the number of tens

As we write	89 > 64	Tens	Ones
		(8)	9
or	64 < 89	(6)	4

There are more number of Tens in 89 as compared to 64 and the number of digits are same.

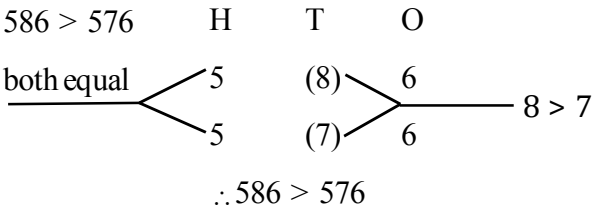
Attention

When two or more numbers have same number of digits.

1. At first, we compare their digits at the left place, and the number is larger whose left digit is larger.
2. When the digit at the left place is same, then the number is larger whose one's place digit is larger or the immediate right digit is larger.

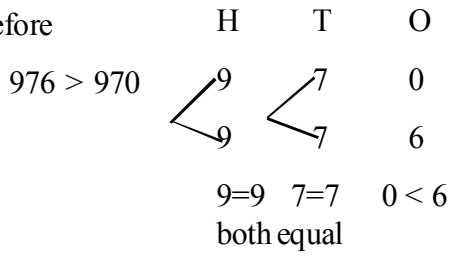
While comparing 586 and 576. There are 3 digits in both numbers and left digit is same hence we campare the digit immediate right to the left digit. Here, 8 is larger than 7.

Therefore



- Comparing numbers 970 and 976 both numbers have 3 digits. Left digit is same of both numbers and also immediate right digit of their left digit is also same. Then we campare the next right digit of the two numbers. In the given numbers 6 is larger than.

Therefore



Attention

In two or more numbers when the number of digits are same and the digits are also same, then the numbers are equal.

Example:

When we compare 9746 = 9746

Th	H	T	O
9	7	4	6
9	7	4	6

Similarly, we compare numbers with five, six or seven digits.

Attention

- The number has more number of digits is larger.
- When the number of digits are equal then we compare the left digit to know the smaller or larger number.
- When the left most digit's are same then we compare the immediate right digit to compare the two numbers.

Let us see what you have learnt 1.4

1. Put the appropriate sign between numbers (>, = or <):

(i) 81,59,632 _____ 9,8,6,54,321

(ii) 76,54,38,601 _____ 66,51,38,602

(iii)	9054179	_____	9645179
(iv)	8963056	_____	896305
(v)	75694	_____	75,69,940
(vi)	9765479	_____	97,65,479
(vii)	7,50,908	_____	7,05,908
(viii)	8,00,901	_____	80,901

1.6 Let us learn to write numbers in ascending order

While writing numbers in ascending order, we first write the smallest of all numbers, Then the number larger than this and so on, in the end we write the largest of all numbers.

Example:

While writing numbers 2543, 5496, 2913 and 1789 in ascending order, we shall compare these numbers.

- The smallest digit at Thousands place is 1 of the number 1789, hence this is the smallest number.
- The digits at Thousands place in the remaining three numbers are 2,5 and 2. Two numbers have same digit at Thousands place, now we compare their digit at hundreds place i.e 5 and 9, 9 is larger than 5, hence the number with digit 5 at hundreds place is smaller, hence the next smaller number than 1789 is 2543 and next is 2913. 5496 has the largest digit at Thousands place hence, it is the largest among all numbers. Hence the numbers in ascending order are:

1789, 2543, 2913 and 5496

We also write them as 1789 < 2543 < 2913 < 5496 or 5496 < 2913 < 2543 < 1789

Let us understand the working of the following numbers in ascending order - 54905, 53706, 9345, 840 and 98605

Smallest number		Next Greatest number		Next Greatest number		Next Greatest number		Greatest Number
840		9345		53,706		54,95		98,705
840	<	9345	<	53706	<	54905	<	98705

1.6.1 Let us learn to write number in descending order

While writing two or more numbers in descending order, we write the largest number first and the smaller than this and so on in the end we write the smallest number.

Example:

While writing the numbers 4963, 5695, 7864 and 5643, in descending order, we shall compare these numbers. we can write these as shown below

Th	H	T	O
4	9	6	3
5	6	9	5
7	8	6	4
5	6	4	3

- At the Thousands place the largest digit is 7 of the number 7864, hence this is the greatest number
- In the remaining three numbers, the digit at hundreds place are 4, 5 & 5. Two numbers have same digit at Thousands place. Hence the number with larger digit at hundreds place will be larger. The digits at hundreds place are also same. Now we see their digits at Tens place and the number with larger digit at Tens place will be greater and this is 5695 and next greater is 5643.
- 4963 is the smallest number.
- The numbers in descending order will be —

  7864, 5695, 5643, 4963, or 7864 > 5699 > 5643 > 4963

  Understand the descending order of numbers - 17,865; 485; 8927; 1,56; 154

Largest number	**Next Smaller number**	**Next Smaller number**	**Smallest Number**
1, 56, 154	17,865	8,927	485

or 156154 > 17865 > 8927 > 485

Attention

- In ascending order, we write the smallest number first, next greater and so on in the end write the largest number.
- In descending order, we write the greater number first, next smaller and so on in the end the smallest number.

Let us see, what you have learnt 1.5

1. Encircle the largest number :

(i) 456, 879, 897, 465, 598

(ii) 7865, 8765, 5678, 6789, 7685

(iii) 764, 6740, 8990, 10900

(iv) 96540, 95640, 94560, 97650

2. Encircle the smallest number :

(i) 8796, 6789, 9876, 9867

(ii) 5690, 6590, 5960, 5096

(iii) 1478, 1748, 4874, 4748

(iv) 89705, 87906, 89067, 87096

3. Write in the ascending number, the numbers given below :

(i) 4965, 4695, 4576, 4659

(ii) 78445, 48570, 48754, 75874

(iii) 54999, 99545, 95449, 54900

(iv) 64959, 49546, 67000, 76000

4. Write in the descending order, the numbers given below :

(i) 59647, 56497, 54976, 58692

(ii) 2946, 2679, 2694, 2469

(iii) 32465, 34265, 35426, 36245

(iv) 10005, 10050, 10500, 15000

1.7 Let us understand forming smallest and greatest number from the given digits

We know that numbers are formed with the help of '0' and digits from 1 to 9. You have understand numbers upto Eight digits. Forming smallest / greatest two digit numbers depends upon the places of the digits.

Example:

- With the help of digit '1' and '2', we can form number 12 and 21, where 21 is larger than 12.
  Let us learn to form smallest and greatest three digit numbers:
  As using digits 1, 3, 5, we can form the following numbers:

	H	T	O
Smallest	1	3	5
	1	5	3
	3	1	5
	3	5	1
	5	1	3
Largest	5	3	1

- Using digits 1, 3, 5, the possible numbers are 135, 153, 315, 315, 513 and 531. The greatest among these is 531 as 5 is the greatest digit next is three and is the smallest digit. Similarly 135 is the smallest number as one is the smallest digit, next large is 3 and the largest digit is 5. Hence the greatest number is 531 and smallest is 135 using the digits 1, 3 & 5.

Let us learn to form smallest and largest number of four digits, with the given digits.

Forming a number using digits 6, 7, 9, 4 and to form the smallest and greatest number four digits with the help of given digits:

Among the given digits 9 is the greatest digit, 7 is next smaller and 4 is the smallest digit.

The greatest number is 9764.

The smallest number is 4679.

Attention

- From the given digits, starting with the smallest digit and next large and in the end greatest digit will form the smallest number.
- From the given digits, starting with the greatest digit, next smallest and in the end smallest digit will form the greatest number.

Let us understand to form smallest and greatest numbers when those is/are one or more 0 digits.

Example :

Forming smallest and greatest number using digits 7, 0, 4, 9 & 5

For making the greatest number, we write the largest digit first, next smaller and in the end the smallest digit. Hence, using digits 7, 0, 4, 9 & 5 the greatest number will be

9 7 5 4 0

Largest digit Smallest digit

Attention

Forming the smallest number, from the given digits, we write the smallest digit first.

The smallest number using 7, 0, 4, 9 & 5 should be 04579. Writing '0' at the extreme left place makes the number with four digits. Hence to make the smallest number with five digits, other than '0' smallest digit will be written first and then '0' and other larger digits in increasing order. All the '0' are written before other digits.

Example :

The smallest number of five digits using digits 7, 0, 4, 9, 5 will be 40579

Let us see some more examples —

Using digits 1, 0, 0, 7, 4 the greatest number is 74100, the smallest number is 10047

Remeber:

Forming smallest and greatest numbers, all the zeros to be put together. In the greatest number at the end and for the smallest number the zero's are placed after the first smallest digit from the given digits.

Example:

Using digits 5, 0, 0, 4, 0, 0, 6

Greatest number = 6540000

Smallest number = 4000056

Remeber :

- Form the given digits, forming the greatest number we write the greatest digit first, Then the next smaller and so on in the end the smallest digit.
- From the given digits, forming the smallest number, we write the smallest digit first (Except 0) next '0' if these is, then next larger and in the end the largest digit to be written.

Let us see, what you have learnt 1.6

1. Form the greatest and smallest number with the help of given digits.

(i)	Digits	Greatest number = _____
	4, 5, 6, 9, 2	Smallest number = _____
(ii)	8, 7, 6, 4, 2, 5, 0	Greatest number = _____
		Smallest number = _____
(iii)	8, 0, 2, 9, 6, 5	Greatest number = _____
		Smallest number = _____
(iv)	4, 0, 0, 3, 2, 1	Greatest number = _____
		Smallest number = _____
(v)	5, 6, 4, 8, 0, 0	Greatest number = _____
		Smallest number = _____

Let us Revise

- The smallest number of four digits 1000 (One Thousand), greatest number is 9999 (Nine Thousand Nine Hundred Nine).
- The smallest number of five digits is 1,00,000 (One Lakh) and the greatest number is 99999 (Ninety Nine Thousand Nine Hundred Ninety Nine)
- The smallest number of six digits 1,00,000 (One Lakh) and the greatestnumber is 999999 (Nine Lakh Ninety Nine Thousand Nine Hundred Ninety Nine)
- The smallest number of seven digits is 1000,000 (Ten Lacs) and the greatest number is 9999999 (Ninety Nine Lacs Ninety Nine Thousand Nine Hundred Ninety Nine).
- The smallest number of eight digits is 100,00,000 (One Crore)
- By adding 1 to the largest number of any number of digits, giving the smallest number of one more number of digits e.g. adding 1 to 99 (Two digit largest) gives 100 if the smallest number of three digits while
- Reading and writing a number, we never speak zero, which ever place it is.
- The place value of a digit is the value of this digit at a particular place.
- The place value of zero is always zero irrespective of place.
- The palce value of a digit at ones place is it's own value.
- The place value of the digit of a number is obtained by placing zeros along with this digit upto the ones place.
- The sum total of the place values of all the digits of a number is the number itself.
- The number with more number of digits is larger.
- When the digits of two numbers are same than the greatest number is obtained by compairing digits from left to right.
- In ascending order first digit is smallest, then next greater and soon in the end the largest digit.
- In descending orders largest digit is first, then the next smaller, so on in the end smallest digit.
- From the given digits (except 0), starting from the smallest digit, next larger, in the end largest digit. This gives the smallest number.
- From the given digits, starting from the largest digit, next smaller and in the end smallest digit . This gives the largest number.

Excercise

1. Fill in the blanks:

(i) 1123, _____, 1125, _____, 1127, _____

(ii) 9977, _____, 9979, _____ 9981, _____

2. Write down the next four numbers in sequence from the given number:

(i) 1,816, _____, _____, _____, _____

(ii) 19215, _____, _____, _____, _____

3. Write the following in digits:

(i) Nine Thousand, Five Hundred Sixteen _____

(ii) Ten thousand, five hundred sixteen _____

4. Write the following in words:

(i) 9,654 _____

(ii) 87, 643 _____

5. Write the place of the digit in the given numbers:

(i) Place value of 6 in the number 16512 _____

(ii) Place value of 5 in the number 35, 40, 200 _____

(iii) Place value of 1 in the 1,00,27,300 is _____

6. Write the following in expanded form:

Number		Expanded form
(i) 7,654	=	_____
(ii) 98,765	=	_____
(iii) 6,24,567	=	_____

7. Put th sign '<' '>' and '=' in blank space:

(i) 5643 ☐ 4826

(ii) 5694 ☐ 5694

(iii) 99876 ☐ 98768

(iv) 10345 ☐ 110345

(v) 66677 ☐ 66675

8. Write the following in ascending order :

4, 564, 9,873, 5,645, 8,793 _____

9. Write the following in descending order :

9,845, 67,833, 64569, 8,765 _____

10. Using the given digits, write the smallest and largest number :

(a) 9, 8, 0, 7, 1, 3 _____

(b) 5, 6, 8, 9, 2, 4 _____

Answers

1.1

1. (ii) Five Thousand Two Hundred Seventy Four
   (iii) Seven Thousand One Hundred Twenty Six
   (iv) Six Thousand Forty Two
   (v) Nine Thousand Nine
   (vi) Six Thousand Five Hundred Sixty
   (vii) Eight Thousand Seven Hundred Eighty Four
   (viii) Two Thousand Seven Hundred Eighty Nine
   (ix) Three Thousand Five Hundred Sixty Nine
   (x) Seven Thousand Eighty Nine

2. (i) 5342 (ii) 6735 (iii) 4026 (iv) 9007
   (v) 3241 (vi) 4653 (vii) 7059 (viii) 9569 (ix) 7379

3. (i) 1200 (ii) 6710 (iii) 8100 (iv) 6000
   (v) 9000 (vi) 6100 (vii) 9999 (viii) 1000 (ix) 9999

4. (i)

4501	4502	4503	4504	4505	4506	4507	4508	4509	4510

(ii)

7591	7592	7593	7594	7595	7596	7597	7598	7599	7600

(iii)

8991	8992	8993	8994	8995	8996	8997	8998	8999	9000

1.2

1. (i) Seven Thousand Four Hundred
   (ii) Ninety Eight Thousand Nine Hundred Ninety
   (iii) One Lac Nine Hundred Seventy Six
   (iv) Four Lacs Forty Thousand Five
   (v) Nineteen Lacs Fifty one Thousand Six Hundred Ninety Nine
   (vi) Forty Lacs Fifty Thousand Four Hundred Seven

2. (i) 30, 430 (ii) 80, 100 (iii) 7,06,690
   (iv) 5,70,705 (v) 50,60,705 (vi) 87,09,609

3. (i) 10,000 (ii) 1,00,000 (iii) 10,00,000
   (iv) 1,00,00,000 (v) 99,99,999 (vi) 1,00,00,000

4. (i)

44559	44560	44561	44562	44563

(ii)

9,99,999	10,00,000	10,00,001	10,00,002	10,00,003

(iii)

99,99,995	99,99,996	99,99,997	99,99,998	99,99,999

1.3

1. (i) 9,000 (ii) 90,00,000 (iii) 400 (vi) 0 (v) 7 (vi) 800
2. (i) 3,00,000 + 90,000 + 5,000 + 400 + 30 + 2
   (ii) 70,00,000 + 9,00,000 + 30,000 + 1,000 + 900 + 20 + 5
   (iii) 4,00,000 + 60, 000 + 9,000 + 500 + 80 + 7
   (iv) 90,00,000 + 9,00,000 + 90,000 + 9,000 + 900 + 90 + 9
   (v) 6,00,000 + 90,000 + 5,000 + 400 + 80 + 2
3. (i) 50,730 (ii) 8,09,070 (iii) 75,07,005

1.4

(i) 81,59,632 < 9,86,54,321
(ii) 76,54,38,601 > 66,51,38,602
(iii) 90,54,179 < 96,45,179
(iv) 89,63,056 > 8,96,305
(v) 75,694 < 7,56,940
(vi) 97,65,479 = 97,65,479
(vii) 7,50,908 > 7,05,908
(viii) 8,00,901 > 80901

1.5

1. (i) 456, 879, 897, 465, 598
   (ii) 7865, 8765, 5678, 6789, 7685
   (iii) 764, 6740, 8990, 10900
   (iv) 96540, 95640, 94560, 97650

2. (i) 8796, 6789, 9876, 9867
   (ii) 5690, 6590, 5960, 5096
   (iii) 1478, 1748, 4847, 4748
   (iv) 89705, 87906, 89067, 87096

3. (i) 4576, 4659, 4695, 4965
   (ii) 48570, 48754, 75874, 78445
   (iii) 54900, 54999, 95449, 99545
   (iv) 49546, 64959, 67000, 76000

4. (i) 59647, 58692, 56497, 54976
   (ii) 2946, 2694, 2649, 2469
   (iii) 36245, 35426, 34265, 32465
   (iv) 15000, 10500, 10050, 10005

1.6 (i) Greatest Number = 96542
Smallest Number = 24569

(ii) Greatest Number = 8765421
Smallest Number = 1245678

(iii) Greatest Number = 98650
Smallest Number = 205689

(iv) Greatest Number = 432100
Smallest Number = 100234

(v) Greatest Number = 865400
Smallest Number = 400568

Answer (Excercise)

1. (i) 1123 1124 1125 1126 1127 1128
(ii) 9977 9978 9979 9980 9981 9982

2. (i) 1817, 1818, 1819, 1820
(ii) 19216, 19217, 19218, 19219

3. (i) 9516 (ii) 10,12,300

4. (i) 9654 = Nine Thousand Six Hundred Fifty Four
(ii) 87, 643 = Eighty Seven Thousand Six Hundred Forty Three

5. (i) 6,000 (ii) 5,00,000 (iii) 1,00,00,000

6. (i) 7,000 + 600 + 50 + 4
(ii) 90,000 + 8,000 + 700 + 60 + 5
(iii) 6, 00, 000 + 20, 000 + 4, 000 + 500 + 60 + 7

7. (i) 5643 > 4826 (ii) 5694 = 5694
(iii) 99,876 = 98768 (iv) 10345 < 110345
(v) 66677 > 66675

8. 4,564 < 5,645 < 8,793 < 9,873

9. 67,833 > 64,569 > 9,845 > 8,765

10. (i) Greatest = 9,87,310 Smallest = 1,03,789
(ii) Greatest = 9,86,542 Smallest = 2, 45, 689

2

ADDITION, SUBTRACTION MULTIPLICATION AND DIVISION

From this lesson, you will learn

- Addition and subtraction with numbers.
- Multiplication and division by numbers upto three digits.
- Estimate the product and quotient while multiplying and dividing numbers and verify the same through actual process.
- Solving daily life problems based on four fundamental operations.

You have learnt operation's of addition, subtraction, multiplication and division with/without carry over of numbers 1 to 100. In our daily life, we need to have operations with larger numbers. Ram Dhan sold his one crop for ₹25240/- and the other for ₹26500/- to know the total income, he will have to add these two numbers.

2.1 Let us learn to add two or more numbers

For addition, we write numbers according to their places i.e as ones, tens etc. We write ones below ones, tens below tens and similarly thousand, ten thousand, lakh etc.

After that we add ones, tens etc and write the sum below each place.

Ramu deposited ₹2420 in the bank in the month of May and ₹6342 in the month of July. To know the total amount Ramu desposited, the two numbers are to be added.

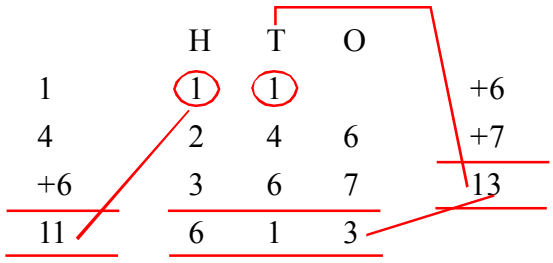
	Th.	H	T	O
Money deposited in the month of May	2	4	2	0
Money deposited in the month of July	+ 6	3	4	2
Total money deposited, by Ram, in Bank	₹ 8	7	6	2

Now you can tell that Ram deposited total ₹8762 in the Bank.

Let us learn addition with carryover

Adding 246 and 367, we add ones into ones 6+7 = 13 ones. We can not write 13 ones under ones place. We break it into one ten and three ones. 3 will be written under ones place one ten will be carried to the next place i.e tens place, whose already 4 tens + 6 tens are there.

After this add the 4 tens, 6 tens and one ten as carry one. This gives 4+6+1=11 tens we can not write 11 tens below Tens place, break it into 10 tens + 1 ten = 1 H + 1 ten. 1 hundred will be taken to hundreds place. Now we add 1 + 2 + 3 = 6 hundreds and sum is 613.



Understand with the help of example given below:

Lakh	TTh.	Th.	H	T	O
(1)	(1)	(1)	(1)	(1)	
4	2	4	5	6	7
+3	7	8	6	3	9
8	0	3	2	0	6

Attention

The carried over from ones to be added in tens, carried over from tens to be added in the hundred and so on use the carry forward process.

Example:-

In an Assembly Election 127689 male and 126957 female cast their votes. How many total votes were polled?

To know this we will have to add the votes cast by male and female voters.

	Lakh	TTh	Th.	H	T	O	
		(1)	(1)	(1)	(1)		carry over
Male votes	1	2	7	6	8	9	
Female votes	1	2	6	9	5	7	
	2	5	4	6	4	6	

Hence total votes polled are 254646

Take some more examples:

From the register of preparing Aadhar Cards it was revealed that 2356742 are male, 1628431 female and 3389427 children. How many total Aadhar cards will be prepared?

To know this all the three figures are to be added

	TL	L	TTh	Th.	H	T	O
	(1)	(1)	(2)	(1)	(1)	(1)	
No. of male	2	3	5	6	7	4	2
No. of female	1	6	2	8	4	3	1
No. of children	+3	3	8	9	4	2	7
Total Cards	7	3	7	4	6	0	0

Hence total 7374600 Aadhar cards will be prepared.

Attention

- While adding, write ones below ones, tens below tens and so on ten lakhs below ten lakhs etc.
- For addition first add ones, tens, hundreds, thousands etc.
- At any place if the total of two or more digits comes in two digits then the right digit is written below the same place and the left digit is taken as carryover to the next left place.

Let us see, what you have learnt 2.1

1. ₹32,879 were spent for digging a pond and ₹1975 were spent for constructing the road. How much money was spent?

   3 2 8 7 9
   + 1 9 7 5

2. A village panchayat planned to spend ₹8,27,432, ₹9,35,761 and ₹ 57,681 for road construction, residential premises and education respectively. How much is the total expenditure of the village panchayat?

   8 2 7 4 3 2
   9 3 5 7 6 1
   +5 7 6 8 1

3. Add the following:

   (i) 5688 + 4989

(ii) 18798 + 34967 + 63271

(iii) 43, 29,322, + 5,60,239

2.2 Let us learn subtraction

In subtraction also, we write digit's according to their places. After that ones are subtracted from ones, tens are subtracted from tens and so on and write difference below each place.

Monthly income of a normal family is ₹ 7563. Out of this ₹ 2402 are spent on food items. How much money is left with the family? To know this we have to subtract the money spent on food items from the income.

		Th.	H	T	O
Total Income	₹	7	5	6	3
Spent on food	₹	– 2	4	0	2
Money left	₹	5	1	6	1

Money left with family ₹ 5161

You sold your wheat and rice crops in the market. The business man (Seth) gave you ₹ 2,22,608 for this. Out of this ₹ 1,20,500 were given to zamindar. How much money is left with you? To know this you will have to subtract the money given to zamindar from the total money received from Seth.

		L	TTh	Th.	H	T	O
Money received from Seth	₹	2	2	2	6	0	8
Money given to zamindar	₹	– 1	2	0	5	0	0
Money left		1	0	2	1	0	8

Let us now learn subtraction with carryover

While subtracting if the digit above is smaller then the digit cannot be subtracted. For this there is a rule for borrowing from the bigger place i.e for ones, tens is a bigger place and for tens, hundreds is a bigger place. Digits on the left have 10 times value than the digits on the right. Hence we borrow from the digit on the immediate next to the left of a digit. See the example below-

In a village, there are 9834 children. Among them, 4456 are girls. How many boys are there? To know this we have to subtract two numbers.

Total children = 9384

No. of girls = 4456

No. of boys = 9834 - 4456

Subtracting 4456 from 9834

	Th.	H	T	O
			12	
		7	2	14
	9	~~8~~	~~3~~	~~4~~
–	4	4	5	6
	5	3	7	8

Hence, number of boys in the village are 5378.

We cannot subtract 6 ones from 4 ones. We borrow one ten from 3 tens or 10 ones, making 14 ones and leaving 2 tens subtract 6 ones from 1 4 ones we get 8 ones. We can also subtract 5 tens from 2 tens. We borrow one hundred or 10 tens from the 8 hundreds at the hundreds place making 12 tens at tens place and leaving 7 hundreds. We are left with 7 tens after subtracting 5 tens from 12 tens and three hundreds after subtracting 4 hundreds from 7 hundreds

2.2.1 Let us learn to subtract five digit numbers

Total population of a village is 89543, our of which 48974 are male. How many females are in the village? To know this we have to subtract the number of males from the total population.

Total Population = 89543

No. of males = 48974

No. of females = 89543 - 48974

	TTh	Th.	H	T	O
		8	14	13	13
Total population	8	~~9~~	~~5~~	~~4~~	~~3~~
No. of Males	-4	8	9	7	4
	4	0	5	6	9

Hence no. of females in the village are 40569.

2.2.2 Let us learn to subtract seven digit number

₹ 93, 46, 217 were given to a village, for construction of a hospital, out of this ₹2243278 were received from people's co-operation and the rest was given by State Govt. How much money did State provide?

To know this, money deposited by peoples co-operation will be subtracted from the total money.

	TL.	L	TTh	Th.	H	T	O
Total money (₹)				(5)	(11)	(10)	(17)
	9	3	4	~~6~~	~~2~~	~~X~~	~~7~~
Money from peoples cooperation	2	2	4	3	2	7	8
Money provided by State Govt.	7	1	0	2	9	3	9

Hence, State govt. provided ₹71,02,939.

Attention

- Always smaller number is subtracted from the larger number.
- In subtraction, process starts from right and goes to left.
- Borrowing is from the digits placed on the left of the digit for which borrowing is done.

Let us see, what you have learnt 2.2

1. Subtract:

   (i) 4 5 9 6 3
   -2 4 5 4 2

   (ii) 3 6 9 4 8
   -2 5 8 5 6

2. Fill in the blanks:

   (i) 5, 49, 632 - 43,286 = _____

   (ii) 17, 92, 650 -15,86,439 = _____

3. Total 30726 animals were brought in a mela of which 12880 were sold. How many animals are left?

   30726
   -12880

4. Govt. gave ₹3,45,680 to a village panchayat out of which ₹ 85,432 were spent on the construction of a road. How much money is left with the panchayat?

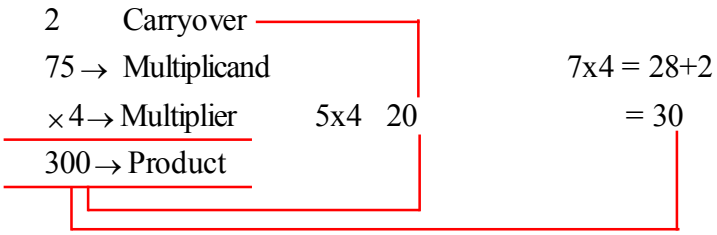
   3 4 5 6 8 0
   - 8 5 4 3 2

2.3 Let us learn the importance of multiplication

While maintaining our income-expenditure, we need to add same number of times. With the help of multiplication we can add easily. One bus can carry 75 people. How many people will be taken by four buses of the same capacity? For this, we need to add 75 four times 75 + 75 + 75 + 75 = 300.

Four buses will carry 300 people. We can do this easily by multiplication.

Example:-



Multiplicand x Multiplier = Product

75 x 4 = 300

Attention

- Repeated addition of a number in itself is called is multiplication. Example 15x4 means 15+15+15+15.
- 'x' is the sign of multiplication.
- Multiplicand × Multiplier = Product

2.3.1 Let us learn to multiply a two digit number by two digit number

Till now you have learnt to multiply a one digit, two digit and three digit number by a single digit.

Let us now learn the multiplication by a two digit number.

A labourer saves ₹85 in a day. How much money will he save in 25 days?

One day saving = ₹85

25 days saving = ₹85x25

```
  85
x 25
 425  ← 85 x 5
+1700 ← 85 x 20
2125
```

First we multiply 85 by 5, 85x5=425. Now we multiply 85 by 2 tens. 85x2 tens = 170 tens or 1700. Now add the two numbers

425 + 1700 = 2125

Look at and understand

There are 40 rectangular fields in a garden, where rose plants have been grown. If there are 90 plants in a field, how many rose plants are there in the garden?

No. of rose fields = 40

No. of plants in a field = 90

Total rose plants = 40x90

= 3600

```
  4 0
x 9 0
  0 0  ← 40 x 0
+3 6 0 0 ← 40 x 9 tens
3 6 0 0 = 360 tens
        =3600 ones
```

Let us learn to multiply three digit numbers by two digit numbers:

Example:

Multiply 182 by 47

Solution:

```
   H T O
   1 8 2
   x 4 7
   ------
   1 2 7 4   ← 182 x 7 = 1274
   7 2 8 0   ← 182 x 4 tens = 728 tens = 7280 ones
   ------
   8 5 5 4
   ------
```

Let us see some more examples

How much is the product of 705 and 55?

Solution:

```
       H   T   O
       7   0   5
       x   5   5
   -------------
       3   5   2   5     ← (705x5)
   3   5   2   5   0   ← (705x5 tens = 3525 Tens = 35250 ones)
   -------------
   3   8   7   7   5   ← ( 3525 + 35250)
   -------------
```

Let us see, what you have learnt 2.3

Find the product:-

(i)
```
   H T O
   4 7 2
   x 4 3
   -----
   -----
```

(ii)
```
   H T O
   5 8 3
   x 7 2
   -----
   -----
```

(iii)
```
   H T O
   8 0 4
   x 8 5
   -----
   -----
```

(ii)
```
   H T O
   1 7 8
   x 5 7
   -----
   -----
```

2.4 Let us learn to multiply a 3 digit number by a three digit number

Example : Multiply 605 by 206

H	T	O	
	6	0	5	
x	2	0	6	
3	6	3	0	→ 605 x 6 Ones
0	0	0	0	→ 605 x 0 Tens
1	2	1	0	0 → 605 x 2 Hundreds
1	2	4	6	3 0 ← Sum of all three products

Remember : For finding the product of three digit number by another three digit number, we add the products of ones, tens and hundreds with the given number.

Example :

Multiply 866 by 420

Solution :

H	T	O	
	8	6	6	
x	4	2	0	
	0	0	0	→ (Multiplication by 0)
1	7	3	2	0 → (Multiplication by 2 Tens)
+ 3	4	6	4	0 0 → (Multiplication by 4 Hundreds)
3	6	3	7	2 0 → Total of all the products

Look at and understand:

1. The cost of a wooden toy is ₹425, how much cost will be of 45 such toys?

The cost of one Toy = ₹425

The cost of 45 Toys = ₹425 x 45

	4	2	5
x		4	5
	2	1	2	5
+ 1	7	0	0	0
1	9	1	2	5

Hence the cost of 45 toys = ₹19125

2. If a labourer earns ₹ 312 in a day then how much money 216 labourers will earn in a day?

Per day earning of one labourer = ₹312

Per day earning of 216 labourers = ₹312 x 216

```
   3 1 2
 x 2 1 6
 -------
 1 8 7 2   Multiplying 312 by 6
 3 1 2 0   Multiplying 312 by one ten
+6 2 4 0 0 Multiplying 312 by Two Hundreds
 -------
 6 7 3 9 2 Total money
```

∴ The earnings of 216 labourers for a day is ₹67392.

Let us see what you have learnt 2.4

1. (i) 3 2 6 x 4 0 (ii) 3 7 2 x 3 1 0 (iii) 3 2 6 x 3 0 2

2. There are 345 girls in a school. Govt. has decided to give ₹175/girl child for their development. How much money school will recceive from Govt?

3. In a city these are 192 wards. There are 18 public places in each ward. How many public places are there in the city?

2.5 Let us learn to multiply numbers with more than three digits by three digit numbers

1. Multiply 52, 469 by 324.

```
   TTh. Th.  H  T  O
     5   2   4  6  9
         x   3  2  4
 ---------------------
     2  0   9  8  7  6
   1  0  4   9  3  8  0
+  1  5  7 4   0  7  0  0
 ---------------------
   1  6  9  9   9  5  6
```

Product of 52469 and 324 is 16999956.

2. Multiply 26, 839 by 634

	TTh.	Th.	H	T	O
	2	6	8	3	9
		x	6	3	4
	10	7	3	5	6
	80	5	1	7	0
+1	610	3	4	0	0
1	701	5	9	2	6

Product of 26839 and 634 is 17015926.

Let us see, what you have learnt 2.5

Find the product:

(i) 47639 x 204

(ii) 10042 x 137

(i) 73824 x 378

(ii) 12363 x 120

2.6 Let us understand some properties of multiplication

(A) Let us see the multiplication of numbers by changing their order:

- $3\times7=21$ $(7+7+7)$

  $7\times3=21$ $(3+3+3+3+3+3+3)$

  $\therefore$ $3\times7=7\times3=21$

Similarly

- $15\times13=195$

  $13\times15=195$

  $\therefore$ $15\times13=13\times15=195$

15	13
×13	×15
45	65
150	130
195	195

Multiplying 13 by 15 or 15 by 13, gives the same result.

Hence we can say that changing the order of two numbers while multiplying will not change the product.

(B) Let us see the multiplication by 1.

(i) $8\times1=8$ (ii) $14\times1=14$ (iii) $1\times9000=9000$

We can say that multiplying a number by 1 does not change the value of the number.

(C) Let us see the multiplication of a number by '0'

(i) $8 \times 0 = 0$ (ii) $12 \times 0 = 0$

(iii) $643 \times 0 = 0$ (iv) $1000 \times 0 = 0$

Hence the product of any number and '0' is always '0'.

(D) Let us observe the product of 100, 200, 300, ... 900, 1000, 2000, 3000 ..... 9000 with any number:

- $23 \times 10 = 230$
- $23 \times 100 = 2300$
- $23 \times 1000 = 2300$

For multiplying a number by 10, 100, 1000 etc.

We put the as the number of zeros along with the number as the no. of zeros with the multiplier.

Multiplying a number by 1000, 2000, 3000, ... 9000, we multiply the number by 1, 2, 3 .... 9 and put on the right side of the number as many number of zeros as with the multiplier.

Let us see what have you learnt 2.6

1. Solve:

(i) $5 \times 9 =$ (vi) $125 \times 300 =$

(ii) $9 \times 5 =$ (vii) $35 \times 900 =$

(iii) $17 \times 10 =$ (viii) $5 \times 0 =$

(iv) $21 \times 100 =$ (ix) $40 \times 0 =$

(v) $40 \times 1000 =$ (x) $27 \times 1000 =$

2.7 Let us learn Division

In the previous level, we have learnt division of two and three digit numbers by one digit number. Now we shall learn division by two digit numbers of numbers upto seven or eights.

There are 675 plants in a school. Each child was assigned the duty to water four plants. We need to find how many plants are being watered and how plants were left unwaterd? How many students were assigned this duty?

We would find out the answer for the following

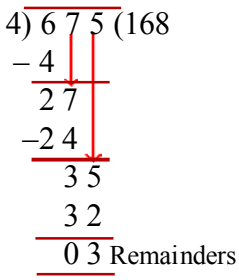
- How many plants were unwatered?
- How many plants were left watered?
- How many students were assigned this duty?

Solution:

Total Plants = 675

One child waters = 04 plants

How many students were assigned this duty, to know this we need to divide 675 by 04.



- Division process is to start from left.
- 6 is divided by 4 and remainder i.e 2 hundreds, now 7 tens are combined with 2 hundreds say 27 tens. Now 4×6=24, 3 tens left 30 units + 5 units = 35 units and 4×8=32
- 03 units remainder i.e 3 plants unwatered.

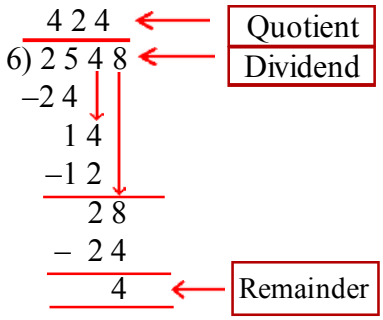
No. of plants did not get water = 3

No. of plants watered = 675-3 = 672

No. of children assigned duty = 168

Let us now see some more examples

Divide 2548 by 6 and write the dividend, divisor, quotient and remainder .



Divisor = 6

Dividend = 2548

Let us see what have you learnt 2.7

Divide:

(i) 714÷3 = (ii) 456÷2 =

(iii) 848÷8 = (iv) 1525÷5 =

2.8 Let us learn to divide four digit numbers by two digit numbers

Divide 8747 by 12. Check your answer Divisor is a two digit number, we shall take left two digits of the dividend.

87 divided by 12 Quotient is 7, this will be written above the hundreds place. Remainder 3, hundreds will be taken with 4 tens making 34 tens. Divide by 12, Quetient will be written above tens place

remainder 10 tens, will be taken with 7 ones making together 107 ones. Divide by 12, Quotient 8 is written above ones place and remainder is 11

2.8.1 Let us learn to check the result

In the given question

Divisor is 12, Quotient is 728, Dividend is 8747 remainder is 11.

We know the result (Quotient x Divisor) + Remainder $(728 \times 12) + 11 = 8736 + 11$

$= 8747$

$=$ Dividend

Dividend = Quotient × Divisor + Remainder

Let us see what you have learnt 2.8

Divide and check the result:

(i) 21278 ÷ 16

(ii) 17852÷22

(iii) 31436÷46

(iv) 90008÷32

(v) 79846÷85

2.9 Let us understand properties of division

- Dividing '0' by any number (Except 0)

  $0 \div 8 = 0$, $0 \div 42 = 0$, $0 \div 1000 = 0$

Remember:-

- If '0' is divided by any number except '0' quotient will be '0'.
- No number can be divided by '0'.
- Division by 1

  $5 \div 1 = 5$, $19 \div 1 = 19$, $445 \div 1 = 445$

Remember:-

If a number is divided by 1 then the quotient will be the same number.

- Dividing a number by the same number

  $5 \div 5 = 1$, $87 \div 87 = 1$, $1425 \div 1425 = 1$

Remember:-

If a number is divided by itself, the quotient is alway 1.

110÷10 = 11, Remainder 0 130÷100, quotient 1, remainder 30

3974÷1000, Quotient 3, reaminder 974

Attention

If a number is divided by 10, leaving the ones digit, rest is quotient and the ones place digit is remainder

Let us see what have you learnt 2.9

1. Write the quotient and remainder

(i) 2560÷10

(ii) 93468÷1000

(iii) 3942÷100

(iv) 587314÷10000

2. Solve

(i) 3942÷1 =

(ii) 325÷325 =

(iii) 0÷55 =

(iv) 37÷1 =

(v) 15÷0 =

Look at and understand

1. State Govt. sanctioned ₹98520, under rural self employment scheme for the construction of 10 shops. How much was sanctioned for one shop?

Total amount = ₹98520

No. of shops = 10

Amount sanctioned for one shop = 98520 ÷ 10 = ₹9852.00

Hence the amount sanctioned for each shop = ₹9852.00

```
      9 8 5 2
   ---------
10) 9 8 5 2 0
   –9 0
   ---
     8 5
    –8 0
    ----
       5 2
      –5 0
      ----
         2 0
        –2 0
        ----
           0
```

2. Mohan used 26 sacks of cement in the construction of shop. Total amount he paid ₹257504. Find the cost of one sack of cement?

The cost of 26 sacks of cement = ₹257504

The cost of one sack will be less, hence to divide the total amount by 26

```
        9 9 0 4
     -----------
26) 2 5 7 5 0 4
   –2 3 4
   -------
     2 3 5
    –2 3 4
    -------
         1 0 4
        –1 0 4
        -------
           0
```

Two digits on the left make 25, which is less than the divisor, so we take 3 digits i.e., 257 and check by dividing by 2. We get 9 hence at Thousands place.

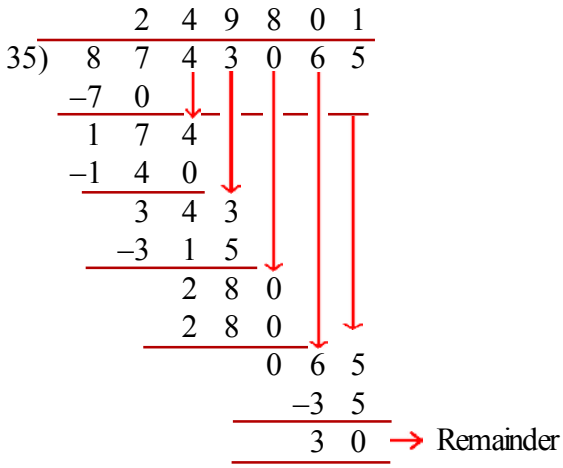
The cost of one sack of cement = 257504 ÷ 26

∴ Cost of one sack of cement = ₹ 9904

2.10 Let us learn to divide seven digit numbers by two digit number

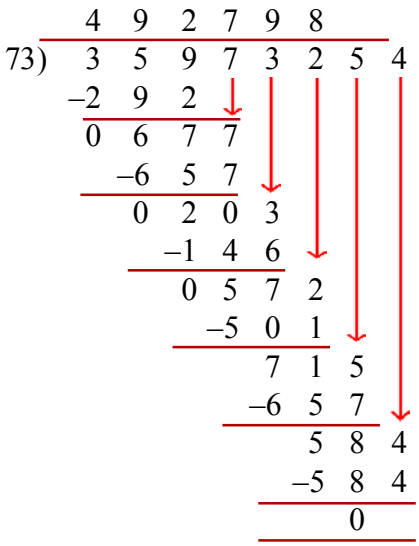
Example: 8743065÷35

To find the first quotient, divide the first, left digit of dividend by 3 to get 2.



2.9.1 Let us learn to divide an eight digit number by a two digit number

35973254÷73



To find the first quotient divide the first two digits of the dividend by 7 to get 5, but this gives the product 365 which is more than 359, hence 4 is the quotient and so on.

Let us see, what have you learnt 2.10

1. The cost of 26 pens is ₹650.
   What will be the cost of one pen?

2. A shopkeeper goes to purchase scooters.
   He purchases 47 scooters in ₹ 2, 82, 000.
   What will be the cost of one scooter?

3. Malikrka roped ₹87540 plants in the field.
   He made 10 rows for all these plants.
   How many plants are these in one row?

4. Divide 957325 by 25

5. Divide 83519757 by 45 and write down the quotient and remainder

2.11 Let us learn to estimate of numbers in 10, 100 & 1000

While purchasing shoes for price 399.95, we estimate to give 400, the next village is 5km from our village. Estimation is a part of our daily life, how much time it will take to go to bazar, to finish a work. All this is based on our estimates. It is also important to estimate numbers.

For any number we estimate whether it is near to 10, 100 or 1000 etc.

Estimate in 10

To estimate in 10, we look at the ones place and if the digit at ones place is less than 5, we ignore the ones place and put 0, there.

Example: 944324, estimate in 10, will give us 944320, as ones place digit is <5. Hence, we put 0 in it's place.

- If at the ones palce is 5 or larger than 5 digit, we put '0' at ones place and add 1 to the tens place.

Example: 26, 57, 987, to estimate in 10 we get 26, 57,990. At ones place there is 7 which is >5, hence we put '0' at ones place and increase the tens digit 8 by 1 to makie it 9

Look at and understand

The estimate of 26757 in 10 = 26760

The estimate of 486792 in 10 = 486790

The estimate of 892114 in 10 = 892110

Estimate in 100

- To estimate of a number in 100, we look at the tens place and if this digit is less than 5 then we write '0' at ones & tens place.

Example : Estimate the number 202724 in 100 = 202700. Here at tens place is 2 which is less than 5 hence we put '0' at ones and tens place

If in the number at tens place the digit is 5 or larger than 5, we put '0' at ones & tens place and add 1 to the hundreds place digit.

Example : Estimate of 4, 56496 in 100 = 4, 56, 500

Here the digit at tens place is 9 which is bigger then 5, hence, put '0' at ones & tens place and add 1 to 4 at the hundreds place to make it 5

Look at and understand

Estimate in 100 of 69, 540, 729 = 69540700

Estimate in 100 of 5897774 = 5897800

Estimate in 100 of 3284934 = 3284900

Estimate in 1000

- To estimate in 1000, we look at the digit at hundred place. If this digit is less then 5 then put '0' at ones, tens & hundreds place

Example : Estimate of 5,784, 300 in 1000 = 5784000

Here, at hundreds place is 3 which is less then 5 hence '0' at ones, tens & hundreds place

- If at hundreds place the digit is 5 or bigger then 5 then we put '0' at ones, Tens & hundred place and add 1 to the digit at thousands place.

Example : Estimate of 456789 in 1000 = 457000. Here, the digit at hundreds place is 7, units is greater than 5, hence put '0' at ones, tens & hundreds place and add 1 to 6 the digit at thousand place to make it 7.

Look at and undrestand

Estimate of 9,58,989 in 1000 = 9,59,000

Estimate of 6,55,546 in 1000 = 6,56,000

Estimate of 13,22,222 in 1000 = 13,22,000

In our daily routine, we have to make fast estimate in different situations, As, how many thing I have to purchase are from the market? How much money I have? Estimate cost of the thing I wish to purchage, according we arrange money while going to market.

Example : The cost of two things is ₹ 730 and ₹998. What is the estimate value of two things in 100?

Estimate of ₹ 730 in 100 = ₹700

Estimate of ₹998 in 100 = ₹1000

Estimate cost in 100 = ₹1700

- Estimate in 1000 of the two numbers, 12,904 and 2888.

  Estimate of 12904 in 1000 = 13000

  Estimate of 2888 in 1000 = 3000

  Estimated total = ₹16000

- Estimate in 100, The subtraction of 314 from 796

  Estimate of 796 in 100 = 800

  Estimate of 314 in 100 = 300

  Estimated subtraction = ₹500

- Estimate the subtraction of 21,496 from 28,792 in 1000

  Estimate of 28,792 in 1000 = 29000

  Estimate of 21,496 in 1000 = 21000

  Estimate of subtraction = ₹8000

- Estimate the addition of 439, 334 and 4317 in 10 and 100

Estimate in 100	**Estimate in 10**
Estimate of 439 in 100 = 400	Estimate of 439 into = 440
Estimate of 334 in 100 = 300	Estimate of 334 in 10 = 330
Estimate of 4317 in 100 = 4300	Estimate of 4317 in 10 = 4320
Estimated addition = 5000	Estimated addition = 5090

Estimate the subtraction of 45599 and 108,734 in 10 and 100.

Estimate of 108734 in 10 = 108,730

Estimate of 45599 in 10 = 45600

Estimated difference 63130

Estimate of 108,734 in 100 = 108700

Estimate of 45599 in 100 –45600

Estimated difference = ₹63100

Actual difference = 108734

– 45599

63135

Attention

Estimate in 10 is more near to the actual difference than the estimate of 100 of two numbers.

Look at understand

The population of two villages is 880 and 830 Estimate the total population in 100. Population of first village = 880 Population of 2nd village = 830

Estimate in 100 = 900 Estimate in 100 = 800

Estimate population in 100 = 900	Actual population = 880
+ 800	= 830
1700	1710

Attention

Estimate is near to the actual result and not exactly same result.

- There were 9683 trees in a garden. Due to the air storm 2412 fell down. Estimate the remaing trees of the garden in 100.

Total Trees = 9683

Fell down due to strom = 2412

Estimated total in 100 = 9700

Estimate of 2412 in 100 = 2400

Estimated total trees = 9700

Estimated trees left = 9700

2400

7300

- In a village there are 8775 male and 9920 female estimate the population in 1000

Solution:

No. of males in the village = 8775

Estimate in 1000 = 9000

Total estimate in 1000 = 9000

+ 9000

18000

No. of the females = 9420

Estimate in 1000 = 900

Let us see what you have learnt 2.11

1. Estimate in 10, 100 and 1000 of the following numbers

Estimate in 10	Estimate in 100	Estimate in 1000
2557 =	665397 =	765079 =
49273 =	553447 =	9656395 =
75392 =	637987 =	8356797 =
13254 =	34966 =	375559 =
32736 =	99987 =	275349 =

2. In a village, there are 2442 males, 2612 females and 3772 children. Estimate the population of the village in 100.

3. A village panchayat had ₹768454. ₹432596 were spent in the coustraction of road. Estimate the money left with panchyat in 1000.

Let us Revise

- In addition and subtraction, we put digits ones, tens, hundreds and thousands of each number under the respective places i.e ones, tens, hundreds etc.
- In addition of two or more than two digit numbers if we get a two digit number as the addition of ones than the left digit is taken as carry over to the tens place and right digit will be written as ones.
- Always subtract, borrowing is from the immediate left digit and if there is '0' then from the next.
- The product of two numbers do not change when we change the order mutliplicand & multiplier.
- Multiplying any number by 1 will give the same number.
- Multiplying a number by '0' will give the result as '0'
- Multiplying an number by 1000, 2000, 3000 .... 9000 etc we multiply the number by 1,2,3... 9 and put four o's (000) on the right side of the product so received.
- Dividing '0' by any number except '0' quotient is '0'.
- Dividing any number by I will give the result as the number.
- Dividing any number by it self gives the answer as 1.
- Dividing any number by 10, the ones place of that number is remainder and the number left will the remaining digit is quotient. Similarly dividing by 100, the number with ones tens place digits is remainder and the number with remainder and the number with remaining digits is quotient.
- No number is divided by 0
- Estimate in 10 0 to 4 0
  5 to 9 10
- Estimate in 100 11 to 49 0
  50 to 99 100
- Estimate in10000 1001 to 4999 0
  5000 to 9999 10000

Excercise

1. Add:

(i) 4 3 5 1 7 6
6 9 1 0 0 2 8
+ 2 1 7 4 2 0 6

(ii) 5 7 9 8 2 4 3
4 5 6 7 8 9
+ 6 0 7 8 5 4

(iii) 4 9 3 4 7 2 1
4 1 4 6 8 7 5
+ 2 0 0 0 0 4 5

2. Subtract:

(i) 8 0 1 0 1 0 1
– 6 9 1 0 0 2 8

(ii) 9 2 8 8 6 4 6
– 4 5 6 7 8 9

(iii) 5 8 4 6 3 2 1
– 2 7 4 6 8 7 5

3. Add:

4100 308 + 4003 + 500054 + 20003

4. Rajesh had ₹15 Lacs. He spent ₹846000 in purchasing of land and ₹259625 in the construction of hour. How much money is left with Rajesh.

5. 1537576 people line in a city. Out of this 844396 are male. How many females are in the city?

6. 278472 no of children appeared in an examination. 28659 got pass. How many got failed?

7. 460 bricks used in the construction of school building and 27945 bricks used for the panchayat bhawan. Estimate in 1000 the total bricks used?

8. Radhe had ₹2, 24370 in his account. He withdrew ₹ 87940. Estimate balance amount in 1000.

9. Solve:

(i) 444×1000 = _____ (ii) 233×462 = _____

(iii) 2934×417 = _____ (iv) 322×11 = _____

(v) 945×15 = _____ (vi) 1000×25 = _____

10. Divide:

(i) 4000 by 1 = _____ (ii) 23290 by 10 = _____

(iii) 45524 by 42 = _____ (iv) 1326250 by 252 = _____

11. Multiply the largest four digit number by smallest four digit number.

12. The cast of 28 sewing machines is ₹19040, what is the cost of one sewing machine?

13. The capacity of one packet is to hold 354 needle. How many needles will be in 144 packets of same size.

14. Find the product of largest three digit number and smallest four digit number.

15. Find the product of largest number of five digits and smallest number of four digits.

16. There are 700 old women and 832 old men. ₹2000 is given to each old person as pension. How much money is given as pension in the village?

17. Ramdeen has 65 sacks of potatoes. If one sack contains 705 potaoes. How many potatoes in total Ramdeen has?

18. Mohan prepares 38 diyas from 1kg soil. How many Diyas will be made from 310kg soil?

Answers

Let us see what you have learnt

2.1

1. Total expenditure = ₹34854
2. Total expenditure = ₹1820874
3. (i) 10,677
   (ii) 1,17,036
   (iii) 48,89,561

2.2

1. (i) 21421
   (ii) 11092
2. (i) 5,49,632 – 43,286 = 5,06,346
   (ii) 17,92,650 – 15,86,439 = 206211
3. 17,846 Animals left
4. 2,60,248 Left

2.3

1. 20296 2. 41976
3. 68340 4. 10146

2.4

1. (i) 13040 (ii) 115320 (iii) 98452
2. 60375
3. 3456

2.5 1. 9718356 2. 1375754 3. 27905472 4. 1483560

2.6 (i) 45 (ii) 45 (iii) 170
(iv) 2100 (v) 40000 (vi) 37500
(vii) 31500 (viii) 0 (ix) 0
(x) 27000

2.7

(1) 238 (2) 228 (3) 106 (4) 305

2.8

(1) Quotient = 1329 (2) Remainder = 811

Quotient = 14 Remainder = 10

(3) Quotient = 683 (4) Quotient = 2812

Remainder = 14 Remainder = 24

(5) Quotient = 939

Remainder = 31

2.9

1. (i) Quotient = 256 Remainder = 0

(ii) Quotient = 93 Remainder = 468

(iii) Quotient = 39 Remainder = 42

(iv) Quotient = 58 Remainder = 7314

2. (i) 3942 (ii) 1 (iii) 0 (iv) 37 (v) can not be divided

2.10

(1) ₹25 (2) ₹6000

(3) 8754 Plants (4) Quotient = 38293

Remainder = 27 Remainder = 0

(5) Quotient = 1855994

2.11

(1) Estimate in 10 = 2560, 49270, 75390, 3250, 32740

Estimate in 100 = 665400, 553400, 638000, 35000, 100000

Estimate in 100 = 76500, 9656000, 8357000, 376000, 275000

(2) 8800

(3) 336000

Answers

(1) (i) 95,19,410

(ii) 68,62,886

(iii) 1,10,81,641

(2) (i) 11,00,073

(ii) 88,31,857

(iii) 30,99,446

(3) 46,24,368

(4) ₹3,94,375

(5) 6,93,180 Female

(6) 249813 Children

(7) 96,000 Bricks

(8) ₹1,36,000

(9) (i) 4,44,000 (ii) 1,07,646 (iii) 12,23,478

(iv) 3,542 (v) 14175 (vi) 25,000

(10) (i) 4,000 (ii) 2,329 (iii) 1,083 Quotient and 38 Remainder

(iv) 53,050

(11) 9999000 (12) ₹680 (13) 50,976 Needles

(14) 999000 (15) 99999000 (16) ₹30,64,000

(17) 45,825 Potatoes (18) 11,780 Diyas

3

FRACTIONS

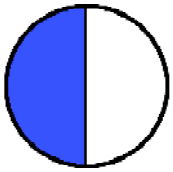
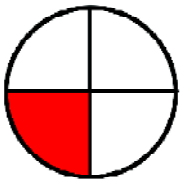
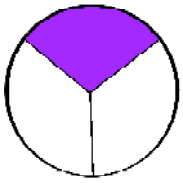
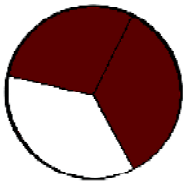
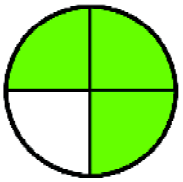
From this lesson, you will learn:

- To know about fractions, reading writing and understanding of fractions.
- Understanding fraction through pictures.
- Forming and understanding equivalent fraction for a given fraction.
- Represent fraction into lowest form.
- Compare fractions, understanding and writing them in ascending and descending order
- Convert compound fraction into improper fraction and improper fraction to compound fraction.
- Addition, subtraction, multiplication and division of fractions with understanding
- Solve daily life problems based on fractions

3.1 Let us learn about fractions and understand reading and writing of fractions

You are acquianted with half, one fourth, three fourth and one and one quarter and use them in your daily life. Now we will learn the meaning of half, one fourth, three fourth etc. How do we write them in mathematics?

Observe the below given pictures and learn to write them

	The circle is half shaded. This means half part of the circle is coloured. In the form of fraction we shall write $\frac{1}{2}$. We shall call it one by two.
	One fourth part of this circle is coloured. This means one fourth part is coloured. In the form of fraction we shall write $\frac{1}{4}$. We shall call it one by four.
	One third part of this circle is coloured. This means one third part is coloured. We shall write $\frac{1}{3}$ in the form of fraction. We shall call it one by three.
	Two third parts of this circle are coloured. This means two third parts are coloured. In the form of fraction we shall write $\frac{2}{3}$. We shall call it two by three.
	Three fourth parts of this circle is coloured. This means it's three fourth is coloured. In the form the of fraction we shall write. We shall call it three by four.

Attention

$\frac{1}{2}$ = Half	$\frac{1}{4}$ = One Fourth
$\frac{1}{3}$ = One Third	$\frac{2}{3}$ = Two Third
$\frac{3}{4}$ = Three Fourth	$\frac{4}{4}$ = Four Fourths = One Whole

In the fractions, the part above the line is called numerator and below the line is called denominator

Example

$\frac{1}{2} = \frac{\text{Numerator}}{\text{Denominator}}$	$\frac{1}{3} = \frac{\text{Numerator}}{\text{Denominator}}$	$\frac{1}{3} = \frac{\text{Numerator}}{\text{Denominator}}$
Num. = 1 Deno. = 2	Num. = 1 Deno. = 3	Num. = 4 Deno. = 5

Attention

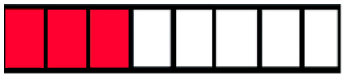
- A fraction is a part of a thing or a group of things.
- Fraction is written in the form of numerator and denominator.
- Upper part of a fraction is called numerator and the lower part is called denominator.

Let us Learn to Make a Fraction

Total no. of parts of a thing are written below the line. The part shown by colours or the part of which, we are talking about is written above the line.

Denominator = Total equal parts of a thing

Numerator = The parts out of total, we are talking about

As shown : 

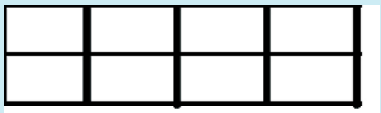
Total equal parts (Deno.) = 8 $\therefore$ Fraction = $\frac{3}{8}$

Red parts (Num.) = 3

Let us See What You Have Learnt 3.1

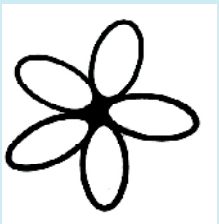
I. Show the coloured parts in the following as per the fraction:

(i) $\frac{3}{8}$ parts

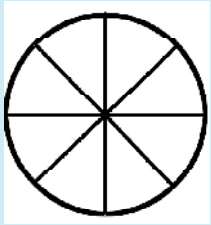


(ii) $\frac{3}{7}$ parts

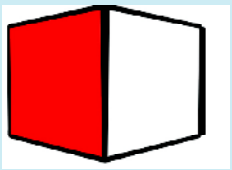
(iii) $\frac{4}{5}$ parts



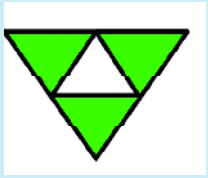
(iv) $\frac{5}{8}$ parts



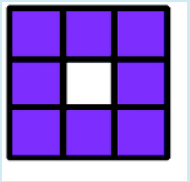
II. Some parts have been coloured in the following, write the fraction for the coloured parts.



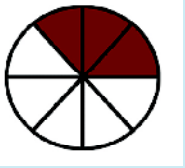
(a)



(b)



(c)



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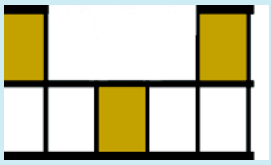

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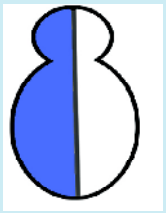
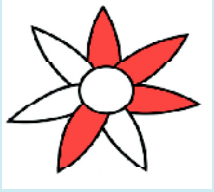


(f)



(g)

(h)

Let us Learn to Make Fraction with the help of a Line

I. The line has been divided into two equal parts from 0 to 1.

One part = $\frac{1}{2}$

The line has been divided into three equal parts from 0 to 1.

First and second parts together makes $\frac{1}{3}$

3.2 Let us know the Equivalent Fraction for a given Fraction.

Fraction = $\frac{1}{2}$

In this picture the figure has been divided into two equal parts, one is cloured.

Fraction = $\frac{2}{4}$

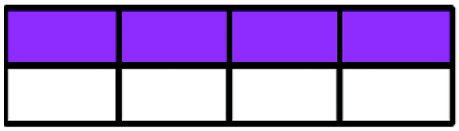
In this picture the figure has been divided into four equal parts. Two equal parts are coloured.

In both the pictures half part is coloured.

Both represents the same part of the figure and represents two different fractions i.e. $\frac{1}{2}$ and $\frac{2}{4}$.

$\therefore \frac{1}{2}$ or $\frac{2}{4}$ are equivalent fractions.

Similarly



This figure is same as the above two figures and representing same coloured part but representing a different fraction i.e $\frac{4}{8}$. Half of the figure is coloured so it is $\frac{1}{2}$.

$\therefore \frac{1}{2}$ or $\frac{2}{4}$ or $\frac{4}{8}$ are equivalent fractions.

Attention

Multiplying the numerator and denominator of a fraction by the same number (Except 0) will not change it's value. These fractions are called equal or equivalent.

Example : $\frac{1\times2}{2\times2}=\frac{2}{4}$ or $\frac{2\div2}{4\div2}$

$\frac{2\times2}{3\times2}=\frac{4}{6}$ or $\frac{6\div3}{9\div3}=\frac{2}{3}$

$\frac{3\times3}{4\times3}=\frac{9}{12}$ or $\frac{5\div5}{15\div5}=\frac{1}{3}$

Let us see and understand some more examples of equal or equivalent fractions:

$\frac{1}{2}=\frac{2}{4}=\frac{4}{8}=\frac{8}{16}=\frac{16}{32}$

$\frac{1}{3}=\frac{2}{6}=\frac{4}{12}=\frac{6}{18}=\frac{8}{24}$

3.3 Let us learn to find the unknow num. or deno. of a fraction and to make them equivalent fractions.

If two fractions are equivalent then the product of the numerator of one fraction with the denominator of other fraction will be equal

As $\frac{1}{3}\times\frac{3}{9}$ $\quad 1\times9=9$, $\quad 3\times3=9$

$\frac{1}{5}\times\frac{5}{25}$ $\quad 1\times25=25$, $\quad 5\times5=25$

Let us know the unknown numerator of a fraction:

$\frac{1}{5}=\frac{\square}{15}$

Both the denominators are known. Their ratio is $\frac{5}{15}=\frac{1}{3}$ Hence, the ratio fo numenators will also be $\frac{1}{3}$.

$\therefore$ Unknown numerator is 3.

The ratio of two known denominators is 3 multiplying. This by the numerator of one fraction will give the numerator of other fraction.

$\therefore$ 3x1=3 is the numerator unknown.

See More Examples:

$\frac{2}{3}=\frac{\square}{27}$

The denominator of second fraction is 9 times the denominator of first fraction. Numerator of second fraction will also be 9 times the numerator of first fraction.

$\therefore$ Unknow numenator = 2 x 9 = 18

Two fractions to be equivalent the product of

2x27=3x18 or 54 = 54

These fractions are equivalent fractions.

Look at and understand

In $\frac{1}{4}=\frac{\square}{8}$, 4 x 2 = or $8 \div 4 = 2$

$\therefore$ Unknown numerator will be 2 times of numerator of first fraction.

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

Let us know to find the unknown denominator:

$\frac{3}{5}=\frac{15}{\square}$, here, the numrator of the fraction with unknown denomitor is five times the numerator the fraction with known denominator: Therefore, unknown denominator will be five times the denominator of first fraction.

$\therefore$ Unknown denominator = 5x5=25

or $\frac{3}{5}=\frac{15}{25}$ $\therefore$ Unknown denominator is 25

Remember

To make given fractions as equivalent fraction, we multipliy the numerator and denominator by the same number (Except 0)

3.4 Let us learn to make the fraction in it's lowerst or simplest form:

A fraction is said to be in it's lowest/simplest form when the numerator/denominator not divisible by any number, except 1.

Example

$$\frac{24\div 2}{36\div 2}=\frac{12\div 6}{18\div 6}=\frac{2}{3}$$

Here in the fraction $\frac{2}{3}$, numerator and denominator are not divided by any number except1, hence this is the lowest (simplest form of fraction $\frac{24}{36}$

See some more Examples

$\frac{45}{55}\div\frac{5}{5}=\frac{9}{11}$ Lowest ferm

$\frac{36}{63}\div\frac{9}{9}=\frac{4}{7}$ Lowest ferm

Let us see what you have learnt 3.2

I. Write the equivalent fractions by multiplication

(a) $\frac{3}{5}$ = ... = ... = ...

(b) $\frac{2}{7}$ = ... = ... = ...

(c) $\frac{8}{32}$ = ... = ... = ...

(d) $\frac{27}{72}$ = ... = ... = ...

II. In the given fractions, fill the numerator or denominator, not given

(a) $\frac{2}{7}=\frac{8}{\square}$

(b) $\frac{5}{8}=\frac{10}{\square}$

(c) $\frac{3}{5}=\frac{\square}{20}$

(d) $\frac{45}{60}=\frac{15}{\square}$

(e) $\frac{18}{24}=\frac{\square}{4}$

(f) $\frac{25}{45}=\frac{\square}{9}$

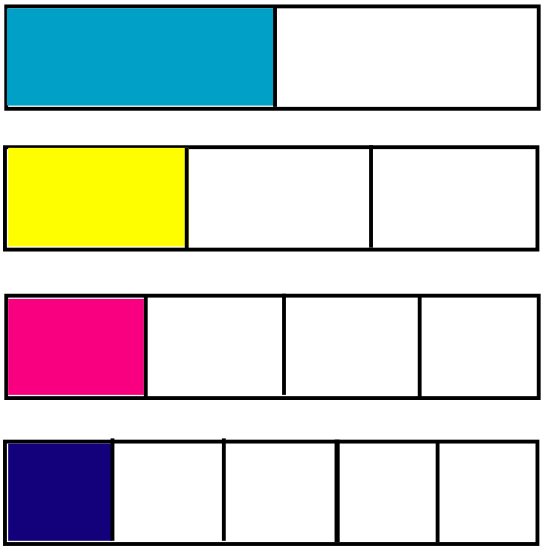
3.5 Let us learn the like fractions

Fractions with same denominator are called like fractions

As $\frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{4}{15}, \frac{8}{15}$ all are like fractions

3.6 Let us Learn to Compare Fractions

Comparing fractions with same numerator:



$\frac{1}{2}$

$\frac{1}{3}$

$\frac{1}{4}$

$\frac{1}{5}$

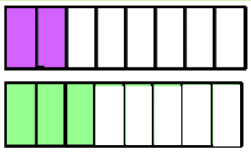
The figures on the left clearly indicate that $\frac{1}{2}$ is greatest, smaller is $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$ is the smallest among these

Attention

Among the fractions with same numerator, the fraction with bigger denominator will be smaller and with smaller denominator will be bigger $\frac{1}{5}$ is bigger than $\frac{1}{7}$ as the denominator of $\frac{1}{5}$ is smaller than the denominator of $\frac{1}{7}$

Camparing like Fractions

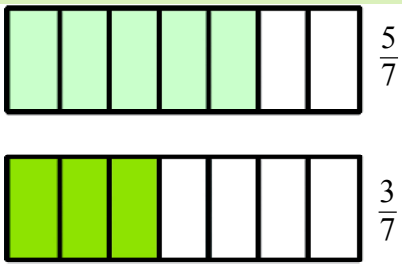
From the figure on the right side it is clear that $\frac{2}{8}$ is smaller them $\frac{3}{8}$.



Attention

Two fractions with the same denominator, the fraction with a bigger numerator will be bigger and the one with a smaller numerator will be smaller.

Similarly



$\frac{5}{7}$

$\frac{3}{7}$

In the two figures above total parts are equal, in the first figure five parts are coloured and in the second three parts are coloured. Hence fraction $\frac{5}{7}$ is bigger than fraction $\frac{3}{7}$.

We can write this as

$\frac{5}{7} > \frac{3}{7}$

Remember

In one or more than two fractions with equal denominators, The fraction with a bigger numerator will be bigger.

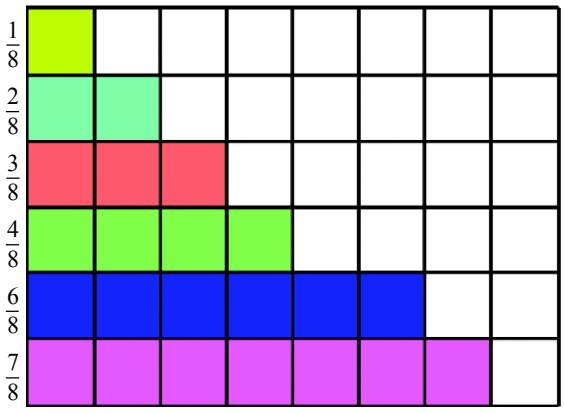
3.7 Let us learn to write fractions in descending and ascending order

$\frac{1}{8}, \frac{2}{8}, \frac{9}{8}, \frac{3}{8}, \frac{7}{8}, \frac{6}{8}$

Descending order

$\frac{7}{8}, \frac{6}{8}, \frac{4}{8}, \frac{3}{8}, \frac{2}{8}, \frac{1}{8}$

or $\frac{7}{8} > \frac{6}{8} > \frac{4}{8} > \frac{3}{8} > \frac{2}{8} > \frac{1}{8}$

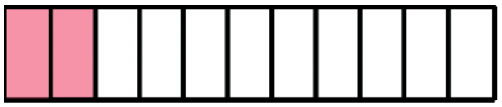


If the denominator of fractions is equal then the fraction with greater numerator is greater and according, the next smaller and in the end smallest fraction is placed in order.

Ascending order - $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{6}{8}, \frac{7}{8}$ or $\frac{1}{8} < \frac{2}{8} < \frac{3}{8} < \frac{4}{8} < \frac{6}{8} < \frac{7}{8}$

Smallest fraction is written in the begining then the greater and in the end the greatest fraction is written.

Comparing fractions with equal Numerator:



$\frac{2}{11} \rightarrow$ In the above figure, there are 11 equal parts and two parts are coloured.

$\frac{2}{6} \rightarrow$ In the above figure, there are six equal parts and two are coloured.

$\frac{2}{5}$ → In the above figure, there are five equal parts and two are coloured.

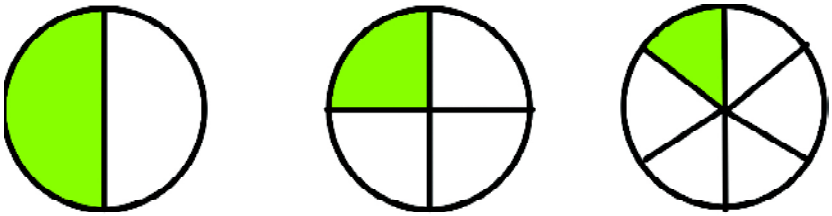
From the above figures it is clear that alll these are of the same dimension or equal. In the first there are 11 equal parts, in the second 6 and in the third 5 equal parts and in all these three figures 2 equal parts are coloured

- In the first figure above the coloured region is less shaded part, in the second is more than this and in the third is still more region.

Coloured fractions will be, in the same way, in increasing order. When the numerator is equal the fractions with greater denominator will be smaller or the fractions with smaller denominator is greater.

As Shown here $\frac{2}{11} < \frac{2}{6} < \frac{2}{5}$

Look at this and understand



$\frac{1}{2}$ > $\frac{1}{4}$ > $\frac{1}{6}$

Attention

- In case the denominator is equal, the fraction with greater numerator will be greater
- In case the numerator is equal, the fraction with smaller denominator will be greater

Let us see what you have learnt 3.3

1. In the empty box put the correct symbol out of these >, = ,<:

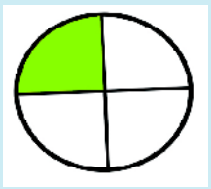
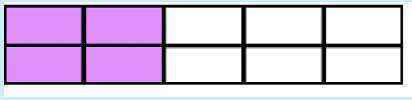
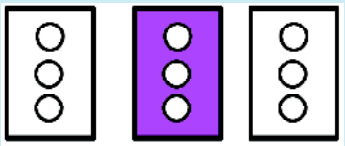
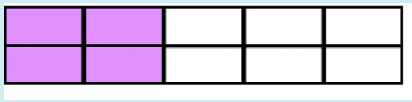
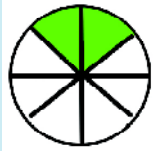
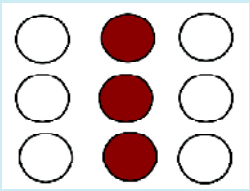
(a) $\frac{4}{5} \square \frac{3}{5}$ (b) $\frac{7}{9} \square \frac{5}{9}$

(c) $\frac{3}{4} \square \frac{9}{12}$ (d) $\frac{2}{5} \square \frac{2}{8}$

2. Write one more equivalent fraction of the following:

(a) $\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, -$ (b) $\frac{2}{3}, \frac{4}{6}, \frac{8}{12}, -$

3. Make the paris from the two boxes given below representing the same fraction

a.  $\frac{1}{2}$	(I)  $\frac{4}{10}$
b.  $\frac{1}{3}$	(II)  $\frac{6}{12}$
c.  $\frac{2}{5}$	(III)  $\frac{2}{8}$
d.  $\frac{3}{6}$	(IV)  $\frac{3}{9}$

4. Find the unknown numerator or denominator and write in the box:

(a) $\frac{3}{8} = \frac{\square}{24}$ (b) $\frac{5}{6} = \frac{30}{\square}$ (c) $\frac{3}{5} = \frac{\square}{15}$

(d) $\frac{2}{7} = \frac{\square}{42}$ (b) $\frac{3}{4} = \frac{12}{\square}$ (c) $\frac{20}{28} = \frac{5}{\square}$

5. (✓) mark the correct pair of equivalent fractions and (x) the incorrect pair

(a) $\frac{2}{3}, \frac{6}{8}$ ☐ (b) $\frac{5}{12}, \frac{10}{12}$ ☐

(c) $\frac{3}{9}, \frac{6}{18}$ ☐ (d) $\frac{1}{8}, \frac{2}{16}$ ☐

6. Write the following fractions in descending and ascending order

(i) $\frac{1}{4}, \frac{1}{8}, \frac{1}{3}, \frac{1}{6}$

Descending order _____

Ascending order _____

(ii) $\frac{3}{10}, \frac{5}{10}, \frac{7}{10}, \frac{1}{10}$

Descending order _____

Ascending order _____

7. Put the appropriate symbol (> = or <) in the box

(a) $\frac{5}{6} \square \frac{11}{12}$ (b) $\frac{1}{2} \square \frac{1}{3}$ (c) $\frac{3}{7} \square \frac{2}{2}$

(d) $\frac{5}{12} \square \frac{1}{2}$ (e) $\frac{10}{3} \square \frac{4}{3}$ (f) $\frac{3}{5} \square \frac{9}{5}$

3.8 Let us understand proper, improper and mixed fraction

Proper Fractions

The fractions with numerator smaller than the denominator are called proper fractions

As : $\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{1}{5}, \frac{2}{7}$

Improper Fractions

Fractions with numerator greater than or equal to the denominator are called improper fractions

As $\frac{5}{3}, \frac{5}{4}, \frac{4}{3}, \frac{7}{5}, \frac{3}{3}$

Mixed Fractions

When we write the mixed fraction in the form of whole number and a proper fraction This is called a mixed fraction.

As - $\frac{5}{3}$ Divisor $\begin{array}{r} 3\overline{)\,5\,(1} \text{ Quotient} \\ -\,3 \\ \hline 2 \quad \text{Remainder} \end{array}$ $\therefore \frac{5}{3} = 1\frac{2}{3}$

$$\left[\text{Improper Fraction} = \text{Quotient } \frac{\text{Remainder}}{\text{Divisor}}\right]$$

Similarly

$\frac{5}{4}$ | $4\overline{)5}\,(1$, -4, 1 | $= 1\frac{1}{4}$

$\frac{4}{3}$ | $3\overline{)4}\,(1$, -3, 1 | $= 1\frac{1}{3}$

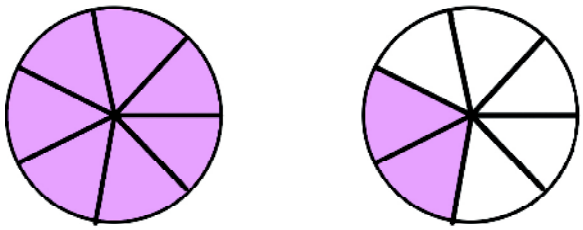
$\frac{7}{5}$ = $1\frac{2}{5}$

Attention

In a mixed fraction one part is whole and the other part is a proper fraction

Look at this also:

$\frac{9}{7} = \frac{7+2}{7} = \frac{7}{7} + \frac{2}{7} = 1 + \frac{2}{7}$ or $1\frac{2}{7}$



$\frac{7}{7}$ + $\frac{2}{7} = \frac{9}{7}$ or $1\frac{2}{7}$

Attention

$1\frac{2}{7} = 1 + \frac{2}{7} = \frac{7}{7} + \frac{2}{7} = \frac{9}{7}$

Similarly

Improper fraction $\frac{11}{2}$ as $5\frac{1}{2}$

$2\overline{)11}\,(5$, -10, 1

Hence we write $\frac{11}{2}$ as $5\frac{1}{2}$

We shall call it five one by two

Let us learn to convert mixed fraction into improper fraction

To convert the mixed fraction $3\frac{1}{4}$ into an improper fraction, we multiply the whole part by the

denominator of fraction part and add to this the numinator of fraction part and keep the denominator of fraction part below this.

Or

Write the whole part (3) with the denominator as the same as of fractions part and add these two ie.

$3 = \frac{12}{4}$ and add $\frac{1}{4} = \frac{12}{4} + \frac{1}{4} = \frac{13}{4}$

(i) $3\frac{1}{4} = \frac{(3\times 4)+1}{4} = \frac{12+1}{4} = \frac{13}{4}$

(ii) $3\frac{1}{4} = \frac{\text{Whole}\,(3)\times \text{Deno}\,(4)+\text{Num}\,(1)}{\text{Deno}\,(4)}$

(iii) $5\frac{2}{7} = \frac{(5\times 7)+2}{7} = \frac{35+2}{7} = \frac{37}{7}$

Attention

- The fractions, in which numerator is smaller than denominator are called proper fractions
- The fractions, in which numerator is equal or greater than the denominator, are called improper fractions in the term of whole and a fractional part these are called mixed fractions

Let us see what you have learnt 3.4

I. Mark (✓) on the correct statements given below and (x) on the wrong statements.

(a) In a proper fraction numerator is greater than denominator ( )

(b) A proper fraction can be converted into a mixed fraction ( )

(c) In an improper fraction, numerator is greater them denominator ( )

(d) $\frac{5}{2}$ is proper fraction ( )

(e) $\frac{6}{8}$ is a an improper fraction ( )

(f) $3\frac{1}{3}$ is a proper fraction ( )

(g) $5\frac{2}{3}$ is an improper fraction ( )

2. Convert the following improper fractions into mixed fraction.

(a) $\frac{11}{2} =$ _____ (b) $\frac{10}{3} =$ _____ (c) $\frac{17}{3} =$ _____

3. Convert the mixed fractions into improper fractions

(a) $2\frac{5}{7} =$ _____ (b) $10\frac{1}{3} =$ _____ (c) $3+\frac{5}{7} =$ _____

3.9 Let us learn to add and subtract fractions

3.9.1 Adding the fractions with equal denominator:

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

In the first figure 3 parts are coloured out of five equal parts and in the second figure one part is coloured. Together four coloured parts out of five equal parts

$\therefore \frac{3}{5}+\frac{1}{5}=\frac{4}{5}$

We do it like this

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

Similarly

$\frac{3}{8}$ $\frac{4}{8}$ $\frac{7}{8}$

$\frac{3}{8} + \frac{4}{8} = \frac{3+4}{8} = \frac{7}{8}$

Attention

Addition of fractions with equal denominator $= \frac{\text{Add the numerators}}{\text{Equal denominator}}$

Remember

Before adding the mixed fraction is to the converted into an improper fraction

See this also: Add $2\frac{1}{3}$ and $4\frac{1}{3}$

Solution : $2\frac{1}{3} = \frac{(3x2)+1}{3} = \frac{7}{3}$, $4\frac{1}{3} = \frac{(3x4)+1}{3} = \frac{13}{3}$

Now we write $2\frac{1}{3} + 4\frac{1}{3} = \frac{7}{3} + \frac{13}{3} = \frac{20}{3}$

or $6\frac{2}{3}$ $=$ $3\overline{)20}(6$
-18
2

Attention

Solving problems involving mixed fractions, we first convert the mixed fraction into an improper fractions and then add to the fraction with same denominator the above question can also be solved like this

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

$$= (2+4) + \left(\frac{1}{3} + \frac{1}{3}\right)$$

$$= 6 + \left(\frac{1+1}{3}\right)$$

$$= 6 + \frac{2}{3}$$

$$= 6\frac{2}{3}$$

Addition of fractions when denominators are not equal:

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

The fundamental principle is that we can add/subtract only equal parts. For adding fractions with unequal denominators first, we make their all denominators equal. In the first fraction the denominator is 2 and in the second it is 3. To make these equal, we multiply the numenator and denominator by 3 in the first fraction and by 2 in the second.

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

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

$\therefore \frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

Similarly

$$\frac{1}{4}+\frac{3}{8}=\frac{2}{8}+\frac{3}{8}=\frac{5}{8}$$

When the denominators are equal then these can be added as these are equal parts

Similarly

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

To make their denominator equal is 15

we multiply the first fraction (Numerator and denominator) by 5

$$\therefore \frac{2}{3}=\frac{2\times5}{3\times5}=\frac{10}{15}$$

$$\frac{1}{5}=\frac{1\times3}{5\times3}=\frac{3}{15}$$

$$\therefore \frac{2}{3}+\frac{1}{5}=\frac{10}{15}+\frac{3}{15}=\frac{13}{15}$$

For addition of fractions, first we make their denominators equal. Then add their numerators and the keep the common (Equal denominator) as denominator

Let us see what you have learnt 3.5

1. Add

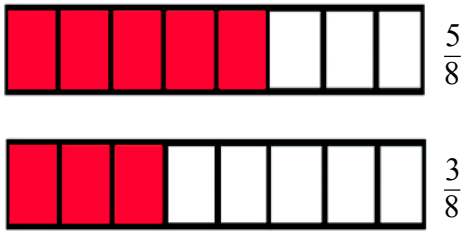
(a) $\frac{4}{5}+\frac{3}{5}=$_____ (b) $\frac{4}{7}+\frac{9}{7}=$_____ (c) $\frac{10}{10}+\frac{4}{10}=$_____

(d) $2\frac{3}{4}+3\frac{1}{4}=$_____ (e) $\frac{9}{13}+\frac{4}{13}=$_____ (f) $3\frac{2}{3}+4\frac{1}{3}=$_____

(g) $\frac{3}{5}+\frac{6}{7}=$_____ (h) $\frac{2}{4}+\frac{4}{8}=$_____ (i) $\frac{2}{5}+\frac{5}{6}=$_____

3.9.2 Let us learn subtraction of fractions

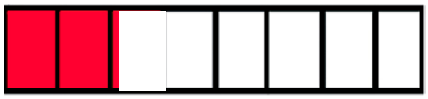
Subtraction of fractions with equal denominator. Ramesh ate $\frac{5}{8}$ of a chocolate and Rakesh ate $\frac{3}{8}$ parts of the choclate. Who ate more and how much?



In the first above shown that Ramesh ate 5 parts out of 8 equal parts of a choclate and in the second figure shown that Rakesh ate three parts out of eight equal parts

This can be shown as-

$\frac{5}{8} - \frac{3}{8} = \frac{5-3}{8} = \frac{2}{8}$ Ramesh ate $\frac{2}{8}$ parts more



than Rakesh, as shown in figure

Attention

- In fraction with equal denominator, we subtract their numerators and keep the denominator common.
- Subtraction of fraction with same denominator $= \frac{\text{Difference of numerators}}{\text{Common denominator}}$

Subtraction of fraction with different denominators.

(i) Subtrac $\frac{3}{5}$ from $\frac{2}{3}$

First we shall convert each fraction into an equivalent fraction so that both have the same denominator

i.e 15 (3x5)

$\therefore \frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$

$\frac{3}{5} = \frac{3}{5} \frac{\times 3}{\times 5} = \frac{9}{15}$

Now $\frac{2}{3}-\frac{3}{5}=\frac{10}{15}-\frac{9}{15}=\frac{10-9}{15}=\frac{1}{15}$

Attention

When the denominators of two fractions are different then we make their equivalent fractions so that both the fractions have the some denominator then subtract the numerator and find the difference.

Let us see some more examples

What is the difference between $\frac{5}{6}+\frac{2}{3}$

Make the denominator such that it is divisible by the denominator of both fractions. Here 6 is divisible by 6 and also by

$\therefore \frac{5}{6}=\frac{5\times1}{6\times1}=\frac{5}{6} \qquad \frac{2}{3}\frac{\times2}{\times2}=\frac{4}{6}$

$\therefore \frac{5}{6}-\frac{2}{3}=\frac{5}{6}-\frac{4}{6} = \frac{5-4}{6}=\frac{1}{6}$

This can also be formed

Equivalent fraction of $\frac{2}{3}$

$\frac{2}{3}, \boxed{\frac{4}{6}}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$

Equivalent fractions of $\frac{5}{6}$

$\boxed{\frac{5}{6}}, \frac{10}{12}, \frac{15}{18}$

There is are equivalent fraction with, equal denominator

$\therefore \frac{5}{6}-\frac{4}{6}=\frac{5-4}{6}=\frac{1}{6}$

What is the difference of 4 and $\frac{3}{8}$?

Attention

Each whole number is a fraction, with denominators as 1.

Here we write 4 as $\frac{4}{1}$

Equivalent fraction of $\frac{4}{1} = \frac{4}{1}, \frac{8}{2}, \frac{12}{3}, \frac{16}{4}, \frac{20}{5}, \frac{24}{6}, \frac{28}{7}, \frac{32}{8}$

Equivalent fraction of $\frac{3}{8} = \frac{3}{8}, \frac{16}{16}, \frac{9}{24}, \ldots$

There are two equivalent fractions are with the same denominator i.e $\frac{32}{8}$ and $\frac{3}{8}$

$\therefore \frac{4}{1} - \frac{3}{8} = \frac{32}{8} - \frac{3}{8} - \frac{29}{8} = 3\frac{5}{8}$

See some more examples

1. A water tank is filled with $\frac{6}{8}$ parts of water. $\frac{3}{8}$ parts water is used. What part of the tank is filled with water now?

We can solve it like this

The part of tank filled with water $= \frac{6}{8}$

The part of water used $= \frac{3}{8}$

The part of the tank filled now $= \frac{6}{8} - \frac{3}{8}$

$= \frac{6-3}{8}$

$= \frac{3}{8}$

2. Ravi spent $\frac{5}{8}$ parts of his income on food items and $\frac{2}{8}$ parts for expendure on travelling. How much and for which purpose he spent more?

Expenditure on food = $\frac{5}{8}$ parts of income

Expenditure on rent/travelling = $\frac{2}{8}$ parts income

Now $\frac{5}{8} > \frac{2}{8}$ as the denominators are same

$\therefore$ He spent more on food.

How much more did he spend?

We shall

Subtract $\frac{2}{8}$ from $\frac{5}{8}$

$\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$

$\therefore$ He spent on food $\frac{3}{8}$ parts more of his income

Let us what you have learnt 3.6

1. Subtract:

(a) $\frac{9}{4} - \frac{3}{4} =$ _____ (b) $\frac{9}{2} - \frac{9}{5} =$ _____

(c) $\frac{3}{8} - \frac{1}{5} =$ _____ (d) $\frac{3}{4} - \frac{5}{8} =$ _____

(e) $1 - \frac{7}{20} =$ _____ (f) $4 - \frac{2}{7} =$ _____

2. Answer the following questions:

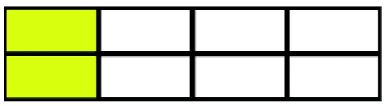
(a) $\frac{1}{4}$ is how much less than $\frac{1}{4}$?

(b) $1\frac{4}{5}$ is how much less than $4\frac{1}{2}$

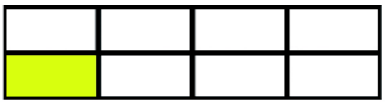
(c) What should be added to $\frac{2}{3}$ to get $\frac{5}{6}$?

(d) What should be added to $3\frac{5}{8}$ to get 4?

3.10 Let us learn the multiplication of fractions



$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$



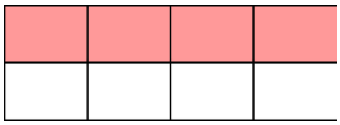
$\frac{1}{8}$ Part

This represents $\frac{1}{4}$ of the above figure on left side.

This represents half of $\frac{1}{4}$ or $\frac{1}{8}$ of whole right sided figure above.

Remember

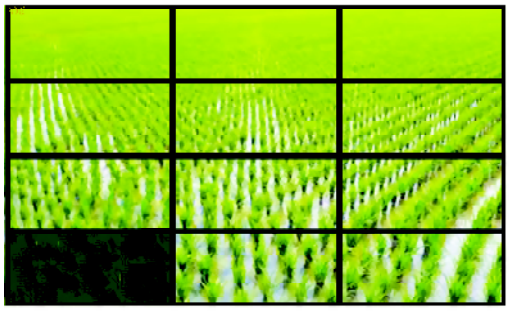
$\frac{1}{4}$ of $\frac{1}{2}$ is the same as $\frac{1}{8}$ of whole $\frac{1}{4}$ of $\frac{1}{2}$ also $\frac{1}{8}$ of whole.



To solve this we multiply the numerators and denominator and the final fraction is

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

See some more examples



In the above figure the field has been divided into equal parts. Further it has been divided into three verticle rectangles and four horizental rectangles total making 12 equal parts. Each small part is one fourth of one third say $\frac{1}{3}$ of $\frac{1}{4}$ or $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$ or $\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$

Let us learn more

$\frac{1}{6} \times \frac{1}{3} = \frac{1 \times 1}{6 \times 3} = \frac{1}{18}$

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

Attention

Multiplying two fractions, we multiply the numerator of one fraction by the numerator of one fraction and denominator of first fraction by the denominator of other fraction

$$\text{Product of two fractions} = \frac{\text{Product of their numerators}}{\text{Product of their denominators}}$$

Let us learn to multiply mixed fractions

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

$= \frac{11}{5} \times \frac{22}{7} = \frac{11 \times 22}{5 \times 7} = \frac{242}{35}$

Remember

For the multiplication of mixed fractions, we convert them into improper fractions and then multiply the numerators and denominators.

Let us see what you have learnt 3.7

1. Multiply:

(i) $\frac{1}{3}$ by $\frac{1}{3}$

(ii) $\frac{1}{4}$ by $\frac{1}{4}$

(iii) $\frac{1}{3}$ by $\frac{1}{6}$

2. Solve the following:

(i) $\frac{1}{4} \times \frac{1}{5}$

(ii) $\frac{1}{11} \times \frac{1}{9}$

(iii) $\frac{2}{5} \times \frac{3}{7}$

(iv) $\frac{11}{13} \times \frac{7}{9}$

(v) $4\frac{5}{11} \times 7$

(vi) $3\frac{4}{9} \times 7\frac{7}{11}$

(vii) $3 \times 2\frac{3}{5}$

3.10.1 Let us learn to multiply more than two fractions find the product of

$\frac{1}{2}, \frac{2}{3}$ and $\frac{2}{3}$

$\frac{1}{2} \times \frac{2}{3} \times \frac{2}{3} = \frac{1 \times 2 \times 2}{2 \times 3 \times 3} = \frac{4}{18}$

$\frac{4}{18}$ can be written in it's lowest form

Numerator is 4 and denominator 18 both are divided by 2

$\therefore \frac{4 \div 2}{18 \div 2} = \frac{2}{9}$

See some more examples

Find the product of $\frac{1}{6}, \frac{3}{5}$ and $\frac{2}{7}$

$\frac{1}{6} \times \frac{3}{5} \times \frac{2}{7} = \frac{1 \times 3 \times 2}{6 \times 5 \times 7} = \frac{6}{210}$

The lowest form of $\frac{6}{210}$ is obtained by dividing numerator and denominator by 2, we get

$\frac{3}{105} = \frac{3 \div 3}{105 \div} = \frac{1}{35}$

Let us see what you have learnt 3.8

1. Find the product:

(a) $\frac{3}{4} \times \frac{4}{6} \times \frac{2}{3}$ = _____

(b) $2\frac{3}{5} \times 5\frac{3}{7} \times 2\frac{1}{3}$ = _____

(c) $\frac{1}{5} \times \frac{1}{9} \times \frac{1}{7}$ = _____

3.11 Let us learn division of a fraction by another fraction

This is a one whole or complete figure.

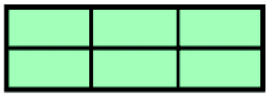
Half part of the whole is coloured.

This shows coloured part of half of the half in the previous page figure.

$\therefore \quad \frac{1}{2}$ of $\frac{1}{2} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ (Coloured Part)

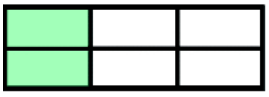
$\therefore$ If $\frac{1}{2} \div 2 = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ $\left[\text{Here we multiply } \frac{1}{2} \text{ by reciprocal of } \left(2\left(\frac{1}{2}\right)\right)\right]$

Let us see this



This shows six equal parts of the whole figure. This means 6 out of 6

and we write $\frac{6}{6}$ i.e the whole



This shows one third of the whole = $\frac{1}{3}$ or $\frac{1}{3}$ of $1 = 1 \times \frac{1}{3} = \frac{1}{3}$ and so

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

This figure shows coloured part half of $\frac{1}{3}$ or two equal parts of $\frac{1}{3}$

$\left(\frac{1}{3} \div 2\right)$

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

or $\frac{1}{3} \div 2 = \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ $\left[\frac{1}{3} \div 2 \text{ means } \frac{1}{3} \times \frac{1}{2}\right]$

Let us see more examples

If we divide $\frac{4}{6}$ by 6 or $\frac{4}{6} \div 6$ then

$\frac{4}{6} \div 6 = \frac{4}{6} \div \frac{6}{1}$ $\left[\text{Inverse of } \frac{6}{1} \text{ is } \frac{1}{6}\right]$

$= \frac{4}{6} \times \frac{1}{6} = \frac{4}{36}$

Similarly

If we divide $\frac{1}{3}$ by $\frac{1}{5}$ or $\frac{1}{3} \div \frac{1}{5}$

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

Attention

Division of a fraction by another fraction is done by multiplying the first fraction by the reciprocal of the second fraction.

(a) Similarly $\frac{3}{4} \div \frac{1}{4} = \frac{3}{4} \times \frac{4}{1} = \frac{12}{4} = \frac{12 \div 4}{4 \div 4} = \frac{3}{1} = 3$

(b) $6\frac{1}{5} \div 3\frac{3}{4}$

$= \frac{31}{5} \div \frac{15}{4}$

$= \frac{31}{5} \times \frac{4}{15} = \frac{124}{75}$

This is an improper fraction. This will be converted into a mixed fraction.

$$\begin{array}{r} 75\overline{)\,124\,(1} \\ -75 \\ \hline 49 \end{array}$$

$\therefore \quad \frac{124}{75} = 1\frac{49}{75}$

Let us see what you have learnt 3.9

1. (a) $\frac{2}{3} \div \frac{1}{3}$ = _____

(b) $\frac{1}{2} \div \frac{1}{8}$ = _____

(c) $4\frac{3}{5} \div 2\frac{1}{3}$ = _____

(d) $10\frac{1}{32} \div 3\frac{1}{2}$ = _____

3.12 Let us learn to solve daily life problems related to fractions

1. Savita has a 18 meter long rope. She needs to cut it into $\frac{3}{4}$ meter pieces. How many pieces will she get?

Solution: Total length of rope = 18m

length of one piece = $\frac{3}{4}$ m

Total no. of pieces of rope $= 18 \div \frac{3}{4} = 18 \times \frac{4}{3} = \frac{72}{3}$

$= \frac{72 \div 3}{3 \div 3} = \frac{24}{1}$ = or 24 pieces

2. Radha does excercise for $\frac{3}{4}$ Hr everyday. Find out

(a) How many days are required to complete 15 Hrs. Excercise?

(b) How many days are required to complete 30 Hrs Excercise?

(a) For $\frac{3}{4}$ hrs she needs one day

$\therefore$ for 15 hrs she whould required $\left(5 \div \frac{3}{4}\right)$ days

$= \frac{15}{1} \times \frac{4}{3} = \frac{60}{3} = 20$ days

(b) For $\frac{3}{4}$ hrs excercise she needs one day for 1 hr excercise she would need more line $\frac{4}{3}$

$\therefore$ For 30 Hrs excercise she would need $= 30 \div \frac{3}{4}$

$= \frac{30}{1} \times \frac{4}{3} = \frac{120}{3}$

$= \frac{120 \div 3}{3 \div 3} = \frac{40}{1} = 40$ days

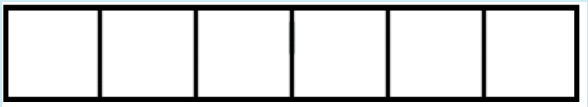
Let us Revise

- Fraction is a part of whole thing/object.
- The upper number of a fraction is called numerator and the lower part is called denominator.
- Fraction = $\frac{\text{Some or all the equal parts of an object / group taken}}{\text{Total equal parts of an object / group}}$
- In any fraction by multiplying or dividing by a number of the numerator and denominator, the value does not change
- The fractions with equal denominator are called like fractions
- In fractions with equal denominator, the fraction with greater numerator will be greater and with smaller numerator will be smaller fraction.
- In fractions with equal numerator, the fraction with greater denominator will be smaller and with samller denominator will be greater.
- The fractions with smaller numerator are called proper fractions
- The fraction with greater or equal numerator are called improper fractions
- Writing an improper fraction in the form of whole number and a fractional part is called mixed fractions
- In a mixed fraction, one part is whole and the other part is a fraction
- Addition of fraction with equal denominator = $\frac{\text{Sum of numerator}}{\text{Common denominator}}$
- Subtraction of fractions with equal denominator = $\frac{\text{Difference of numerator}}{\text{Common denominator}}$
- While applying fundamental operations (+,–,×,÷) with fractions, mixed fraction to be converted into an improper fraction
- For addition and subtraction of fractions with unequal denominators, first convert them into equivalent fractions and then apply addition/subtraction with equal denominators.
- Product of fractions = $\frac{\text{Product of their numerators}}{\text{Product of their denominator}}$
- For dividing a fraction by another fraction, divisor fraction's numerator and denominators are interchanged and then multiply the two fractions
- When there is no denominator, we take 1 as denominator

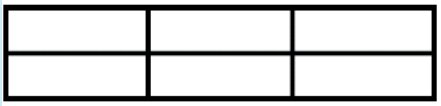
Practice

1. Colour the boxes according to the given fraction:

(a) $\frac{3}{6}$



(b) $\frac{4}{5}$



2. Put (> = or <) in the boxes:

(a) $\frac{3}{5} \square \frac{4}{5}$ (b) $\frac{7}{9} \square \frac{5}{9}$

(a) $\frac{3}{4} \square \frac{9}{12}$ (a) $\frac{2}{5} \square \frac{3}{8}$

3. Fill in the blanks:

(a) $\frac{3}{8} = \frac{\square}{24}$ a) $\frac{5}{6} = \frac{30}{\square}$

4. Mark ($\surd$) the correct pair of equivalent fractions:

(a) $\frac{2}{8}, \frac{6}{8}$ ☐ (b) $\frac{5}{12}, \frac{10}{12}$ ☐

(c) $\frac{3}{9}, \frac{9}{18}$ ☐ (b) $\frac{1}{8}, \frac{2}{16}$ ☐

5. Pick up the proper and improper fractions and write then:

$\frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{7}{9}, \frac{27}{8}, \frac{15}{14}, \frac{13}{11}, \frac{4}{5}, \frac{1}{9}, \frac{5}{7}$

6. (a) Write the following in ascending order:

I. $\frac{3}{6}, \frac{3}{7}, \frac{3}{5}, \frac{3}{4}, \frac{3}{8}$

II. $\frac{3}{10}, \frac{4}{10}, \frac{6}{10}, \frac{9}{10}, \frac{1}{10}$

(b) Write the following in descending order:

I. $\frac{2}{8}, \frac{4}{8}, \frac{6}{8}, \frac{7}{8}, \frac{5}{8}$

II. $\frac{4}{5}, \frac{4}{7}, \frac{4}{6}, \frac{4}{9}, \frac{4}{8}$

7. Solve:

(a) $\frac{4}{5}+\frac{3}{5}$ (b) $\frac{4}{7}+\frac{9}{7}$

(c) $\frac{12}{17}+\frac{3}{17}$ (d) $2\frac{2}{9}+3\frac{5}{9}$

(e) $\frac{9}{13}+\frac{4}{13}$ (f) $\frac{10}{10}+\frac{4}{10}$

(g) $4+\frac{3}{4}$ (h) $\frac{2}{5}+\frac{5}{6}$

8. Fill in the blanks:

(a) $\frac{3}{4}+\square=\frac{3}{4}$ (b) $\frac{1}{4}+\frac{3}{5}=\frac{3}{5}+\square$

(c) $\frac{1}{2}+\square=\frac{3}{5}$ (d) $2\frac{1}{5}+\square=5\frac{3}{5}$

9. Form equivalent fractions:

(a) of $\frac{5}{6}$ (Equivalent) $\frac{10}{12}$ .....

(a) of $\frac{2}{3}$ (Equivalent) $\frac{4}{6}$ .....

10. How much less is:

(a) $\frac{1}{2}$ from $2\frac{1}{4}$ (b) $1\frac{4}{5}$ from $4\frac{1}{2}$

(c) In $\frac{2}{3}$ what should be added to get $\frac{5}{6}$?

(d) In $3\frac{5}{6}$ what should be added to get 4?

11. Simplify:

(a) $2\frac{3}{4}+2$ (b) $6\frac{3}{7}+5\frac{4}{7}$

(c) $13\frac{7}{8}-8\frac{5}{8}$ (b) $\frac{9}{7}-\frac{2}{3}$

12. $\frac{4}{7}$ parts of a cloth $\frac{2}{7}$ parts used for handkerchief. How much cloth is left?

13. Multiply:

I. (a) $\frac{3}{4}\times 4$ (b) $\frac{19}{25}\times 12$ (c) $17\frac{1}{3}\times 9$

II. (a) $1\frac{1}{8}\times 3$ (b) $2\frac{3}{5}\times\frac{10}{9}$

(c) $7\frac{1}{2}\times 8$ (d) $\frac{5}{12}\times\frac{7}{11}$

14. Divide:

(a) $4\frac{3}{5}\div 2\frac{1}{3}$ (b) $\frac{2}{3}\div\frac{2}{3}$

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

15. A car runs 7 km in one litre petrol. In $6\frac{3}{4}$ litre petrol, how much distance it will cover?

Answers

Let us see what you have learnt

3.1

I. (a) $\frac{3}{8}$ parts {Any three parts can be coloured/filled}

(b) $\frac{4}{5}$ parts {Any four parts can be coloured/filled}

(c) $\frac{3}{7}$ parts {Any three parts can be filled/coloured}

(d) $\frac{5}{7}$ parts {Any five parts can be filled/coloured}

II. (a) $\frac{1}{2}$ (b) $\frac{2}{5}$ (c) $\frac{8}{9}$ (d) $\frac{3}{8}$

(e) $\frac{3}{8}$ (f) $\frac{1}{2}$ (g) $\frac{4}{7}$ (h) $\frac{3}{8}$

III. $\frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}$

3.2

I. (a) $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20}$ (b) $\frac{2}{7} = \frac{4}{14} = \frac{6}{21} = \frac{8}{28}$

(c) $\frac{4}{16} = \frac{2}{8} = \frac{1}{4}$ (d) $\frac{27}{72} = \frac{9}{24} = \frac{3}{8}$

II. (a) 28 (b) 16 (c) 12

(d) 20 (e) 3 (f) 5

3.3

1. (a) $\frac{4}{5} > \frac{3}{5}$ (b) $\frac{7}{9} > \frac{5}{9}$ (c) $\frac{3}{4} = \frac{9}{12}$ (d) $\frac{2}{5} > \frac{2}{8}$

2. (a) $\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}$ (b) $\frac{2}{3}, \frac{4}{6}, \frac{8}{12}, \frac{10}{15}$

3. (a) $\frac{1}{4} \rightarrow$ (iii) $\frac{2}{8}$; (b) $\frac{1}{3} \rightarrow$ (iv) $\frac{3}{9}$;

(c) $\frac{2}{5} \rightarrow$ (i) $\frac{4}{10}$ (b) $\frac{3}{6} \rightarrow$ (ii) $\frac{6}{12}$;

4. (a) 9 (b) 36 (c) 9

(d) 12 (e) 16 (f) 7

5. (a) × (b) × (c) √ (d) √

6. (i) Descending Order : $\frac{1}{3}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}$ (ii) $\frac{7}{10}, \frac{5}{10}, \frac{3}{10}, \frac{1}{10}$

(i) Ascending Order : $\frac{1}{8}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}$ (ii) $\frac{1}{10}, \frac{3}{10}, \frac{5}{10}, \frac{7}{10}$

7. (a) $\frac{5}{6} < \frac{11}{12}$ (b) $\frac{1}{2} > \frac{1}{3}$ (c) $\frac{3}{7} < \frac{2}{2}$

(d) $\frac{5}{12} < \frac{1}{2}$ (e) $\frac{10}{3} < \frac{4}{3}$ (c) $\frac{3}{5} < \frac{9}{15}$

3.4

1. (a) × (b) × (c) √

(d) × (e) × (f) √ (g) ×

2. (a) $5\frac{1}{2}$ (b) $3\frac{1}{3}$ (c) $5\frac{2}{3}$

3. (a) $\frac{19}{7}$ (b) $\frac{31}{3}$ (c) $\frac{26}{7}$

3.5

1. (a) $\frac{7}{5}$ or $1\frac{2}{5}$ (b) $\frac{13}{7}$ or $1\frac{6}{7}$ (c) $\frac{14}{10}$ or $1\frac{4}{10}$

(d) 6 (e) 1 (f) 8

(g) $\frac{51}{35}$ or $1\frac{16}{35}$ (h) 1 (i) $\frac{37}{30}$ or $1\frac{7}{30}$

3.6

1. (a) $\frac{6}{4}$ or $1\frac{2}{4}$ (b) $\frac{27}{10}$ or $2\frac{7}{10}$ (c) $\frac{7}{40}$

   (d) $\frac{1}{8}$ (f) $\frac{13}{20}$ (g) $\frac{26}{7}$ or $3\frac{5}{7}$

3.7

1. (i) $\frac{1}{9}$ (ii) $\frac{1}{16}$ (iii) $\frac{1}{18}$

2. (i) $\frac{1}{20}$ (ii) $\frac{1}{99}$ (iii) $\frac{6}{35}$

   (iv) $\frac{343}{11}$ (v) $\frac{2480}{99}$ or $25\frac{4}{99}$ (vi) $\frac{39}{5}$ or $7\frac{4}{5}$

3.8

1. (a) $\frac{24}{72}$ or $\frac{1}{3}$ (b) $\frac{3458}{105}$ or $\frac{494}{105}$ or $32\frac{14}{15}$ (e) $\frac{2}{315}$

3.9 1. (a) 2 (b) 4 (c) $\frac{69}{35}$ or $1\frac{34}{35}$

   (d) $\frac{642}{224}$ or $\frac{321}{112}$ or $2\frac{97}{112}$

Answers Excercise

1. (a) {Any three parts can be coloured}

   (a) {Any four parts can be coloured}

2. (a) $\frac{3}{5} \boxed{<} \frac{4}{5}$ (b) $\frac{7}{9} \boxed{<} \frac{5}{9}$ (c) $\frac{3}{4} \boxed{=} \frac{9}{12}$ (d) $\frac{2}{5} \boxed{<} \frac{3}{8}$

3. (a) 9 (b) 36

4. (a) × (b) × (c) × (d) √

5. Proper Fraction $\frac{1}{2}, \frac{5}{8}, \frac{3}{8}, \frac{7}{9}, \frac{4}{5}, \frac{1}{9}, \frac{5}{7}$

   Inproper Fraction = $\frac{27}{8}, \frac{15}{14}, \frac{13}{11}$

6. (a) (i) Ascending Order = $\frac{3}{8}, \frac{3}{7}, \frac{3}{6}, \frac{3}{5}, \frac{3}{4}$

   (ii) Ascending Order = $\frac{1}{10}, \frac{3}{10}, \frac{4}{10}, \frac{6}{10}, \frac{9}{10}$

   (b) (i) Descending Order = $\frac{7}{8}, \frac{6}{8}, \frac{5}{8}, \frac{4}{8}, \frac{2}{8}$

   (ii) Descending Order = $\frac{4}{5}, \frac{4}{6}, \frac{4}{7}, \frac{4}{8}, \frac{4}{9}$

7. (a) $\frac{7}{5}$ or $1\frac{2}{5}$ (b) $\frac{13}{7}$ or $1\frac{6}{7}$ (c) $\frac{15}{17}$ (d) $\frac{52}{9}$ or $5\frac{7}{9}$

   (e) 1 (f) $\frac{14}{10}$ or $1\frac{4}{10}$ (g) $\frac{19}{4}$ or $4\frac{3}{4}$ (h) $\frac{37}{30}$ or $1\frac{7}{30}$

8. (a) 0 (b) $\frac{1}{4}$ (c) $\frac{1}{10}$ (d) $3\frac{2}{5}$

9. (a) $\frac{10}{12}, \frac{15}{18}, \frac{20}{24}$ (b) $\frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$

10. (a) $\frac{7}{4}$ or $1\frac{3}{4}$ (b) $\frac{27}{10}$ or $2\frac{7}{10}$ (c) $\frac{1}{6}$ (d) $\frac{1}{6}$

11. (a) $\frac{19}{4}$ or $4\frac{3}{4}$ (b) 12 (c) $5\frac{2}{8}$ (d) $\frac{13}{21}$

12. $\frac{2}{7}$ parts

13. (i) (a) 3 (b) $\frac{228}{25}$ (c) $9\frac{3}{25}$ (d) 156

(ii) (a) $\frac{27}{8}$ or $3\frac{3}{8}$ (b) $\frac{13}{3}$ or $4\frac{1}{3}$ (c) 60 (d) $\frac{35}{132}$

14. (a) $\frac{69}{35}$ or $1\frac{34}{35}$ (b) 1 (c) $\frac{375}{132}$ or $2\frac{111}{132}$ (d) 4

15. $\frac{189}{4}$ km or $47\frac{1}{4}$ km

4

DECIMALS

From this lesson, you will learn:

- To know about decimals
- Writing fractions, with denominator 10, 100, 1000 etc., in decimal form
- Convert decimal fractions into simple fractions and simple fractions into decimals
- Comparing decimals and arrange them in descending and ascending order
- Operations with decimals i.e addition, subtraction, multiplication and division by only whole numbers.
- Understanding fractions, with denominator 100, in the form of percent
- Convert decimals into percent and vice versa
- In units with decimals change them in higher or lower units.
- Solving based on decimals and percent, the daily life problems

4.1 What is a decimal?

We face problems in calculation for measurement, dealing with money and other daily activities involving multiplication and division.

These calculations can be done easily with the help of decimals.

Decimal is a fractions with denominator 10, 100 or multiples of 10. In other words in maths. When we use a point before any number to represent it's tenth, one hundredth or still smaller part is called a decimal representation.

Let us know about decimal

You have read numbers from ones, tens, hundreds, thousands and still greater numbers. You know the value of unit/ones is /tens value is ten times of unit/ones and write on the left side of ones and similar hundreds value ten times the tens value.

As

Thousand	Hundreds	Tens	Ones
1×1000=1000	1×100=100	1×10=10	1×1=1

If we go to the opposite side of ones place then we see the place values becomes one tenth.

Th.	H	T	O	Tenth	Hundredths	Thousandths
1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

In this way the place value of a digit of number becomes 10 times it's value on a place left side and becomes one tenth if it is in the right side. Before moving to right from ones place a point is marked (.) which is called decimal point. The place value of a digit of any number is shown in the table.

Place vlaue of 2 in the number 2222.222

Th.	H	T	O	Tenth	Hundredth	Thousandth
2	2	2	2	$\frac{2}{10}$ or 0.2	$\frac{2}{100}$ or 0.02	$\frac{2}{1000}$ or 0.002
2×1000 =2000	2×100=200	2×10=20	2×1=2	$2\div10=\frac{2}{10}$	$2\div100=\frac{2}{100}$	$2\div1000=\frac{2}{1000}$

Let us now learn to write fractions with denominator 10, 100, 1000 into decimal form.

If we make 10 equal parts of a unit then the value of it's one part will be one tenth. This will be called one tenth or decimal one. This is writen by placing a point to the left of ones place.

As $\frac{1}{10}$ = 0.1 (we read it zero decimal one)

If we further make ten equal parts of this one tenth part, each part will be further one tenth of this i.e one hundredth part and we write it as $\frac{1}{100}$ = 0.01 (and we read it zero decimal zero one) If we further make 10 equal parts of this one hundredth part, each part will be one thousandth part we write as $\frac{1}{1000}$ or one thousandth =0.001 (We read it as zero decimal zero, zero one)

We write the decimal numbers

One	=	1	=	1.0
One tenth	=	$\frac{1}{10}$	=	0.1
One hundredth	=	$\frac{1}{100}$	=	0.01
One thousandth	=	$\frac{1}{1000}$	=	0.001

Remember

One tenth of a unit/ones is $\frac{1}{10}$, we read it as zero decimal and write as 0.1

Let us now learn to write fractions with denominator 10, 100 and 1000 in the form of decimal

If the denominator of a fraction is 10 then place decimal before the numerator leaving one place on left the right 10	If the denominator is 100, then place a decimal point before the numerator leaving two places from right to left	If the denominator is 1000, then place a decimal before the numerator leaving three place from right to left
$\frac{1}{10} = 0.1$	$\frac{1}{100} = 0.01$	$\frac{1}{1000} = 0.001$
$\frac{2}{10} = 0.2$	$\frac{2}{100} = 0.02$	$\frac{2}{1000} = 0.002$
$\frac{11}{10} = 1.1$	$\frac{13}{100} = 0.13$	$\frac{15}{1000} = 0.015$
$\frac{1125}{10} = 112.5$	$\frac{215}{100} = 2.15$	$\frac{2566}{1000} = 2.566$

Attention

- If there are less number of digit in the numerator the number of places are to be left on the right side, to place a decimal in the left, then put 010's to reach the required place for placing the decimal
- At the end of the decimal point, if there is a '0' then this may be written/may not be written it has no value ex 1.0 = 1.00 = 1.000 = 1

Let us learn the place value of digits of decimals:

Number in		Place Value						
Digits	Words	Hundreds	Tens	Ones	Decimal	One tenth $\frac{1}{10}$	One hundredth $\frac{1}{100}$	One Thousandth $\frac{1}{1000}$
125.021	One hundred twenty five decimal zero two one	1	2	5	·	0	2	1
720.275	Seven hundred Twenty decimal two seven five	7	2	0	·	2	7	5
230.208	Two hundred thirty decimal two zero eight	2	3	0	.	2	0	8
300.025	Three hundred decimal zero two five	3	0	0	.	0	2	5

The part of a decimal number on the right of ones place is called decimal part.

Let us see what you have learnt 4.1

1. Write the following into words

   (i) 25.25 _____

   (ii) 15.03 _____

   (iii) 269.250 _____

   (iv) 115.999 _____

   (v) 205.302 _____

   (vi) 775.001 _____

2. Write the following in digits

   (i) One hundred forty nine decimal two seve one

   (ii) Five hundred sixty nine decimal five two seven

   (iii) Eight hundred eighty seven decimal two zero five

   (iv) Six hundred thirty decimal zero zero seven

3. Join the pairs of fractions and decimal number

I.	0.1	A.	$\frac{1}{1000}$
II.	0.001	B.	$\frac{5}{100}$
III.	0.01	C.	$\frac{3}{1000}$
IV.	0.4	D.	$\frac{1}{10}$
V.	0.003	E.	$\frac{1}{100}$
VI.	0.05	F.	$\frac{4}{10}$

4.2 Let us learn to convert fractions into decimals and decimals into fractions

For converting decimals into fractions after removing the decimal point from the decimals:

(a) Put the number as a numerator of a fraction.

(b) Count the number of digits on the right side of the decimal and put as many '0' S in denominator to the right side of 1.

(c) In the following decimal numbers there is only one digit to the right of decimal point. Remove the decimal and make this as numerator and put one zero to the right of 1.

$1.3 = \frac{13}{10}$ $0.3 = \frac{3}{10}$ $12.3 = \frac{123}{10}$ $1.7 = \frac{17}{10}$

(d) In the following decimals, there are two digits on the right of decimal point. There are two zero in the denominator on the right side of 1.

$0.13 = \frac{13}{100}$ $1.35 = \frac{135}{100}$ $2.05 = \frac{205}{100}$

(e) In the following decimals there are three digits to the right side of decimal point, hence there are three zeros in the denominator to the right side of 1.

$7.255 = \frac{7255}{1000}$ $0.125 = \frac{125}{1000}$ $0.005 = \frac{5}{1000}$ $7.055 = \frac{7055}{1000}$

Converting a fraction into decimals by dividing the numerator by denominator

Example:

Convert $\frac{4}{5}$ into decimals form

Divide the numerator 4 by 5, 4 is not divisible by 5 hence the quotient is 0
Put '0' after decimal, in the dividend 4.
now forty tenths divided by 5 to get 8 tenths or 0.8 i.e. 40 – 40 = 0 and quotient is 0.8

$$5 \overline{)\ 4.0} \quad 0.8$$
$$4.0$$
$$00$$

Hence, $\frac{4}{5} = 0.8$

Converting a fraction into decimal fractions by making an equivalent fraction

1. For converting fractions into decimals, the equivalent fraction to be made such that the denominator be either 10, 100, 1000.... etc.
2. Now, look at the denominator of an equivalent fraction and put a decimal in the numerator after as many places as the number of '0's are in the denominator.

See below given example

1. $\frac{4}{5} = \frac{4\times2}{5\times2} = \frac{8}{10} = 0.8$

2. $\frac{3}{25} = \frac{3\times4}{25\times4} = \frac{12}{100} = 0.12$

3. $\frac{8}{5}=\frac{8\times2}{5\times2}=\frac{16}{10}=1.6$

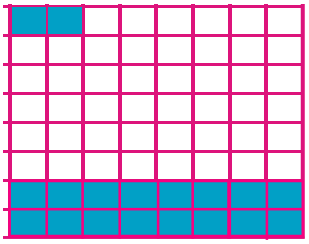
4. $\frac{9}{5}=\frac{9\times2}{5\times2}=\frac{18}{10}=1.8$

Let us see what you have learnt 4.2

Covert the following into decimal fractions by convert them into equivalent fractions

(i) $\frac{3}{4}$ (ii) $\frac{7}{25}$ (iii) $\frac{3}{125}$ (iv) $\frac{9}{5}$ (v) $\frac{3}{50}$

4.3 Let us learn to compare decimal fractions



Which is greater 0.2 and 0.02?

0.2 represents $\frac{2}{10}$ or two tenth parts .02 represents $\frac{2}{100}$ or two hundredth parts two red rectangles are out of the ten such horizontol rectangles representing $\frac{2}{10}$ or 0.2

0-2 or $\frac{2}{10}$ $\frac{2}{100}$ or 0-02

Whole as two small parts with blue colour are out of 100 small parts representing $\frac{2}{100}=0.02$

Which colour indicates that 0.2 is greater than 0.02

Attention

Tenth part of an object is always greater than 100th (hundredth part) of the same object

Think about, which is more if you get two parts out of 10 parts of a chocolate or two parts out of 100 parts of the same chocolate?

Similarly compare 0.5, 0.005, 0.05

0.05 means $\frac{5}{10}$ [5 parts out of 10] Greatest

0.05 means $\frac{5}{10}$ [5 parts out of 100] Smaller

0.005 means $\frac{5}{1000}$ [5 parts out of 1000] Smallest

we can write these as

$0.5 > 0.05 > 0.005$ or $0.005 < 0.05 < 0.5$

In descender we write as under

0.5, 0.05, 0.005

In ascending order we write as

0.005, 0.05, 0.5

Similarly 0.2 is smallest among 0.2, 0.3, 0.5, 0.6, 0.9 as 0.2 is 2 out of 10 and 0.9 is 9 out of 10.

We write these in

descending order $\rightarrow$ 0.9, 0.6, 0.5, 0.3, 0.2

ascending order $\rightarrow$ 0.2, 0.3, 0.5, 0.6, 0.9

Which decimal number is greater?

- A decimal number is greater when the number to the left of the decimal point is greater
- If the number to the left of the decimal point is equal or 0 then
  - (i) The number with greater digit at tenth place is greater
  - (ii) If tenth digits are same then the number with greater digits at hundered place is greater
  - (iii) If the digit at hundred the place is same then the number with greater digit at thousandth place will be greater

Let us learn to arrange decimal numbers in descending order

(i) 12.056, 2.456, 2.067, 10.967, 0.679

Ans. 12.056, 10.967, 2.456, 2.067, 0.679

(ii) 10.5, 10.29, 10.057, 10.406, 10.09

Ans. 10.5, 10.406, 10.29, 10.09, 10.057

(iii) 0.75, 0.057, 0.3476, 0.0750, 0.0940

Ans. 0.75, 0.3476, 0.0940, 0.0750, 0.057

(iv) 0.007, 0.700, 0.0007, 0.707

Ans. 0.707, 0.700, 0.007, 0.0007

Let us learn now to arrange number in ascending order

30.042, 30.004, 3.972, 3.875, 0.764

Ans. 0.764, 3.875, 3.972, 30.004, 30.042

Let us see what you have learnt 4.3

1. Arrange the numbers in descending order
   - (i) 8.007, 5.006, 8.008, 5.01, 3.004
   - (ii) 12.05, 17.007, 17.07, 15.009

2. Arrange the numbers in ascending order

(i) 9.001, 9.01, 9.21, 9.007, 11.001

(ii) 15.01, 15.001, 14.07, 19.205

4.4 Let us learn addition, subtraction, multiplication and division of decimal numbers

4.4.1 Addition of decimal numbers

1. Place the decimal numbers below each other according to their places and fill the place up and down of the two decimal numbers.
2. Decimals points should be in a line up & down.
3. If in a number there is no digit at tenth, hundredth and thousandth place then put '0' in that place.
4. In the numbers right most digit has least value and the left most has greatest value. As we start adding values from the ones/units in ordinary numbers similarly in decimals we start adding from the right most digit.

Example : Add 25.6, 3.04 and 34.27

```
  (1)     (1)
  25  .   60
   3  .   04
+ 34  .   27
  ----------
  62  .   91
```

Attention

- While adding decimal point should be in a line up/down.
- When there is one digit after the decimal point in a number then we can put '0' after this if need be to make the number of places equal i.e. 25.6 or 25.60.

Example

Add the following

15kg. 530g. 6kg. 65g. 10kg. 5gm

```
  (1)      (1)(1)
  15  .   530 kg
  06  .   065 kg
  10  .   005 kg
+ 31  .   600 kg
  ---------------
```

Total = 31.600 kg (31kg. 600gm)

Decimal part of a kg has three place i.e

1kg = 1.000. Hence we write kg & g in 3 decimals

4.4.2 Subtraction of decimals

1. Write the bigger number upper side and smaller lower up/down their decimal points.
2. If at the tenth's, hundredth's and thousandth's place there is no digit then please write '0' there.
3. Subtract from the right most digit.

Example

Sheetal purcchased 35m and 50cm cloth. 23m 28cm cloth was given ot the tailer. How much cloth's left with sheetal?

Solution

$$\begin{array}{r} {\scriptstyle 4}\,{\scriptstyle 10} \\ 35.50\ \text{m} \\ -\ 23.28\ \text{m} \\ \hline 12.22\ \text{m} \end{array}$$

$\therefore$ 12.22m cloth was left with sheetal or we can also write 12m 22cm

Example

Gopal has 25ℓ and 800mℓ oil. He sold 18ℓ and 250mℓ. How much oil is left with Gopal?

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 15} \quad {\scriptstyle 7}\,{\scriptstyle 10} \\ 25.800\ \ell \\ -\ 18.250\ \ell \\ \hline 07.550\ \ell \end{array}$$

7.550ℓ oil is left with Gopal or 7ℓ and 550 mℓ.

4.4.3 Multiplication of decimals by whole numbers

1. Write the decimal number as per place value positions. Place a decimal between whole and the decimal part.
2. Start multiplying with the right most digit of least place value.
3. Place the decimal point in the product as per the decimal number.

Example

One sack contain's 35.575kg wheat.

How much wheat will be in 5 sacks?

Sol. The wheat in one sack = 35.575kg

The wheat in five sacks = 35.575×5

$$\begin{array}{r} 35.575\ \text{kg} \\ \times\ 5\ \text{kg} \\ \hline 177.875\ \text{kg} \end{array}$$

$\therefore$ 177.875kg wheat will be in 5 sacks.

Example

If the perday labour is ₹142.75. Then how much will be for seven days?

Labour for one day = ₹142.75

Labour for 7 days = ₹142.75 × 7

$$\begin{array}{r} 142.75 \\ \times\ 7 \\ \hline 999.25 \end{array}$$

∴ Seven days labour = 999.25

4.4.4 Division of a decimal by a whole number

1. Start division from left as in the numbers.
2. When we bring down the digit after the decimal point then put a decimal point in the quotient before the next part of the quotient is written
3. If the whole number is not divisible then put '0' after decimal point and bring it down for divison

Look the example solved below and understand the procedure for division of decimals by a whole number

$$\begin{array}{r|l} & 119.39 \\ 7 & 835.73 \\ -7 & \\ \hline & 13 \\ -7 & \\ \hline & 65 \\ -63 & \\ \hline & 27 \\ -\ 21 & \\ \hline & 63 \\ -\ 63 & \\ \hline & 00 \end{array}$$

$$\begin{array}{r|l} & 5.7 \\ 9 & 51.3 \\ -45 & \\ \hline & 063 \\ -63 & \\ \hline & 00 \end{array}$$

$$\begin{array}{r|l} & 1.37 \\ 9 & 12.33 \\ -\ 9 & \\ \hline & 33 \\ -27 & \\ \hline & 63 \\ -\ 63 & \\ \hline & 00 \end{array}$$

$$\begin{array}{r|l} & 0.155 \\ 5 & 0.775 \\ -5 & \\ \hline & 27 \\ -25 & \\ \hline & 25 \\ -\ 25 & \\ \hline & 00 \end{array}$$

$$\begin{array}{r|l} & 12.35 \\ 7 & 86.45 \\ 7 & \\ \hline & 16 \\ 14 & \\ \hline & 24 \\ 21 & \\ \hline & 35 \\ 35 & \\ \hline & 00 \end{array}$$

Remember

- We follow the same procedure for division in decimals as in the normal division
- In the decimal the tenth part is written after the decimal point hence the quotient after this will be written after puting a decimal point before this.

Let us see what you have learnt 4.4

Solve the following

1. 50.41 + 35.67 = _____
2. 50.41 + 35.67 = _____
3. 0.75 – 7 = _____

4. $1.75 - 6$ = _____

5. $12.63 \div 3$ = _____

6. $633.76 \div 4$ = _____

7. A shopkeeper sold 12.75 meter cloth from a pack of 18 meters. How much cloth is left?

8. Gomati purchased 4.250kg potatoes, 1.500kg onion and 0.250kg tomatoes. How many kg vegetable did she purchase?

9. Mohan milked 8.800 liter milk. He sold 7.250 liter milk. How much milk is left with him?

10. The cost of a chair is ₹5670.50. How much cost of six chairs will be?

11. The cost of 5 packets of sweet is ₹2015.75. How much is the cost one pocket?

4.5 Let us learn to convert fractions with denominator 100 into percent, percent means the same out of 100, As $\frac{1}{100}$ means 1 out of 100 or 1%

Attention

Percent symbol is %

$\frac{15}{100}$ means 15 out of 100 or 15 percent or 15%

$\frac{44}{100}$ means, 44 out of 100 or 44 percent or 44%.

4.5.1 Convert decimals in to percent

To convert decimal into percent, put 1 in place of decimal point and put as many zero with 1 as the no of digits

$$0.62 = \frac{62}{100} = 62\%$$

$$0.78 = \frac{78}{100} = 78\% \qquad 0.10 = \frac{10}{100} = 10\%$$

$$0.05 = \frac{5}{100} = 5\% \qquad 0.57 = \frac{57}{100} = 57\%$$

$0.34 = \frac{34}{100} = 34\%$ $0.28 = \frac{28}{100} = 28\%$

4.5.2 Convert percent into decimal

1. A ballon seller purchased 100 ballons of red and blue colour. If red ballons are 60% What percent are the blue ballons?

Sol. Red ballons are 60% means $\frac{60}{100}$ or 60 out of 100

$\therefore$ No of blue ballons = 100-60 = 40

$\therefore$ Blue ballons are 40 out of 100 or $\frac{40}{100}$ or 40%

$\therefore$ Blue ballons = 40%

2. 200 people gathered in a marriage party. If there were 40% people were from bride-groom side, how many were from bride side?

Sol. People from bride-groom side = 40%

$\therefore$ 40% of 200 = $\frac{\cancel{200}^{2} \times 40}{\cancel{100}}$ = 80 people

$\therefore$ People from bride side = 200 – 80 = 120

Ans. 120 people or 60% or indecimal form

3. A farmer went to bazzar with ₹1000. He spent 30% the purchase of seeds and the cost spent on other Aggriculture equipments. How much was spent on equipments.

Sol. Amount spent on seeds = 30% of 1000

$= \frac{\cancel{1000}^{10} \times 30}{\cancel{100}}$

= ₹300

$\therefore$ Amount spent on equipments = 1000 – 300 = ₹700

$\therefore$ Amount spent in percent $= \frac{700}{1000} \times 100 = ₹70$

i.e 70% or 0.7

4. Ramjee's Salary = ₹500. He spent 82.5% of salary on house hold material. Rest deposited in Bank. How much salary was deposited in Bank?

Total salary of Ramjee = ₹500

Spent for household items = 82.5% of 5000

$$\frac{5000 \times 82.5}{100} = \frac{50 \times 82.5}{10} = 5 \times 825$$
$$= ₹4125$$

$\frac{825}{10}$ is the fractional form of decimal 82.5.

Money deposited in Bank = 5000 – 4125

= ₹ 975

Let us see what you have learnt 4.5

1. Convert into percent

(i) $\frac{73}{100}$ = _____ (ii) $\frac{5}{100}$ = _____ (iii) $\frac{20}{100}$ = _____

(iv) 0.025 = _____ (v) 0.08 = _____ (vi) 9.90 = _____

2. Ashlam's village is 300 km away from the city. He covers 80% of his journey to his village by Rail (Train). Remain covers by Bus. How many kilometer he covers by Bus?

3. 45% part of a Tank of capacity 500 litre is filled with water. What part is empty?

4.6 Let us learn to convert of a given unit into lower and higher units

There are 100 paise in a rupee

∴ One paisa is hundredth part of a rupee.

or ₹ $\frac{1}{100}$ = ₹0.01

10 paise = Ten hundredth = $\frac{10}{1000}$ = ₹0.10

25 paise = 25 hundredth of one rupee = ₹ $\frac{25}{100}$ = ₹0.25

Read and under stand

₹5 Paise 25 = ₹5.25

₹15 Paise 30 = ₹15.30

₹105 Paise 50 = ₹105.50

₹35 Paise 80 = ₹35.80

₹213Paise 10 = ₹213.10

₹100 Paise 1 = ₹ 100.01

Let us see what you have learnt 4.6

Below given rupees & paise, write them in decimal in given space

(i) ₹55 Paise 20 = ₹_____

(ii) ₹110 Paise 3 = ₹_____

(iii) ₹1 Paise 10 = ₹_____

(iv) ₹27 Paise 9 = ₹_____

(i) ₹82 Paise 40 = ₹_____

(ii) ₹57Paise 25 = ₹_____

(iii) ₹19 Paise 99 = ₹_____

(iv) ₹8 Paise 1 = ₹_____

4.6.2 Converting litre & mililitre into litre and write in decimals

Onelitre = 1000 mℓ (for litre into litre and for mililitre we write mℓ)

Read and understand

1 mℓ is one thousandth part of a litre

$\therefore$ 1 mℓ (Thousandth part of a litre) = $\frac{1}{1000}\ell = 0.001\ell$

10 mℓ = 10 Thousandth of a litre = $\frac{10}{1000}\ell = 0.010\ell$

250 mℓ = 250 Thousandth of a litre = $\frac{250}{1000}\ell = 0.250\ell$

4.6.3 Converting kilogram and gram in kilogram and writing in decimals

1 kilogram = 1000 gram (In short we write kilogram as 'kg' and gram as 'g')

$\therefore$ 1 gram = one thousandth part of a kilogram

$= \frac{1}{1000}$ kg = 0.001kg

100gm = Hundred thousandth part of a kilogram

$= \frac{1\cancel{00}}{10\cancel{00}}$ kg = 0.100kg

500gm = 5 hundredth thousandth part of kilogram

$= \frac{5\cancel{00}}{10\cancel{00}}$ kg = 0.500kg

4.6.4 Convert kilometer, meter into kilometer and write in decimals

One kilometer = 1000 meter (In short we write 'km' for kilometer and 'm'0 for meter)

1 meter = one thousandth part of a kilometer

$\therefore$ 1m = $\frac{1}{1000}$ km = 0.001km

10m = Ten Thousandth part of a km

$$\frac{10}{1000}\text{ km} = 0.010\text{km}$$

250m = 250 Thousandth part of a km

$$= \frac{250}{1000}\text{ km} = 0.250\text{km}$$

4.6.5 Convert meter, centimeter into meter and write in decimals

1 meter = 100 centimeter (In short we write m for meter and cm for centimeter)

$\therefore$ 1cm = 1 Hundredth part of a meter

$$= \frac{1}{100}\text{ m} = 0.01\text{m}$$

10cm = 10 Hundredth part of a meter = $\frac{10}{100}$ m = 0.1m

25cm = 25 Hundredth part of a meter = $\frac{25}{100}$ m = 0.25m

4.6.6 Convert centimeter, milimeter into centimeter and write in decimals

One centimeter = 10 milimeter (In short we write mm for milimeter)

1mm = One tenth of a centimeter = $\frac{1}{10}$ cm = 0.10cm

5mm = 5tenth parts of a centimeter = $\frac{5}{10}$ cm = 0.50cm

7mm = 7 tenth parts of a centimeter $\frac{7}{10}$ cm = 0.70cm

Let us see what you have learnt 4.7

(i)	5 kg 500 g	=	(ii)	18 kg 150 g	=
(iii)	25 ℓ 750 mℓ	=	(iv)	14 ℓ 750 mℓ	=
(v)	75 km 250 m	=	(vi)	300 km 200 m	=
(vii)	3 m 250 cm	=	(viii)	10 cm 300 cm	=
(ix)	3 m 5 mm	=	(x)	24 cm 7 mm	=
(xi)	12 cm 8 mm	=	(xii)	25 cm 4 mm	=

Let us Revise

1. The place value of digits from ones place to the left becomes 10 times
2. The place value of digits to the right of ones place decrease and becomes one tenth of its value
3. If a unit (ones) divided into 10 equal parts each part is one tenth of it's value
4. $\frac{1}{10}$ part of a unit (ones) is written as = 0.1 and we read it as "zero decimal one"
5. On the right side of unit (ones), the digits have values one tenth $\frac{1}{10}$, one Hundredth $\frac{1}{100}$ and one Thousandth $\frac{1}{1000}$ etc.
6. One unit (or one) = 1= 1.00 (one decimal zero zero)

   One Tenth $\frac{1}{10}$ = 0.10 (zero decimal one zero)

   One Thousandth $\frac{1}{100}$ = 0.0001 (zero decimal zero one)

   One Thousandth = $\frac{1}{1000}$ = 0.001 (zero decimal zero zero one)
7. If there is '0' at the end of decimal point it's value does not change
8. To convert a fraction into a decimal fraction, make the equivalent fractions such that the denominator becomes 10 or multiple of 10 i.e 100, 1000 etc.
9. To convert decimals into fraction, remove the decimal point and write number so left as numerator and in the denominator put as many zeroes after 1, as the number of digits are after the decimal point.
10. While comparing two decimal numbers decimal number with a greater digit on the left side of decimal point is greater.
11. If the digit on the left side of the decimal point of two decimal numbers or if it is '0' then
    (i) The number is greater whose tenth digit is greater
    (ii) If the tenth digit is also same the number will he greater whose hundredth place digit is greater
    (iii) If the digit at the hundredth place is also same then the number will be greater whose digit at the thousandth place is greater
12. While adding and subtracting two or more decimal numbers are in line up down, digits on the last & right side are written down their respective place

13. When there is no digit, in a decimal number at tenth, hundredth and thousandth place then we write '0' in their places as required addition & subtraction

14. While subtracting we start subtraction from the right most digit with least place value

15. For division, we use the same procedure as we do for whole numbers

16. While converting decimal into fraction, we put under 1 in the denominator and put as many zeros with 1 as the number of digits on the right side of the decimal number

Excercise

1. Write the decimals in words

   (i) 7.42

   (ii) 32.056

   (i) 47.307

   (i) 127.608

2. Convert the fractions into decimals

   (i) $\frac{25}{100}$ = _____ (ii) $\frac{6}{100}$ = _____

   (i) $\frac{375}{1000}$ = _____ (i) $\frac{37}{10}$ = _____

3. Write the following in digits

   (i) One thirty five decimal five one

   (ii) Seven Hundred eleven zero two

   (iii) Nine hundred three decimal two zero five

   (iv) Six hundred twenty one zero zero seven

   (v) Eight hundred thirty six decimal five three six

4. Covert decimals into fractions

   (i) 1.3 = (iv) 12.3 =

   (ii) 0.71 = (v) 0.006 =

   (iii) 0.02 = (vi) 6.033 =

5. Join the correct numbers in column X & Y.

Column X	Column Y
(i) $\frac{4}{1000}$	(A) 4.4
(ii) $\frac{4}{10}$	(B) 0.044
(iii) $\frac{44}{10}$	(C) 0.4
(iv) $\frac{4}{100}$	(D) 0.004
(v) $\frac{44}{1000}$	(E) 0.04

6. Convert the fractions in to decimals

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

7. Make the decimal numbers by converting the following equivalent fractions

(i) $\frac{3}{4}$ (ii) $\frac{7}{25}$

(iii) $\frac{9}{50}$ (iv) $\frac{7}{125}$

8. Change the decimals into fractions

(i) 0.15 = ☐ (iv) 7.001 = ☐

(ii) 7.125 = ☐ (v) 29.01 = ☐

(iii) 9.012 = ☐ (vi) 12.05 = ☐

9. Write the decimals in ascending order

(i) 11.056, 9.01, 7.123, 0.597, 10.137

_____ _____ _____ _____ _____

(ii) 0.31, 0.375, 0.0912, 0.081, 0.6

_____ _____ _____ _____ _____

10. Write the decimals in descending order

0.303, 0.003, 0.300, 0.0003

_____ _____ _____ _____

11. Add

(i) 0 . 3 4 (ii) 4 . 1 7 (iii) 7 0 3 . 0 1 2

+ 0 . 5 4 + 0 . 5 8 + 2 3 . 2 3 0

_____ _____ _____

_____ _____ _____

12. Subtract

(i) 2 0 . 6 5 (ii) 3 0 1 . 0 7 (iii) 9 0 5 . 0 0 7

– 8 . 9 7 – 1 3 9 . 1 9 – 2 3 6 . 1 2 0

_____ _____ _____

_____ _____ _____

13. Multiply

(i) 1 2 . 5 (ii) 7 2 0 . 0 1 (iii) 1 4 . 5 0

× 7 × 5 × 1 0 0

_____ _____ _____

_____ _____ _____

14. Multiply

(i) 8.310 

(ii) 16.6 100 

(iii) 409.55 

15. Solve the daily life related problems

(i) Sheela purchased copies for ₹150.75 and book for ₹212.50 Then how much money in total sheela spent?

(ii) Sushma purchased 8kg lady finger at the rate of ₹22.50 per kg. How much total did Sheela spend?

(iii) A village level worker of Govt. (Gram Sewak) distributed 1.250kg of tomato seed among five farmers. How much did one farmer get seed?

(iv) Mohan had 15.500kg paddy seed. Out of this 3.125kg seed he gave to his brother. How much seed is left with Mohan?

16. Convert into percent

(i) $\frac{57}{100}$ = _____ (ii) $\frac{9}{100}$ = _____ (iii) $\frac{30}{100}$ = _____

(iv) 0.50 = _____ (v) 0.07 = _____ (vi) 7.70 = _____

17. 400 quintal wheat was collected out of the wheat crop in Kareem's field. He sold 65% of this. How much wheat is left unsold?

18. Convert the percent into decimal

(i) 55% = _____ (ii) 20% = _____

(iii) 85% = _____ (iv) 67% = _____

19. Write in decimals

(i) 2 kg 100g ☐ (ii) 17 kg 5g ☐

(iii) 9 ℓ 15 mℓ ☐ (iv) 1 ℓ 100 mℓ ☐

(v) 15km 750 m ☐ (iv) 1 km 7 m ☐

Answers

Let us see what have you learnt

4.1

1. (i) Twenty five decimal two five
   (ii) Fifty five decimal two five
   (iii) Two hundred sixty nine decimal two five zero
   (iv) One hundred fifteen decimal nine
   (v) Two hundred five decimal three zero two
   (vi) Seven Hundred Seventy five decimal zero zero one

2. (i) 149.271 (ii) 569.527 (iii) 887.205 (iv) 630.007

3. (i) $\rightarrow$ D (ii) $\rightarrow$A (iii) $\rightarrow$E (iv) $\rightarrow$F
   (v) $\rightarrow$C (vi) $\rightarrow$B

4.2

1. $\frac{3}{4}\times\frac{25}{25}=\frac{75}{100}=0.75$

2. $\frac{7}{25}\times\frac{4}{4}=\frac{28}{100}=0.28$

3. $\frac{3}{125}\times\frac{8}{8}=\frac{24}{1000}=0.024$

4. $\frac{9}{5}\times\frac{2}{2}=\frac{18}{10}=1.8$

5. $\frac{3}{50}\times\frac{2}{2}=\frac{6}{10}=0.06$

4.3

1. (i) 8.008, 8.007, 5.01, 5.006, 3.004
   (ii) 17.07, 17.007, 15.099, 12.05

2. (i) 9,001, 9.007, 9.01, 9.21, 11.001
   (ii) 14.07, 15.001, 15.01, 19.205

4.4

1. 86.08
2. 14.74
3. 5.25
7. 5.25 m
8. 6 kg
9. 1.550 litre

4. 10.50
10. ₹3405
5. 4.21
11. 403.15
6. 158.44

4.5

1. (i) 73 % (ii) 5 % (iii) 20 % (iv) 25 %
   (v) 8 % (vi) 990 %
2. 45 km
3. 55 % part or 275 liter

4.6

(i) 55.20 (ii) 110.03 (iii) 1.10 (iv) 27.09
(v) 82.40 (vi) 57.25 (vii) 19.99 (viii) 8.01

4.7

(i) 5.500 kg (ii) 18.150 kg
(iii) 25.750 liter (iv) 14.750 liter
(v) 75.250 km (vi) 300.200 km
(vii) 5.5 meter (viii) 13 meter
(ix) 3.005 meter (x) 24.70 cm
(xi) 12.80 cm (xii) 25.40 cm

Excercise

1. (i) Seven decimal four two
   (ii) Thirty two decimal zero five six
   (iii) Forty seven decimal three zero seven
   (iv) One hundred twenty seven decimal six zero eight

2. (i) 0.25 (ii) 0.06 (iii) 0.375 (iv) 3.7

3. (i) 135.51 (ii) 711.02 (iii) 903.205
   (iv) 621.007 (v) 836.536

4. (i) $\frac{13}{10}$ (ii) $\frac{71}{100}$ (iii) $\frac{2}{100}$ (iv) $\frac{123}{10}$
   (v) $\frac{6}{1000}$ (vi) $\frac{6033}{1000}$

5. (i) $\rightarrow$ (D)
   (ii) $\rightarrow$ (C)
   (iii) $\rightarrow$ (A)
   (iv) $\rightarrow$ (E)
   (v) $\rightarrow$ (B)

6. (i) 0.06 (ii) 0.875 (iii) 0.8

7. (i) 0.75 (ii) 0.28 (iii) 0.18 (iv) 0.056

8. (i) $\frac{15}{100}$ (ii) $\frac{7125}{1000}$ (iii) $\frac{0912}{1000}$ (iv) $\frac{7001}{1000}$
   (v) $\frac{2901}{100}$ (vi) $\frac{1205}{100}$

9. (i) 0.597, 7.123, 9.01, 10.137, 11.056
   (ii) 0.081, 0.0912, 0.31, 0.375, 0.6

10. 0.303, 0.300, 0.003, 0.0003

11. (i) 0.88 (ii) 4.75 (iii) 726.242

12. (i) 11.68 (ii) 161.88 (iii) 668.887

13. (i) 87.5 (ii) 3600.05 (iii) 1450

14. (i) 0.83 (ii) 0.166 (iii) 81.9

15. (i) ₹363.25 (ii) ₹180 (iii) 250 kg (iv) 12.375 kg

16. (i) 57% (ii) 91% (iii) 30%
(iv) 50% (v) 7% (vi) 770%

17. 140 Quantal

18. (i) 0.55 (ii) 0.20 (iii) 0.85 (iii) 0.67

19. (i) 2.100 kg (ii) 17.005 kg (iii) 9.015 liter (iv) 1.100 liter
(v) 15.750 km (vi) 1.007 km

5

MEASUREMENT

From this lesson, you will learn

- Utility of measurement in daily life
- Knowlege of different units of measurement of length
- Knowledge of different units of measurement of weight
- Knowledge of units of measurement of volume/capacity
- Knowledge of units of tempereture
- Knowledge of different units of time
- Knowledge of Indian currency
- Addition, subtraction, multiplication and division of different units
- Solving daily life problems based on measurement

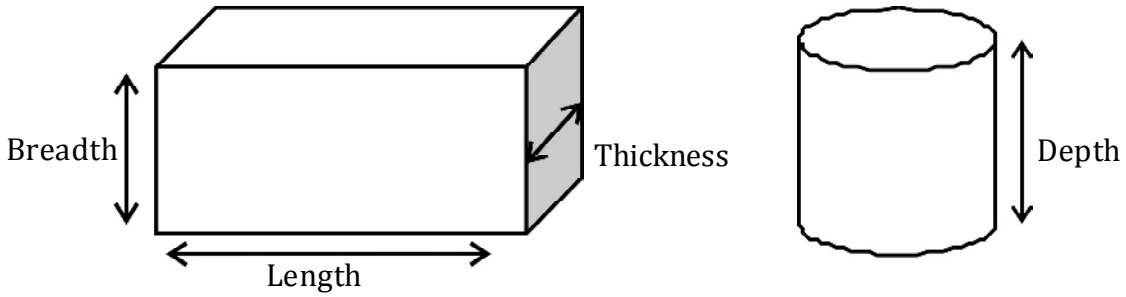
Utility of measurement of length in daily life

We need to measure the length, width, thickness etc. of different objects as to measure the length of the sides of the house, room, field and cloth etc. We need to know the distance between two places so as to make choice of the means of transport like, train, bus, taxi, riksha etc. to settle the fare. In earlier days the length was used to be measured in foot, yards, mile, furlong, kosh etc.

Fields were measured in terms of gathe a unit normally used by the Patwaris for the measurement of land used for agriculture purpose etc.

Persently, we use milimeter, decimeter, centimeter, meter and kilometer to measure the length. The basic unit of measure of length is "meter". Some people still use yards to measure the cloth. Fields are also measure by some people, in yards. Hence, we need to know these units. Let us know the units to measure the length.

5.1 Let us understand the different units to measure length and the relation among them



Actually, we measure length only in the measurement of thickness and height etc. We measure this with the help of a scale (Feeta). You have read that to measure small lengths we use centimeter and milimeter and to measure the larger lengths, we use meter and kilometer.

- We make use of a scale to measure length, breadth, height, depth, thickness or round objects.
- We use standard units for the measurement like a milimeter, decimeter, centimeter, meter and kilometer, but the basic unit to measurement of length is meter.
- On the scale, the distance between two digits marked on the centimeter scale is called 1 centimeter.
- The distance between '0' and '100cm' is called 1 meter.
- You might have seen on the scale there are 10 small verticle lines between '0' and 1 cm. The distance between two such small lines is called 1 milimeter we write as 1mm. In this way, 10 mm = 1cm

Let us know about various units of measure of legth

In our daily routine we need to use mm, cm, meter, kilometer etc. for the measurement of length to the relations among these units is shown below:

10 milimeter	=	1 centimeter
100 centimeter	=	1 meter
1000 centimeter	=	1 kilometer

Other then the above, we also use the following units:

10 centimeter	=	1 decimeter
10 decimeter	=	1 meter
10 meter	=	1 decameter
10 decameter	=	1 hactometer
10 hactometer	=	1 kilometer

In short there units are written as shown under.					
Milimeter	–	mm	Decameter	–	dm
Centimeter	–	cm	Hactometer	–	hm
Decimeter	–	dm	Kilometer	–	km
Meter	–	m			

Let us learn to convert these into each other

1. To convert centimeter into milimeter:

Multiply the centimeter by 10 to get milimeter.

as 1 cm = 10 mm

4 cm = 4×10 mm = 40 mm

11cm = 11×10 mm = 110 mm

7 cm 5 mm = (7×10+5) mm = (70+5) mm = 75 mm

2. To convert milimeter into centimeter:

We divide the milimeter by 10 get centimeter.

$1 \text{ mm} = (1 \div 10) \text{ cm} = \frac{1}{10} \text{ cm} = 0.1 \text{cm}$

40 mm = (40÷10) cm = 4 cm

90 mm = (90÷10) cm = 9 cm

67 mm = (67÷10) cm = 6.7 cm

3. To convert meter into centimeter: \

Multiply the meter by 100 to get centimeters.

1 meter = centimeter

3 m = (3×100) cm = 300 cm

5 m = (5×100) cm = 500 cm

4 m 50 cm = (4×100+50) cm = (400+50) cm = 450 cm

4. Convert centimeter into meter:

Divide the given number of centimeter by 100 to get meter.

100 cm = 1 m

400 cm = (400÷100) m = 4 m

560 cm = (560÷100) m = 5.60 m

5. Convert kilometer into meter:

Multiply the kilometer by 1000 to get the meter.

1 km = 1000 m

15 km = (15×1000) m = 15000 m

9 km 600 m = (9×1000+600) m = (9000+600) = 9600 m

6. Convert meter into kilometer:

Divide the meter in by 1000 to get the kilometer.

1000 m = 11 km

600 m = (6000÷1000) km = 6 km

7800 m = (7800÷1000) km = 7.800 km

Understand tthe following

7km 800m = 7.800km

5m 6 cm = 5.60m

6cm 7mm = 6.70cm

Let us see what you have learnt 5.1

1. Fill in the blanks

4 cm = 40 mm — 1 cm = 10 mm, 4 cm = 4x10 mm = 40 mm

8 cm = ____mm

10 cm = ____mm

15.7 cm = ____mm

2. 2 m = 200 cm — 1 m = 100 cm, 2 cm = 100x2 cm = 200 cm

5 cm = ____cm

7 m = ____cm

4.5 cm = ____cm

3. 3 km = 3000 m — 1 km = 1000 m, 3 km = 3x1000 m = 3000 m

6 km = ____m

15 km = ____m

4.375 km = ____m

4. 50 mm = 5 cm — 10 mm = 1 cm, 50 mm = (50÷10) cm = 5 cm

80 mm = ____cm

60 mm = ____cm

75 mm = ____cm

5. 500cm = 5cm

700cm = ____m

1200mm= ____m

1560cm = ____m

100 cm = 1 m, 500 cm = (500÷100) cm = 5 m

6. 400m = 4km

9000m = ____km

11000m = ____km

15775m = ____km

1000m = 1 km, 4000 m = (4000÷1000) km = 4 km

7. (i) 9.800km = 9_____ 800_____

(ii) 7.60m = 7 _____ 60 _____

8. 2m 50cm = 200m + 50cm = 250cm

5m 80cm = _____ + _____ = _____ cm

7 m 8cm = _____ + _____ = _____ cm

_____ m _____ cm = 300 cm + 15 cm = _____ cm

9. 750 cm = 700m + 50cm = 7m 50cm

1080 cm = 1000cm + _____cm = 10m _____cm

1230 cm = _____cm + _____cm = _____m_____cm

1608 cm = _____cm + _____cm = _____m_____cm

10. 1km = 1000m

3km = 3000 m

3km 500m = 3000m + 500m = 3500m

12km 300m = _____m + _____ m = _____ m

15km 55m = _____m + _____ m = _____ m

7km 8m = _____m + _____ m = _____ m

11. Distance of temple from Manoj's house is 4 km 30m.

(a) How many meters away is mandir from Manoj's house?

(b) Sonia require 30m 80cm cloth for her suit. How many centimeter cloth Sonia must purchase?

(c) A well is 60m 10cm deep. How many centrimeter is the depth of the well?

5.1.2 Let us learn to add the measures of length

(a) Rajesh's shop is 2km 300m away from his home. Bada bazar is further 3km 200m from the shop in this same direction. How four bada bazar from Rajesh's house?

Solution

	km	m
Distance of shop from Rajesh's home	2	300
Distance of bazzar from shop	+3	200
Distance of bazzar from home	5	500
	5km	500m or 5.500km

While adding write km & meter up and down of same unit.

(b) 4 meter cloths need for the elder daughter of Deenu, 3 meter 80cm is for the second daughter and 3m 50cm cloth is required for third daughter. How much cloth Deenu should purchase?

Solution

	1	
	m	cm
Cloth required for elder daughter	4	00
Cloth required for second daughtly	3	80
Cloth required for third daughter	+3	50
Total cloth required	11	30

Total cloth required = 11m 30cm

= 11.30m

∴ Deenu should purchage 11.30m cloth.

Let us see what have you learnt 5.2

1. Add

(a)

cm	mm
17	8
+21	1

(b)

m	cm
12	50
+10	45

(c)

km	m
18	350
+21	230

(d)

cm	mm
26	7
+38	5

(b)

m	cm
9	76
+12	55

(c)

km	m
7	440
+15	860

2. Nagpur is 1260 km from Delhi. Bangaluru is 1387 km from Nagpur. How for is Bangaluru from Delhi via Nagpur?

5.1.3 Let us learn subtraction of measures of length

(i)

	Km	m
	62	1250 (1000+250)
	63	250
–	35	500
	27	750

Ans. 27km 75m

Subtract meter from meter but 500 can't be sutracted from 250m ∴ Borrow 1km from 63, leaving 62km and marking 1250m at the meters place Now 500m is subtracted from 1250m ∴ 750m and 27km when subtracted 35 from 62.

(ii)

	m	cm
	3	
	54	70
–	48	80
	5	90

Ans 5m 90cm

80 cm is not subtracted from 70 cm. One meter (100 cm) borrowed from 54 leaving 53 on and making 170cm at the cm place ∴ 80 subtracted from 170 = 90 & 57–48=5

5.1.4 Let us learn multiplication of the measures of length

+ (1)		
	km	m
	15	200
		× 8
	121km	600m

First multiply 200 by 8 gives 1600m or 1km and 600m. Now 15×8=120 km and 1 carryover of 1600m is added gives 121km

+ (3)		
	m	cm
	60	30
		× 12
	723m	60

Multiply 30cm by 12 gives 360cm or 3m and 60cm (3m is carry over to meters). Now multiply 60 by 12 gives 720m add 3m carry over from 360cm.

+ (1)		
	cm	mm
	35	2
		×5
	176cm	0mm

Let us do some more problems

2 meter 70cm cloth is required for one shirt. How much cloth will be required for making 9 shirts of same size?

		m	cm
Cloth for one shirt	=	2	70
		+ 6	
For 9 shirts	=	2	70
			×9
		24m	30cm

70 cm is multiplied by 9 gives 630cm. 6 meter is carried over to meter and 30cm is placed under cm and 2m×9 =18m+6m carry one = 24m

∴ Cloth required for 9 shirts = 24m 30cm

5.1.5 Let us learn division of mesures of length

27m 45cm ÷ 5 = 2745cm÷5

First convert 27m and 45cm into cm and then divide by 5 or convert into meter i.e. 27m 45cm = 27.45m and divide by 5

or

```
      5 4 9 cm
   ------------
5) | 2 7 4 5
     2 5
   -------
       2 4
       2 0
     -------
       - 4 5
       - 4 5
     -------
         0
```

```
      5 . 4 9m
   ------------
5) | 2 7.4 5
     2 5
   -------
       2 4
       2 0
     -------
       - 4 5
       - 4 5
     -------
         0
```

The length of a pipe is 58 meter. Four equal parts are made. What is the length of each part?

```
      14.5
   ------------
4) | 5 8. 0
     -4
     ---
      1 8
     -1 6
     ----
       2 0
       2 0
     -----
         0
```

Ans. 14m- 50cm or 14.50m

Let us see what you have learnt 5.3

(i) A train from Agra to reached Bhopal covered 525km then Bhopal to Nagpur covered 480km. How much distance the train covered from Agra to Nagpur?

(ii) Rahmat had a pipe 325m 50cm Out of this Ramesh shared 27m 60cm. How much length of pipe is left with Rahmat?

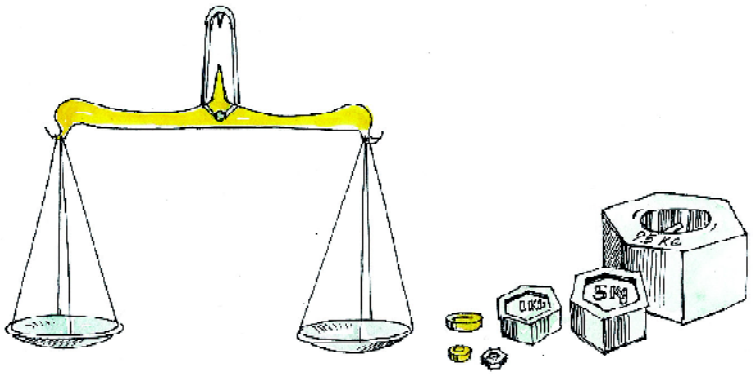
(iii) 4 m 75cm cloth is required for Sunita's one suit. How much cloth is required for six such suits?

(iv) One packet of cloth is of 128 meters. Five equal parts to be made out of this. What will be length of each part?

5.2 Let us learn about the units of mesure of weight

In our daily routine, we make purchages by weight of many things as 20kg wheat flour, 2kg onion, 250g cumin, 50g cardamom etc.

We have learnt that to measure weight we use different scales (balance) and weights.



We measure lighter things or which are to be purchage in small quantity by gram or miligram.

Heavier objects/things or which we required to be used in large quntity we measure by kg, quintal etc.

Units of Weight

10mg	=	1cg
10cg	=	1dg
10dg	=	1g
10g	=	1 dag
10dag	=	1hg
10hg	=	1kg
100kg	=	1quintal
10quintal	=	1 ton
1gm	=	1000mg
1kg	=	1000g

Attention for symbols of units of weigth.

Kiologram	=	kg
Hactogram	=	hg
Decagram	=	dag
Gram	=	gm
Decigram	=	dag
Centigram	=	cg
Miligram	=	mg

5.2.1 Let us learn to convert units of measure of weight into each other

(i) Convert gram into miligram

1gm = 1000mg

15gm = 15×1000 mg = 1500mg

22gm 500mg = $(22 \times 1000 + 500)$mg = (22000+500)mg = 22500mg

(ii) Convert mg into gram

$1\text{mg} = (1 \div 1000)\text{gm} = \frac{1}{1000}\text{gm} = 0.001\text{gm}$

2000mg = $(2000 \div 1000)$gm = 2gm

4650mg = (4000 + 650)mg

= 4gm 650mg = 4.650 gm

(iii) Convert kg into gm

1kg = 1000gm

5kg = 5000gm

(iv) Convert gm in to kilogram

$1gm = (1 \div 1000)kg = \frac{1}{1000} kg = 0.001kg$

5000gm = (5000 ÷ 1000)kg = 5kg

(v) Understand the following also

5kg 600gm = 5.600gm

70gm 250mg = 70.250gm

5.2.2 Let us learn to add the units of measure of weight

Keshaw purchased 35kg 500gm onion and 15kg 750gm potatoes. How much total did he purchase?

Solution :

	kg	gm	
	(1)		
Onion	35	500	500 gm + 750 gm = 1250gm or 1kg 250gm
Potatoes	+15	750	
Total	51	250	1 carry over to be added in kg making it 51

∴ Total weight = 51.250kg

5.2.3 Let us learn to subtract the units of measures of weight

Rama purchased 80kg 700gm wheat. She got 25kg 350g wheat into flour. How much wheat is left with her?

	kg	g	
Total wheat	– 80	700	
Converted in flour	– 25	350	55kg 350gm = 55.350kg
	55	350	

5.2.4 Let us learn multiplication of the units of weight

The capacity of one sack is 37kg 600g rice. How much there will be in 8 sacks?

Solution:

kg	gm	
37	600	600gm × 8 = 4800gm = 4kg
	× 8	37kg × 8 = (296kg + 4 carry over)
300	800	

$\therefore$ 300kg 800gm or 300.800kg

$\therefore$ 8 sacks will contain 300. 800kg. wheat.

5.2.5 Let us learn division of units of measure of weight

Razia prepared 80 kg. proper. She made packs of 5kg each. How many packets did the make?

Solution :

```
5) 80 (16
  –5
  30
 –30
   0
```

Ans. 16 packet

Let us see what you have learnt 5.4

(i) Sandeep purchased 35kg 25gm rice. His brother also purchased 62kg 750gm rice. How much rice was purchased in their house?

(ii) The tomato crop in Shyam's field was 88kg 600gm. He gived 79kg 800gm potatoes. How much potatoes are left with him?

(iii) Geeta purchased 9 packets of grams. Each packet was of 12kgm 500gm grams. How much in total did she purchased?

(iv) Seema had 72gm 200mg gold. She asked the golds with prepare 4 bangles. How much gold is required for one bangle?

5.3 Let us know about volume/Capacity

We need different containers for water, oil, ghee liquid material. How much liquid is filled in a container is called the capacity of the continers.

5.3.1 Let us learn the units of capacity

You know that the measure of liquids like Milk, Kerosene oil, Petrol, Diesel etc. is different from the measure of solids. Liquids are measured in litre/mililitre.

Liquids are measured by litres/mililitre containers. Litre and mililitre are related as given below.

Figures of standard measuring containers

1 litre = 1000 mili litre

½ litre = 500 mili litre

1000 litre = 1 kilo litre

Other than the above units, we also use the following units for measuring capacity.

10 ℓ = 1 dal (daca litre)

100 ℓ = 1 hℓ (hacto litre)

10 dal = 1 hℓ (hacto litre)

10 dl = 1 ℓ

100 cl = 1 ℓ

1000 ml = 1 ℓ

6 litre 500 mililitre = 6.500L

500 ml = $\frac{1}{2}$ ℓ or 0.5 ℓ

∴ 6 litre 500 mililitre = 6. 500 ℓ

5.3.2 Let us learn to add teh measures of capacity

One day, from his oil Depo Dhaniram sold 80ℓ 500mℓ oil. Next day 7ℓ 750ℓ oil was sold. How much did he sell on two days?

Solution:

ℓ	mℓ	
		500+750 = 1250 mℓ
80	500	1250ℓ = 1ℓ + 250mℓ
+67	750	250mℓ is written under mℓ and 1 Carryover (80 + 67 + 1 = 148)
148	250	
or	148ℓ 250ℓ	or 148.250ℓ

5.3.3 Let us learn to subtract the measures of capacity

Ahmed halwai purchased 110ℓ 500ℓ milk. He prepared sweets with 76ℓ 75ℓ milk. How much milk is left with him?

Solution:

ℓ	mℓ	
109	1500	
110	500	
– 76	750	
33	750	The milk left with halwai = 33ℓ + 50mℓ or 33.750ℓ

5.3.4 Let us learn to multiply the measures of capacity

If one pitcher pot contains 11ℓ 500ℓ water then how much water will be 8 such pitcher pots?

ℓ	mℓ
11	500 mℓ
	×8
88	400 mℓ

500 × 8 = 40mℓ = 4ℓ

88ℓ + 4000ℓ = 88ℓ + 4ℓ = 92ℓ

Ans = 92ℓ

5.3.5 Let us learn to divide the measures of capacity

Madan filled a drum with 200 litre water using a 5 litre container. How many times the small container will fill the drum?

Solution: No. of small containers times the small container = 200÷5

∴ The drum will be filled by 40 time the small container = 40 container

```
5) 2 0 0 (40
  –2 0
  – 0 0
    0
```

Let us see what you have learnt 5.5

(i) In a school 200 mℓ milk is given per day to each student. How much milk will be required in a day for 425 students.

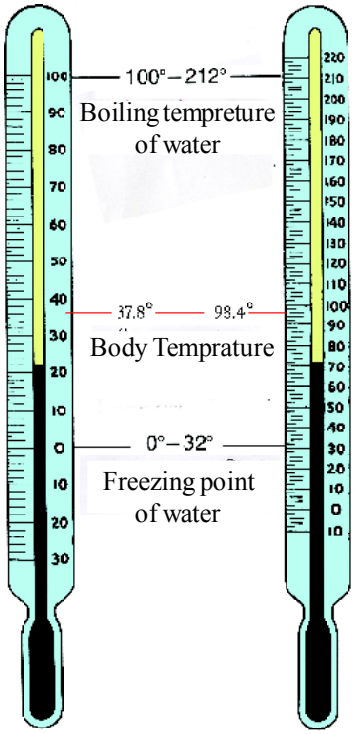
(ii) Charku's one buffalo gave 8ℓ 300 mℓ milk and the second gave 5ℓ 800mℓ. How much milk both buffaloes gave?

(iii) Gauri purchased a container filled 27ℓ oil. She sold 20ℓ 500mℓ oil. How much oil is left with her?

(iv) Mahmood purchased 20ℓ 500mℓ milk in 7 days. If daily consumption of milk is same in his house. How much milk is required for one day?\

5.4 Let us learn about temperature

In your home when some one is having fever, we ask how much is the fever? You listen the news in the TV and often we hear that today's temprature was 43 degre. Sometimes we say today's day is very hot or cold. You look at your fridge, temperature is set as per our need. How much is the fever, how hot or cold the day is at what temperature water boils or at what temperature water feezes, to know all this to know all this we need to learn the measurement is the measure to tell something is how hot or cold is? When we put a container full of water on fire the temperature increases slowly. After sometime steam will be formed. Similar temperatures comes down and water is freezed, as you have seen in the friedge.



Similiarly if some one feels warm, we use thermometer to measure the temprerture. Our body has a fixed temperature in normal circumstances as. If our body temperature crosses that point we feel warm and we say we have fever.

To measure the temperature, we use an insrtrument, called Thermometer. Temperature is measured in Celsius/Farenheit degrees. The symbol of degree is 0.

5.4.1 Let us learn the unit of temperature

Temperature is measured in two different units.

(i) Degree Celsius °C – This unit is most frequently used.

(ii) Degree Fahrenheit °F – This unit is used to measure the temperature. This is smaller then degree Celsius.

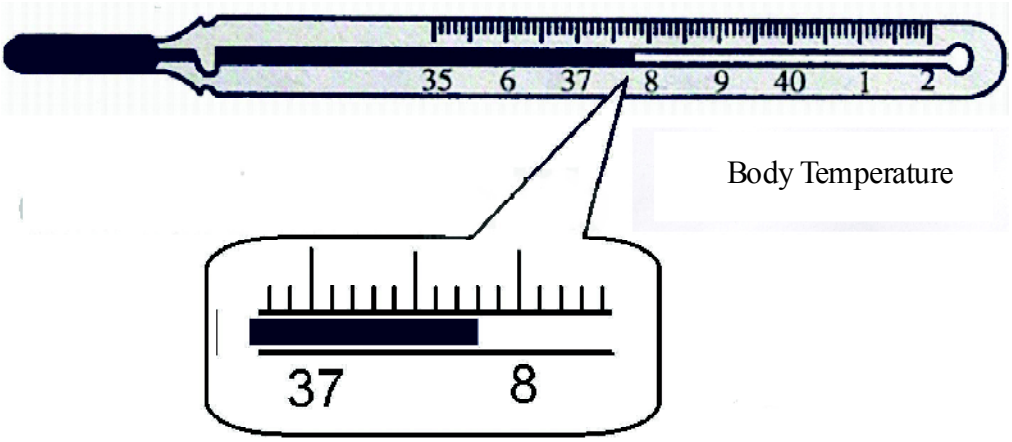
On the degree Celsius Thermometer normally marked signs from 30°C to 110°C. On the Fahrenheit Thermometer the making's are from –10° F to 212°F.

5.4.2 Let us learn some general Temperature

(1) Body Temperature

Our body's normal temperature is 37 °C or 98.°6F.

We use a special Thermometer to measure the body Temperature. We call it a 'Doctor Thermometer'.



In this Thermometer the degree are marked from 35°C to 42°C. In the Farhrenheit degree thermometer the making are from 95°F to108°F

If our body temperature goes beyond 37°C or 98°F then we have fever in our body. Body temperature more than 40°C or 106°F becomes risky for life. In such situation we should consult the doctor and also using cold stripes of cloth bring the temperature down.

(2) Environment Temperature

In the hot reigions the temperature reaches upto 48°C to 50°C. During such environment we should avoid the hot winds and drink lots of water to keep the temperature under centre.

Similarly in the cold places the temperature sometime comes down to o°C and we see all around ice layers. Cold waves are also dangerous for our body. Hence, we must use woolen clothes to cover our body for safety purpose.

(3) Boiling and freezing point of water

Pure water normally boils at 100°c. This is called the boiling point of water. On hills, due to less air pressure, water may boil even before 100°c. Pure water freezes at 0°C, this is called it's freezing point.

Let us learn what you have learnt 5.6

1. What is Temperature?

   _____

2. What are the units of measure for temperature?

   _____

3. What is filled in the bulb of Thermometer?

   _____

4. How much is a normal person's body Temperature in °C ?

   _____

5. What are the boiling and freezing points of pure water?

   _____

5.5 Let us learn the units of measurement of time

You are well aware about an hour, minutes, seconds, day, night, month & the year. Time is measured in hours, days, weeks, month, years, decades & century etc. You see that a day & night covers 24 hours. Sometimes days are longer, nights are shorter and sometimes nights are longer and days are shorter. We know together day a night is 24 hours. Our all works are time based. As day-night labour, 100 days work in Manrega for each labour. All these time based. Our watch/longer alaram tells time in hours, minutes and seconds

Let us now learn the measure of time and other related information.

Fornoon – From 12 mid night to 12 noon (am)

Afternoon – From 12 noon till 12 mid night

The smallest unit of time is second. In addition minutes, Hours, Days, Weeks, Months, Years, Decades, century etc.

One day	=	24 hours
One hour	=	60 minutes
One minute	=	60 second
One week	=	7 days

One month	=	30 or 31 days except Feb. Where 28 or 29 days
One year	=	12 months = 365 or 366 days
One decade	=	10 years
One century	=	100 years
One millenium	=	100 years

5.5.1 Let us know about calender

Look at the below given calender carefully.

12 months are shown in the calender in order (January to December)

Year 2014

	Jan					Feb					March					April				
Sun		5	12	19	26		2	9	16	23	30	2	9	16	23		6	13	20	27
Mon		6	13	20	27		3	10	17	24	31	3	10	17	24		7	14	21	28
Tues		7	14	21	28		4	11	18	25		4	11	18	25	1	8	15	22	29
Wed	1	8	15	22	29		5	12	19	26		5	12	19	26	2	9	16	23	30
Thur	2	9	16	23	30		6	13	20	27		6	13	20	27	3	10	17	24	
Fri	3	10	17	24	31		7	14	21	28		7	14	21	28	4	11	18	25	
Sat	4	11	18	25		1	8	15	22		1	8	15	22	29	5	12	19	26	

	May					June					July					August				
Sun		4	11	18	25	1	8	15	22	29		6	13	20	27	31	3	10	17	24
Mon		5	12	19	26	2	9	16	23	30		7	14	21	28		4	11	18	25
Tues		6	13	20	27	3	10	17	24		1	8	15	22	29		5	12	19	26
Wed		7	14	21	28	4	11	18	25		2	9	16	23	30		6	13	20	27
Thur	1	8	15	22	29	5	12	19	26		3	10	17	24	31		7	14	21	28
Fri	2	9	16	23	30	6	13	20	27		4	11	18	25		1	8	15	22	29
Sat	3	10	17	24	31	7	14	21	28		5	12	19	26		2	9	16	23	30

	September					October					November					December				
Sun		7	14	21	28		5	12	19	26	30	2	9	16	23		7	14	21	28
Mon	1	8	15	22	29		6	13	20	27		3	10	17	24	1	8	15	22	29
Tues	2	9	16	23	30		7	14	21	28		4	11	18	25	2	9	16	23	30
Wed	3	10	17	24		1	8	15	22	29		5	12	19	26	3	10	17	24	31
Thur	4	11	18	25		2	9	16	23	30		6	13	20	27	4	11	18	25	
Fri	5	12	19	26		3	10	17	24	31		7	14	21	28	5	12	19	26	
Sat	6	13	20	27		4	11	18	25		1	8	15	22	29	6	13	20	27	

Months in a year and the no. of days in months are as under:

	Name of month	No. of day
1.	January	31
2.	February	28 or 29
3.	March	31
4.	April	30
5.	May	31
6.	June	30
7.	July	31
8.	August	31
9.	September	31
10.	October	30
11.	November	30
12.	December	31

Leap year comes in every four years time. The year divisible by 4 is a leap year. Normally in february there are 28 days but in a leap year it has 29 days and the leap year 366 days otherwise one year has 365 days.

Total 365 or 366 in a leap year

A week : One week has seven days. Seven days of a week are named after planets. These are: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.

- We have given the information for an english calender which starts from January 1 to December 31. 1st day of January is celebreted as new years day.
- In our country, there are different celenders called desicalender pertaining to a particular religion, Vikrmi Samvat, Hizerysamwat, Nanakshahi calender.
- According to Hindu calender the year starts from "Chaitra Shukal Partipada" Date 11.04.2013 is the 1st day of Vikrmi samwat 2070.
- From the calender we know the informations of different festivals.
- The use of calender is also important for fixing the marriage dates and Janam Patri etc.

Let us see what have you learnt 5.7

1. From the given calender of year 2013, find the relevent information and fill in the blanks.

   (i) Which day was on 7th July?

   _____

   (ii) Which months have five sundays?

   _____

   (iii) Which of the two months have same day & date?

   _____

   (iv) In which month falls saturday on 10th date?

   _____

2. Fill in the blanks

   (i) 1hour = _____ minutes

   (ii) 1 minute = _____ Seconds

   (iii) 1 century = _____ years

   (iv) 1 year = _____ months

3. In which months of the year, there are 30 days?

   _____

4. Which of following are leap years?

   1996 2012 2002 2014

5.5.2 Let us learn to see the time in the watch

The watch has strong relations in our daily life. We go to work at a particular time, work for number of hours, at which time we started work and at which time we finished our work etc.

We need it everyday. Not only this, our time for sleeping, dinner time, tea time, in the school recess time, all we do to look at the watch/clock.

5.5.3 Let us know about the watch/clock

There are two types of clocks. One in which we directly see the time.

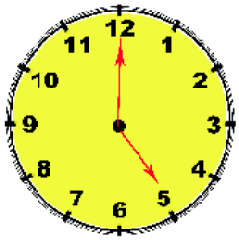
4:30	13:15	22:00	23:55
30 minutes past 4 O'clock in morning	Fifteen minutes past one o'clock	22hrs. or 10 o'clock night	Fifty five minutes past twenty three night

(55 minuts past 11 in nights)

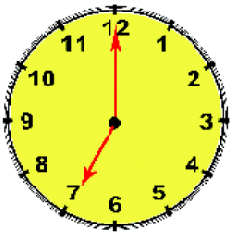
These types of clock are called digital clocks. These are seen on the bus stand, railway station and the airports.

Second type watches are called "analog watches".

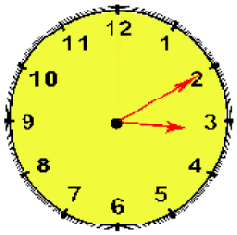
We generally use analog watches number from 1 to 12 are marked on their dial. There are three needles - Hour hand, minute hand & Seconds hand. In 24 hours, the hour hand moves around the dial twice (From 1 to 12)



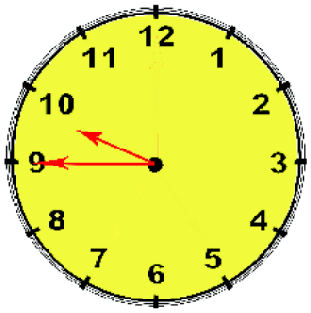
Five o'clock 5:00



Seven o'clock 7:00



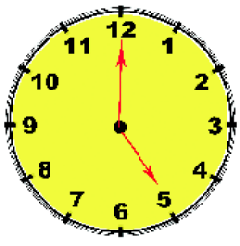
12 o'clock 12:00



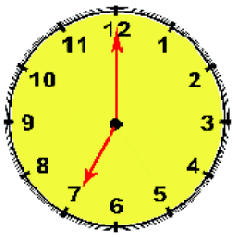
Three o'clock 3:00

There are five small parts between two digits. In all there are 60 marks (Equal) on the dial of the watch/clock. Hour hand is small but thick. This makes one round in 12 hours. This moves slowest among the three the minute needle/hand is slightly thin but larger in size. This completes 60 rounds in one hour. This moves faster than hours hand. Seconds hand is largest and thinest among all. This completes 60 rounds in one mute.

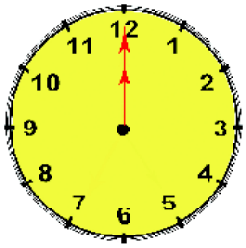
If the minute had is at 12 and the hour hand is exactly an a digit then the time will the number of hours as the no. of digits.



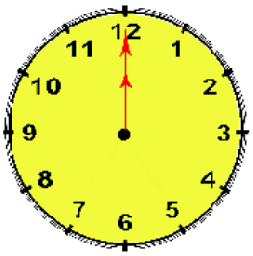
10 minutes past 3
3:00



50 minutes past 8



30 minutes part II

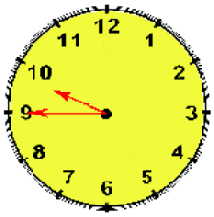


30 minutes past 11
11:30

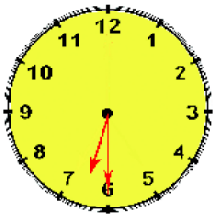
To know the number of minutes in a clock at a particular time, we look at the position of minute hand and multiply the digit/number by 5 to set the number of minutes at that time.

Let us know the time shown in the clocks given below

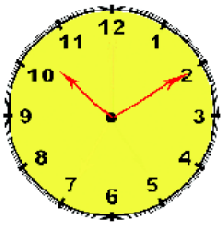
(i) At 9:45, the hour hand will be ahead of 9 and before 10 and minute hand at 9 ($\therefore 5 \times 9 = 45$)



(ii) 30 minutes past 6 (6:30): Hours hand is in between 6 & 7. When 30 minutes minute hand will be at $30 \div 5 = 6$.



(iii) 10 minutes past 10 (10:10) hours hand slightly ahead of 10. Minute hand would be at $10 \div 5 = 2$. Commonly speaking about time, we speak quarter past a particular number for 15 minutes.



As 15 minutes past 2 → Quarter past two

15 minutes past 7 → Quarter past seven

Similar of minute hand is 30. minutes ahead of a paticular number then we speak half past that number.

As 30 minutes past 8 → Half past eight

30 minutes past 11 → Half part eleven

30 minutes past 2 → Half past two or two and a half

If 45 minutes past a particular number then we can speak three quarter to the previous number or quarter to next number.

As 45 minutes past 5 → Quarter to six

45 minutes past 8 → Quarter to nine

Let us see what you have learnt 5.8

1. Fill in the blanks

(i) On the railway station and bus terminals _____ Clocks are fixed.

(ii) In _____ clocks needles move along the dial for measurement of time.

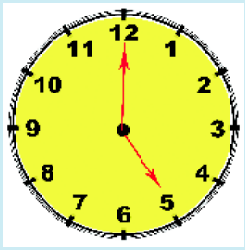
(iii) The dial of a watch/clock as per the hours is divided into _____ equal parts.

(iv) Between two numbers on the dial of a clock _____ parts one there.

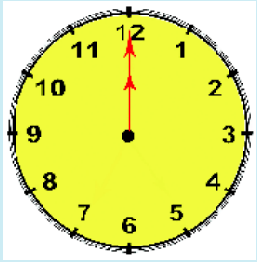
(v) The hour hand completes one round on the dial in _____ hours.

(vi) The minute hand completes one round on the dial in _____ minute.

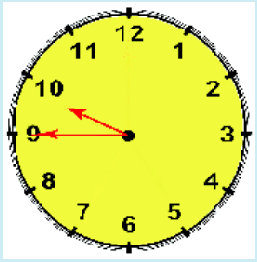
2. Look at the following figures and see the positions and see the positions of needles and fill in the blanks with correct time.



(i)



(ii)



(iii)

(i) .....

(ii) .....

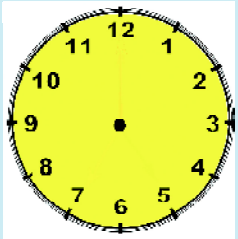
(iii) .....

3. Draw the needles of clocks according to the time written.

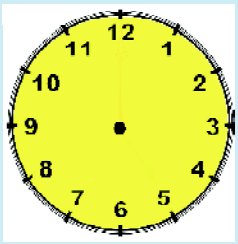
(i) 4 o'clock

(ii) Half past five

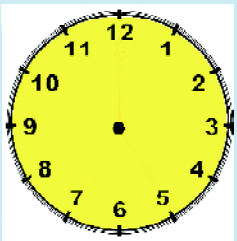
(iii) Quarter to nine



(i)



(ii)



(iii)

4. Write the given time in digits.

(i) Half past 3 (ii) Quarter to eight

(iii) Quarter past 10 (iv) Half past two

5.5.4 Convert units of measurement of time into each other

(i) 1Hr = 60

2 Hrs 20 minutes = (2×60) minutes + 20 minutes = (120 + 20) minutes = 140 minutes

4 Hrs 50 minutes = (4×60) minutes + 50 minutes = (240+50) minutes = 290 minutes

(ii) 1 minutes = 60 Seconds

20 minutes = 20×60 second = 1200 seconds

50 minutes = 50×60 seconds = 3000 seconds

(iii) One day = 24 hrs

5days 10 hrs = (5×24) hrs + 10 hrs = (120 + 10) hrs = 130hrs

8 days 20 hrs = (8×24) hrs + 20 hrs = (192 + 20) hrs = 212 hrs

(iv) One week = 7 days

9 weeks = 9×7 days = 63 days

(v) 60 minutes = 1 hr

300 minutes = (300÷60) hrs = 5 hrs

800 minutes = (800÷60) hrs

60 hr) 8 0 0 (13 hr
6 0
2 0 0
1 8 0
2 0 minutes

∴ 13hrs 20 minutes

5.5.5 Addition of measures of time

(i)

5hrs	30 minutes	40 seconds
+ 6 hrs	40 minutes	50 seconds
12 hrs	11 minutes	30 seconds

Add 40+50 = 90 seconds 1 minute 30 seconds. Write 30 see under seconds 1 carry over to minute add (30+40) minute add 1 carry our = 71 minute = 1 hr 11 minuts write 11 under minute 1carry over to be added in hours i.e. 5+6+1=12 hrs.

(ii)

17hrs	35 minutes	45 seconds
+ 11 hrs	55 minutes	35 seconds
29 hrs	31 minutes	20 seconds

45sec+35sec = 80see = 1m20s 35m+55m +1m carry over = 91 minutes = 1hr 31 minutes 1carry over added 17+11+1=29

5.5.6 Subtraction of units of measure of time

(i)

15hrs	95 minutes	
16 hrs	35 minutes	47 seconds
9 hrs	55 minutes	40 seconds
6hrs	40minutes	7 seconds

Subtract 40 sec from 47 sec = 7 sec, write under seconds 55 can not be subtracted from 35 borrow 1 hr 60 minutes from 16 leaving 15hrs and making 95 minutes subtract 55 minuts = 40 minutes. 15-9 = 6hr.

		60+14=74	60+25	
	32hrs	14minute	85 seconds	
(ii)	~~35~~hrs	~~15~~ minutes	~~25~~ seconds	
	– 15 hrs	30 minutes	40 seconds	
	17hrs	44 minutes	45 seconds	

5.5.7 Mutliplication of measures of time

32hrs	25minute	
×	6	
32hr	30 minute	

6 is multiplied by 25 minutes = 150 minutes = 2hrs. 30m 2hrs carry over. 5 hrs×6 = 30 hrs + 2 carry over = 32 hrs

Let us learn what you have learnt 5.9

Solve:

(a) 3 hrs 20 minute 40 seonds
+7 hrs 30 minute 55 seconds

_____

_____

(b) 7 hrs 30 minute 50 seonds
+3 hrs 20 minute 20 seconds

_____

_____

(c) 3 hrs 20 minute
× 8

_____

_____

5.6 Let us know about Indian currency

We all know about rupees & paise. Buying, selling account of give to take laboures salery account, all we need deal with money. Rupee (₹) is our Nation's currency symbol.

As the Indian currency is ₹ Rs similarly American currency is dollar ($ Symbol) British Currency is pound £ symbol. Different countries have different currency. Currency of all nations is made up of paper and also of metal. Let us learn about India currency rupees & paise in this section.

You know our country's currency is ₹. This is in the form of notes & coins. Our currency is made up of notes & coins. Our currency is made up of paper as well as metal. We have paper currency as ₹2000 (New note), ₹500 (new note), ₹200 (we not) ₹100, ₹50, ₹20, ₹10, ₹5, ₹2, ₹1. Metal coins are ₹10, ₹5, ₹2, ₹1, 50paise. We used to deal with metal coins 25 paise, 20paise,10paise, 5paise, 1pasie, now the use of these coins stopped.

₹1 = 100 paise

₹5 = 500 p

₹10 = 1000 p

₹2000 = 200000 p

We write rupees as ₹, paise as p 25 rupees 50 paise = ₹25.50 paise or

Writing rupees & paise in short form

₹75.60 paise = ₹75.60

₹215.80 paise = ₹215.80

₹40.25 paise = ₹40.25

₹18.65 paise = ₹18.65

₹103.8 paise = ₹103.08

5.6.2 The metod of converting ₹ into paise and paise into ₹

500 paise = ₹5.00 ₹6.00 = 600 paise

800 paise = ₹8.00 ₹7.80 = 780 paise

3500 paise = ₹35.00 ₹3.25 = 325 paise

708 paise = ₹7.08 ₹9.08 = 908 paise

Whole converting paise into ₹, we have to be careful to leave two places on the right and put (.) or divide the number of paise by 100 (₹1=100paise) to conver ₹ into paise, multiply the number of ₹ by 100 to get the paise.

5.6.3 Let us learn to add rupees and paise

For the addition of rupees & paise, we add rupees under rupees and paise under paise for two or more number of money transaction. When the number of paise exceeds 100 then we take carry over and add to the column above rupees.

₹	P
(i)	
416	80
+129	45
546	25

80P +45P = 125P = ₹1.25

₹ 416.80

+₹ 129.45

₹ 546.25

Babita purchased onion for ₹42.50, tomatoes for ₹40 and lady finger for ₹25.75. How much did Babita spend on vegetables?

Amount spent for Onions	= ₹42.50
Amount spent for Tomatoes	= ₹40.00
Amount spent for onions	= ₹25.75
Total amount spent	= ₹108.25

Sohan purchased rice for ₹45.50, serials for ₹ 28.75 and vegitables ₹ 13.25. How much did he spend the material?

for Rice = ₹45.50

for serial = ₹ 28.75

for revegetables = ₹13.25

total amount = ₹ 87.50

Let us se what you have learn 5.10

I. Convert ruppes & paise into rupees

(a) ₹80 paise 50 =

(b) ₹172 paise 5 =

(c) ₹305 paise 25 =

(d) ₹87 paise 8 =

(e) ₹274 paise 90 =

II. 1. Geeta purchased green peas for ₹58 Paise 75 Tomatoes for ₹ 67 Paise 90 and red chilli for ₹84 Paise 25.

2. Kartar got his mother's eyes operated he paid ₹1500 for docter's fee. Purchased lens for ₹2500 and medium for ₹800. How much total did he spend on his mohter's eyes operation.

3 Whole family got new clothes in Mohan's marriage.

Sarree for grand mother ₹2250.00, saree for mother ₹2780 father's clothes ₹1850, Sister' suit ₹545.90. How much total did the family spent too colthes?

5.6.4 Let us learn to subtract rupees & paise

1. Nandan had ₹5000. He purchased seeds for ₹3500 and manure for ₹200. How much money left with him?

Solution:

Spent on seeds	=	₹3500.00
Spent on manure	=	+₹1200.00
Total expenditure	=	₹4700.00
Total money he had	=	₹5000.00
Total expenditure	=	–₹4700.00
Money left	=	₹300.00

Ans. ₹300

2. Sheebu earned ₹325 for one day labour. She purchased flour for ₹16.50, serial for ₹23.60 and milk for ₹30. How much money is left with Sheebu now?

For flour	=	₹16.50			
For serials	=	₹23.60	Total money Sheebu had	=	₹325.00
For milk	=	+₹30.00	Expenditure	=	-₹70.10
Total expenditure	=	₹70.10	Amount left	=	₹254.00

Let us learn what you have learnt 5.11

1. Shanker gave her daughter ₹500. Daugther returned ₹45.50 after making purchases in the market. How much did she spend?

2. Geeta sold papad for ₹720. She purchased material for making new papads for ₹320 ₹25 spent on rikshaw. How much money is left with Geeta?

5.6.5 Let us learn multiplication of rupees & paise

1. Cost of on litre petrol is ₹68.45. How much 12 litres of petrol will cost?

Solution:

Cost of 1 liter petrol = ₹68.45

Cost of 12 liter of petrol = ₹68.45×12

```
  6 8 4 5
×     1 2
---------
  1 3 6 9 0
+ 6 8 4 5 0
---------
  8 2 1 4 0
```

So ₹68.45 × 12 = ₹821.40

Ans. ₹821.40

2. Sumit worked for 25 days for the construction of a building. Sumita's one day labour is ₹235. How much will she get in all?

1 day labour = ₹235

25 days labour = ₹235×25

$$\begin{array}{r} 235 \\ \times 25 \\ \hline 1175 \\ +4700 \\ \hline 5875 \end{array}$$

Ans. ₹5875

Let us see what you have learnt 5.12

1. The cost of one unit of electricity is ₹ 3.75. How much will be the bill for 450 units?

2. Shanker purchased 55kg peeds for his field (grams) If the cost of 1kg of gram is ₹72.50, then how much money Shanker will pay?

5.6.6 Let us learn to divide of rupees and paise

1. Raju brought a bundle of cloth for ₹2392. Total cloth in the bundle was found 40 meters. What is the cost of one meter cloth?

Solution:

Cost of 40 meters cloth = ₹2392

Cost of one meter cloth = ₹(2392÷40)

$$\begin{array}{r} 40\overline{)2392}\,(59.8 \\ -200 \\ \hline 392 \\ -360 \\ \hline 320 \\ -320 \\ \hline 0 \end{array}$$

Ans. 59.8 = ₹ 59.80

2. The cost of 5 tikets by Punjab mail train from Delhi to Amritsar is ₹1525. What will be the cost of one ticket?

Solution:

Cost of 5 tickets = ₹1525

Cost of one tickets = ₹ (1525÷5)

```
5) 1 5 2 5 (305
  –1 5
    2 5
  – 2 5
      0
```

Ans. ₹305

Let us see what you have learnt 5.13

1. Sohan got his salary for 30 days as ₹ 12780. What is his one day salary?

2. Rahmat purchased one quintal wheat for ₹ 2200. What is the cost of one kg of wheat?

3. Sonu and Mohan wen to a confectionary store. Sonu purchased wheat flour 10kg, Sugar 2kg, 1kg whole black gram, and 1kg black grams. Mohan purchased wheat flour 20kg, sugar 3kg, 1kg whole lentil white gram. How much more was Mohan's willthan Sohan's bill?

   Costs of all items are written on the board hanged in the shop

Price List

Item	Cost / Kg
Wheat flour	25.00
Sugar	40.00
Whole red lentil	78.90
Whole black gram	80.50
Black green gram	75.50
Black gram	77.60
White gram	81.50

5.6.7 Recognising Currency

Now a days there are some fake notes in the market we need to recognise the real and fake currency so that we are not cheated.

Let us Revise

- We use a scale for the measurement of length.
- We use standard units for measurement such as mililitre, deciliter, meter, decimeter, centimeter and kilometer etc.
- The length between '0' and 100 on centimeter scale is 1 meter.
- 10 mili meter = 1 centimeter
- 100 centimeter = 1 meter
- 1000 meter = 1 kilometer
- In short, we write mm for milimeter, me formili liter cm for centimeter etc. 'm' for meter and km for kilometer.
- For measuring the weight of solid objects we use kilogram, gm, Quintal, Ton etc.
- 1 gm = 1000 mg
- 1 kg = 1000 g
- For measuring liquids such as milk, oil, kerosine

  1 liter = 1000 mililiter

  1000 liter = 1 kiloliter
- Temperature is measured in degree Censius and degree Farhenheit.
- The unit of measurement of temperature is called degree and the symbol is '0'.
- The normal temperature of our body is 34°C celsius or 98.6° Farhenheit.
- In doctor's thermometer is the scale between 35°C to 42°C . In the Farhenheit scale is marked between 95°F to 108°F
- If our body temperature is more then 98.6°F. Then we feel warm and is called fever.
- Pure water normally boils at 100°C.
- For noon is between 12:00 mid night to 12:00 noon.
- Afternoon is between 12:00 noon to 12:00 mid night.

1 day	=	24 hrs	1 month	=	30 or 31 days except February
1 hr	=	60 minutes	1 year	=	12 months
1 m	=	60s	1 decade	=	10 years
1 week	=	7 days	1 century	=	100 years
			1 milienius = 1000 years		

The year which is divisible by 4 is called a leap year and it has 366 days.

Normal year is of 365 days.

According to Hindu calender the year starts from Chaiter Shukal Partipada.

Indian currency is rupee (₹).

Excercise

1. Fill in the blanks

(i) 1 meter = _____ centimeter

(ii) 1 kilometer = _____ meter

(iii) 1 gram = _____ miligram

(iv) 1 kilogram = _____ gram

(v) 1 liter = _____ mililiter

(vi) 1 kilometer = _____ liter

(vii) 1 minute = _____ seconds

(viii) 1 hr = _____ minutes

(ix) 1 century = _____ years

(x) ₹1 = _____ Paise

2. Write the answer in one word

(i) What is the standard unit for measurement of length?

(ii) What is the unit of measurement of milk?

(iii) What is the unit of measurement of tempreture?

(iv) At what temperature pure water starts boiling?

(v) At what temperature pure water freezes?

(vi) What is the temperature of healthy body?

(vii) What is filled in the bulb of thermometer?

(viii) On Farhenheit scale 32°F is equivalent what on Celsius scall?

(ix) How many days are these in a leap year?

(x) What is Indian currency?

3. I. Add

(a)

m	cm
10	40
+ 8	50
+ 7	80

(b)

kg	g
70	300
+ 90	275
+ 40	700

(c)

ℓ	me
70	40
+ 67	750

(d)

₹	P
817	70
+ 985	89

II. Subtract

(a)

km	m
70	400
– 37	745

(b)

kg	g
85	200
– 25	450

(c)

ℓ	mℓ
210	400
– 76	750

(b)

kg	g
700	50
– 340	75

III. Multiply

(a)

m	cm
40	50
×	8

(b)

ℓ	mℓ
15	300
	× 5

(c)

kg	g
70	320
×	7

(d)

₹	p
270	20
×	8

3. Divide

(a) (40 km 50m) ÷ 5 = _____

(b) (40ℓ 400mℓ) ÷ 8 = _____

(c) (500 kg 650g) ÷ 5 = _____

(d) ₹904 ÷ 64 = _____

4. Solve the following questions

I. Ramlal needs 26m 80cm rope for getting water from the well. He has 18m 15cm pipe with him. How much long pipe did he need more?

II. 33 meters cloth is required for making 15 shirts. How much cloth is required for one shirt?

III. Ramdhan purchase 10 sacks of wheat. Each sack contains 50kg wheat. He distributed the wheat among 25 workers labours. How much wheat did each labourer get?

IV. There was 20 liter milk in a container. Out of this 5ℓ 600 me milk was taken by Manish and 2ℓ 400 mℓ was taken by Satish. Rest was divided equally among 6 people. How much each get?

V. A bucket of 15 liter capacity is filled by 60 glass water. How much is the capacity of a glass?

Answers

Let us see what you have learnt

5.1

1. 80 mm, 100 mm, 157 mm
2. 500 cm, 700 cm, 450 cm
3. 6000 m, 15000 m, 4375 m
4. 8 cm, 6 cm, 7.5 cm
5. 7 m, 12 m, 15.6 m
6. 9 km, 11 km, 15.775 km
7. (i) 9 km, 800 m
   (ii) 7 m, 60 cm

8. 5 m 80 cm = 500 cm + 80 cm = 580 cm

7 cm 8 cm = 700 cm + 8 cm = 708 cm

3 cm 15 cm = 300 cm + 15 cm + 315 cm

9- 1080 cm = 1000 cm + 80 cm = 10 m 80 cm

1230 cm = 1200 cm + 30 cm = 12 m 30 cm

1608 cm = 1600 cm + 08 cm = 16 m 8 cm

10. 12 km 300 m = 12000 m + 300 m = 12300 m

15 km 55 m = 15000 m + 55 m = 15055 m

7 km 8 m = 7000 m 8 m = 7008 m

11. (a) 4030 m (b) 3080 cm (c) 6010 m

5.2 1. (a) 38 cm 9 mm (b) 22 m 95 cm (c) 39 km 580 m

(d) 65 cm 2 cm (e) 22 m 31 cm (f) 23 km 300 m

2. 2647 km

5.3 (1) 1005 km (2) 49 m 90 cm

(3) 28 m 50 cm (4) 25.6 m

5.4 (1) 98 kg (2) 8 kg 800 g

(3) 112 kg 500 g (4) 18 g 50 mg

5-5 (1) 85ℓ (2) 14ℓ 100 mℓ

(3) 6ℓ 500ℓ (4) 3ℓ 500ℓ

6. (i) Temperature is that meausre which tells that a body or any thing how hot or cold it.

(ii) Temperature is measured in degree Celsius or degree Forhenheit

(iii) Mercury is filled in the bulb of thermometer.

(iv) Temperature of a healthy person is 37° degree Celsius.

(v) The boiling point of pure water is 100° Celsius and the freezing point is 0°c Celsius.

5.7 1. (I) Sunday (II) March, June, September, December

(III) January and October (IV) August

	2.	(I)	60 m	(II)	100 year	
		(III)	60 second	(IV)	12 months	
	3.	April, June, Septemeber, November			4.	1996, 2012
5.8	1.	(I)	Digital	(II)	Analog	(III) 12
		(IV)	5 Parts	(V)	12 Hrs	(VI) 60 minute or one hour
	2.	(I)	5 o'clock	(II)	12 o'clock	(III) 45 minutes past 9
	4.	(i)	3hrs 30 minute	(ii)	45 minutes past 7	
		(iii)	15 minutes past 10	(iv)	30 minites past 2	
5.9	(i)	10 hr 51 minute 35 second				
	(ii)	4 hr10 minutes 30 second				
	(iii)	26 hrs 40 minutes				
5.10	I.	(a)	₹8.50	(b)	₹172.05	(c) ₹305.25
		(d)	₹87.08	(e)	₹274.90	
	II.	1.	₹210 90 P	2.	₹4800	3. ₹7425.90
5.11	(i)	₹454.50		(ii)	₹375	
5.12	1.	₹1687.5		2.	₹3987.50	
5.13	1.	₹426		2.	₹22	3. ₹292.30

Excercise Answer

1.	(i)	100	(ii)	1000	(iii)	1000
	(iv)	1000	(v)	1000	(vi)	1000
	(viii)	60	(ix)	100	(x)	100
2.	(i)	m	(ii)	liter	(iii)	Celsius of Farhenheit
	(iv)	100° celsius	(v)	0° celsius	(vi)	37° celsius or 98.6°F
	(vii)	mercury	(viii)	0° celsius	(ix)	366 days (x) ₹

3.	I.	(a) 26 m 70 cm	(b) 201 kg 275 g		
		(c) 138ℓ 150 mℓ	(d) ₹1803 59 P		
	II.	(a) 32 km 655 m	(c) 59 kg 750 g		
		(c) 133ℓ 650 mℓ	(d) ₹359 75 P		
	III.	(a) 324 m 00 cm	(b) 76ℓ 500mℓ		
		(c) 492 kg 240g	(d) ₹2161 60 p		
3.	(a)	8 m 10 m	(b) 5ℓ 50mℓ		
	(c)	110 kg 130 g	(d) ₹14 08 p		
4.	(i)	8 m 65 cm	(ii) 2 m 20 cm	(iii) 20 kg	
	(iv)	2 -2 liter	(v) 250 mililiter		

6

PERIMETER, AREA AND VOLUME

From this lesson, you will learn:

- Meaning of perimeter, it's utility, to find the perimeter of plane figures.
- Meaning of area, it's utility, to find the area of plane figures.
- Meaning of volume, it's utility, to find the volume of solid figures.

We need to measure the length of the walls of a room, the length of the field to fence it around, these its all are called perimeter. All this can be done by calculating the perimeter of room, field etc.

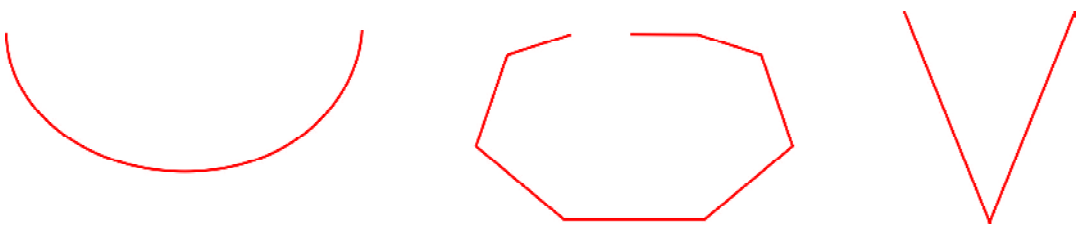
Similarly we need to know about area when we want to tile the floor of a room, purchasing a piece of land/selling the same, we are to calculate the area.

How many bricks are needed to construct a wall of paritcular dimensions, how many bricks are needed to construct a house, how much soil is needed to fill a particular pit in you house, all you need to calculate volume. How much water/oil/milk will a container have, all this requires to know the volume.

Let us know more about, perimeter, area and volume.

Till now we have gathered information about the names and dimensions of different figures.

The figures, which do not end at the point from which it is started, are called open figures, as shown below in the figure A.



Figure

Figure

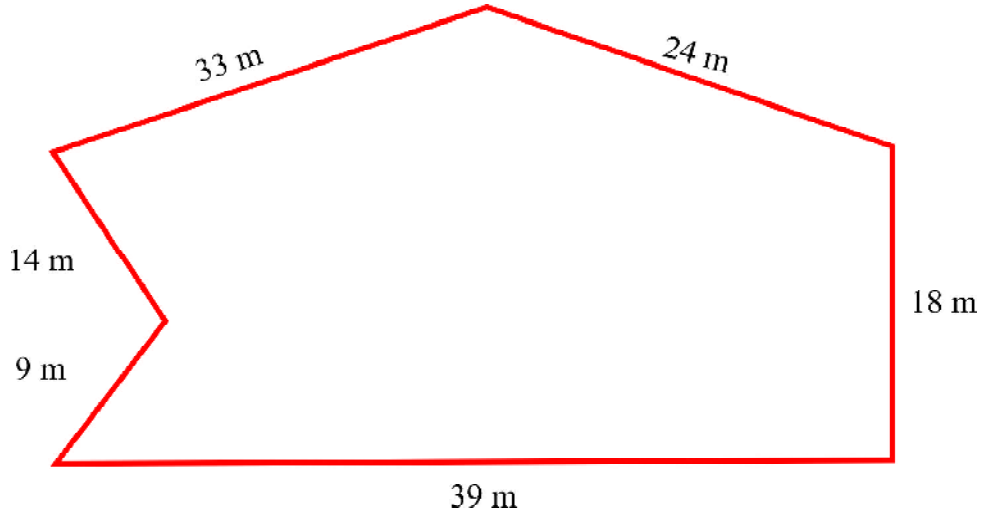
6.1 Let us learn the meaning of perimeter, it's utility, to find the perimeter of plane figures

All closed figures ends at the point from where they start. If we go around that figure starting from a point and come to the same point, the distance covered is called it's perimeter

Ex. Completing one round of a rectangular field is called it's perimeter. The distance covered by making a full round of a rectangular field is it's perimeter.

The measure of the total length around a figure is called it's perimeter

To find the perimeter, length of all the sides of a figure are added given in the figure of a field, How much distance will be covered going round the field once.



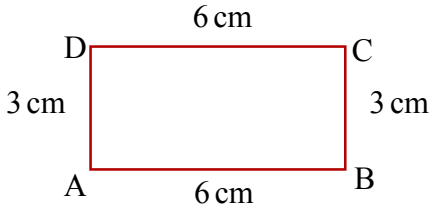
To complete one round of the field total distance will be covered 33m + 24m + 18m + 39m + 9m + 14m = 137 meter. Hence the perimeter of this field is 137 meter.

Attention

The perimeter of a simple or curved figure is the total measure of the length covered going around the figure once.

Let us know to find the perimeter of a rectangle.

Rectangle is a four sided closed figure. Whose opposite sides are equal and also parallel. All the angles are 90^{o} Below is the figure.



In the above figure ABCD is a rectangle, whose A, B, C, D are four vertices. Opposite sides are equal $\therefore$ AB = CD are called sides along the length BC and AD are sides along the width of the rectangle

Perimeter of ABCD rectangle

AB = 6 cm BC = 3 cm

$\therefore$ DC = 6 cm also AD = 3 cm

Perimeter = length + breadth + length + breadth

= 6+3 + 6+3 =18 cm

Also we can write

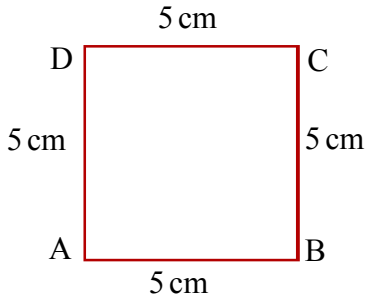
2 × length + 2 × breadth = 2 (length + breadth)

2×6 + 2×3 = 12+6 = 18cm

$\therefore$ Perimeter of rectangle = 2 × (length + Breadth)

Let us learn to find the perimeter of a square

Square is also a four sides closed figure whose all four sides are equal and also it's all angles are of 90^{o} measure. Below is a figure of square.



Above is a square ABCD. This has four vertices and four sides. All the sides are equal as AB = BC = CD = DA. Perimeter of square ABCD is

= m AB + mBC + mCD + mDA

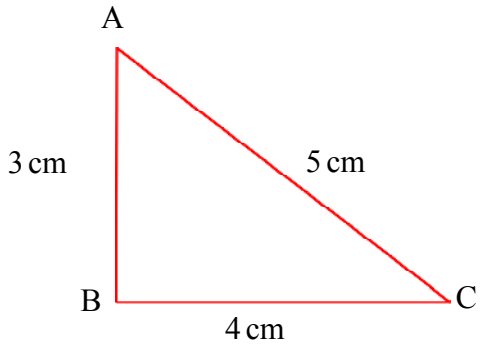
= 5cm + 5cm + 5cm + 5cm = 20cm

= 4×measure of side = 4×5 = 20cm

Perimeter of square = 4×measure of side

Let us learn to calculate the perimeter of triangle.

A trinagle is a three sided closed figure, this has three vertices and three sides. Below is a figure of a triangle.



In the above figure ABC is a triangle, AB, BC and AC are it's three sides and A, B, C are it's vertices. The perimeter of triangle ABC is

= measure of side BC + measure of side AC + measure of side AB

= 4cm + 5cm + 3cm = 12cm

= Sum of the measures of all sides

Perimeter of a triangle is the sum of the measures of all the three sides

Let us see what you have learnt 6.1

1. Fill in the blanks

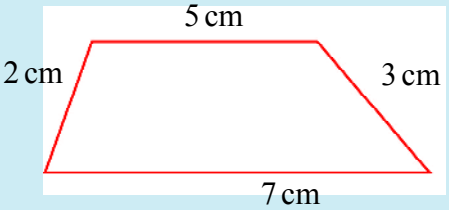
   (a) A figure made up of different segments, the perimeter of the figure is the _____ of all the measures of sides of the figure.

   (b) Perimeter of rectangle = 2 × (length + _____)

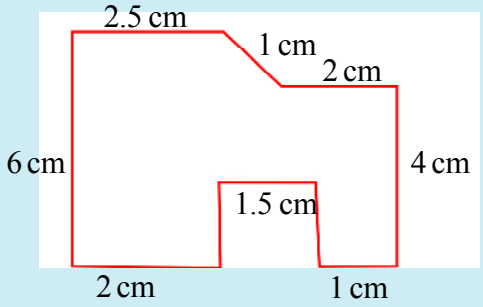
   (c) Perimeter of square = Sum of _____ of all sides.

   (d) Perimeter of triangle = Sum of all _____ sides.

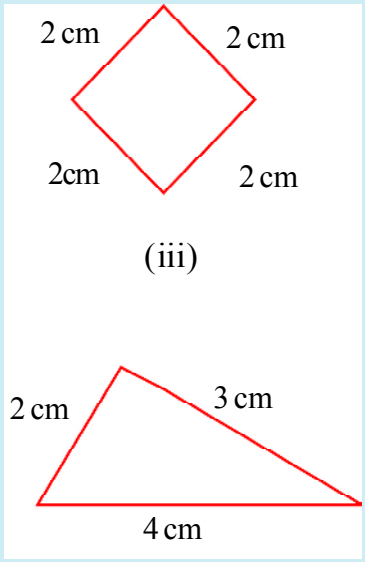
2. Find the perimeter of the following figures



(i)



(ii)



(iii)

(iv)

3. The length of the rectangle is 10m and the breadth is 3 meter. Find the perimeter

4. The measure of the side of a square is 8m. Find the perimeter.

5. A rectangular park is 100m long and 60m wide. How much wire is required to cover this once?

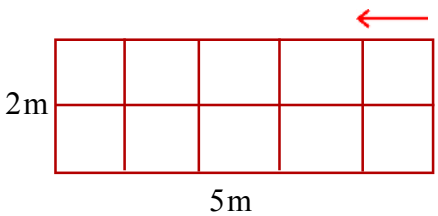
6. The side of a square field is 80m. How much distance will be covered in four rounds along this field?

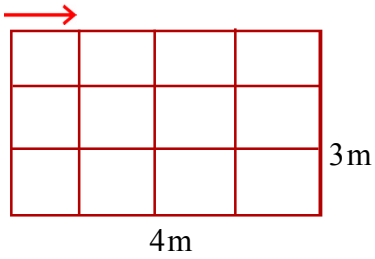
7. The sides of a Triangular park are 75m, 65m and 60m. Find the perimeter.

6.2 Let us learn the meaning, utility and to calculate the area of plane figures

For making the floor of the house, ploughing the field or white washing the walls of the house, we have to make the calculations and for which need to find the area on a plane. The place occupied by any object is called the area of the surface occupying the space on a plane. Given below are the floors of different varandas, one is 5m long, 2m wide and the other is 4m long and 3 m wide.

To calculate the area, look at the figure given below:-





The perimeter of first floor is 2× (5m + 2m)

= 2×7 = 14 meter The perimeter of second floor is 2×(4+3) = 2×7 = 14 meter we see that the perimeter of both floors is same. We would like to know that whether they are occupying the same region on the plane.

For this we divide the surface of both the figures into 1m side squares there are 10 equal squares in the first figure and there are 12 such squares. The perimeter is same for two surfaces but these occupy different place on the floor i.e areas are different.

Remeber

The surface covered by any body on the plane is called it's area.

As the units of length are cm, mm, meter, kilometer, square meter etc. the two units of length are used in the area hence, we write square before the unit to be called the unit of area.

1cm×1cm = 1sq.cm

1m×1m = 1 sq.m

1km×1km = 1sq. km

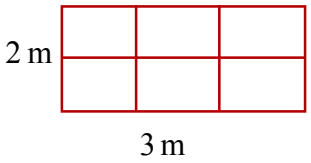
Let us know this also

As we know 1m = 100 cm similarly 1m×1m = 1 square meter

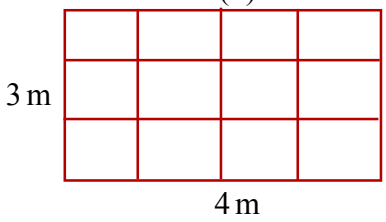
= 100×100 square cm = 10000 square centimeter the surface covered, by a square of 1 meter side, on the plane is called 1 square meter. This is the unit of area when the side is measured in meters

Let us learn to calculate the area of rectangular and square figures

(a)



(b)



The above given figure (a) is a rectangle with length 3m and breadth 2m. Dividing this 10 to squares of 1m side, we get 6 squares

∴ Area = 6sq meter

Similarly rectangle in figure (b) is of sides 4m and 3m divided into 12 squares of 1m side

∴ Area = 4×3=12 square meters

To find the area of a rectangular figure we multiply the measure of two lengths.

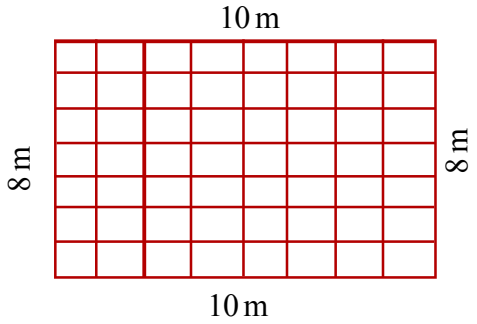
∴ Area = measure of length × measure of breadth

Look at and understand

If a rectangle has length 10m and breadth 8m, what will be it' area?

Area of rectangle = No. of total small square

= 80 sq. meter



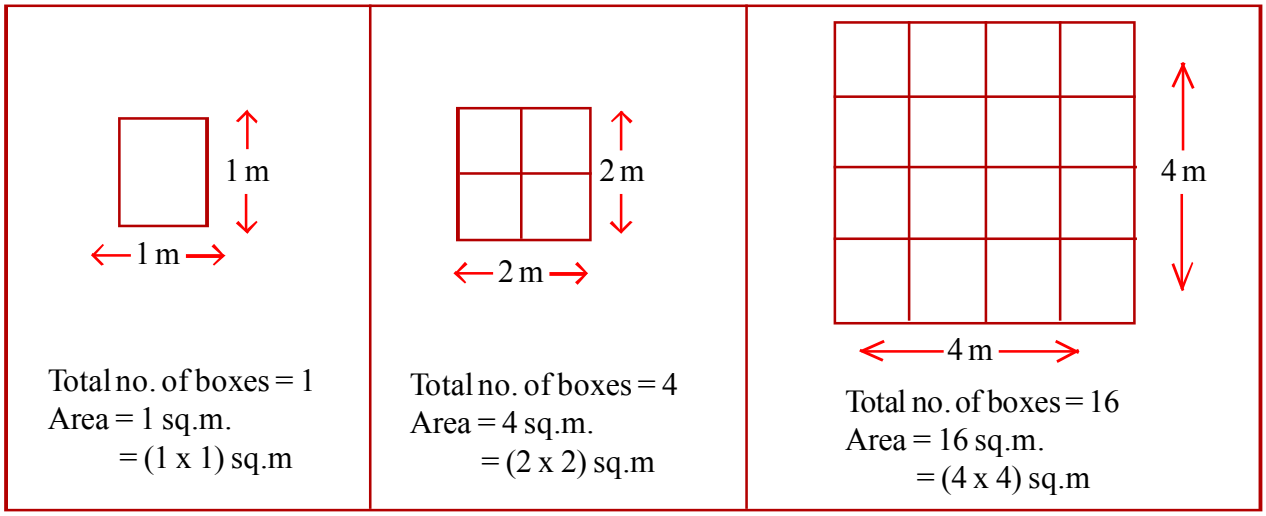
or

Area of the rectangular figure drawn opposite = measure of length × measure of breadth

= 10m x 8m

80sq.m

Let us learn to calculate the area of a square



Given above squares of 1m side,2m side and 4m side. All the squares have been divided into squares of 1m side and we notice that in the first part of figure on left is only one square of 1×1= 1sq.m

In the second figure there are four squares of inside and we also see that 2×2 =4 sq.m semilarly in the third figure no. of 1 meter squares are 16 i.e 4×4=16

Remember

Area of square = side×side or square of the length of side

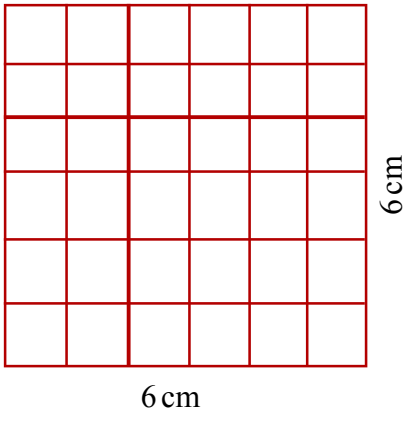
Let us see and understand

If the side of a square is of 6cm, find it's area.

As in the figure total no. of small squares = 36 { Each of 1cm side}

∴ Area = 36sq cm

We can also write like



Area of square = side × side

= 6cm × 6cm

= 36sq.cm

Example:1

The side of a square field is 10m. What will be the cost of digging at the rate of ₹5 per sq. meter?

Sol.: To find out the total cost of digging the field, we need to find it's area.

Side of the square field = 10m

∴ Area of the field = 10m × 10m = 100sq.m

The cost of 1sq meter = ₹5

∴ The cost of 100sq. meters = ₹5 × 100

= ₹500

Example:

A field is in the form of a rectangle with length 80m and breadth 60m. What will be the cost of leveling the field at the rate of ₹2 per sq.m

Sol.: Area of the filed = length × breadth

= 80 × 60 sqm = 4800sq.m

Cost of leveling 1sq meter field = ₹2

∴ Cost of leveling 4800 sq. meter field = ₹2 × 4800 = ₹9600

Let us see what you have learnt 6.2

1. Fill in the blanks

   (a) The measurement of surface on a plane covered by any figure is called it's _____.

   (b) Area of rectangle = length _____.

   (c) Area of a square = _____ × _____.

2. Find the area of squares with given side

   (a) 4m (b) 12m (c) 15m

3. Find the area of rectangles with given dimensions.

(a) length = 15m, breadth = 10m

(b) length = 20m breadth = 8m

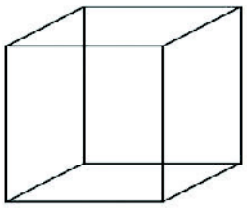
4. The side of a square platform is 6m. What will be the cost of covering it with tiles at the rate of ₹250 per sq meter?

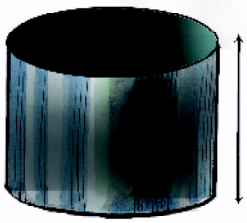
5. The length of a rectangular field is 100m and breadth is 60m. What is the rate of ₹1.50 per square meter?

6.3 Let us learn the meaning of volume, it's utility and to calculate the volume of solid figures.

We need to understand the meaning of volume for calculating the number of bricks required for the construction of our house. We can not make the assessment of space for keeping our goods in the godawn without the knowledge of volume.

Let us know the meaning of volume





Looking at the above figures we know that these figures have three dimensions length, breadth & thickness/height. The solid objects have three measures and they occupy a definite space and space occupied by them is called their volume.

- The object whose length, breadth & height are equal is called a cube.
- The object whose length, breadth & height are not equal is called a cuboid.

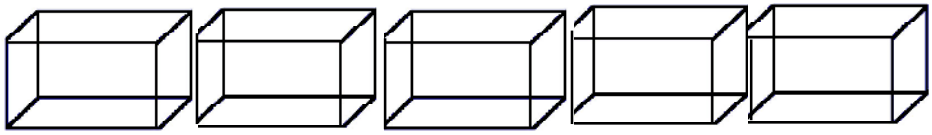
The solid object, whose shape's small, will cover less space and if shape is large, it will cover more space and accordingly the volume will be less or more. Example: half brick covers less space as compared to the full brick and hence, the volume of full bricks more than the volume of half bricks.

Attention

The space covered by a solid is called its volume

Let us learn to find the volume of a cuboid:

Wooden or metalic solid of length, breadth & thickness having each 1cm, the space occupied by this is 1 cubic centimeter or the volume of that solid is 1 cubie centimeter in short, we write 1cc

1 cm 

In the above figure five solid blocks each of 1 cubic centimeter are placed together. Hence the cuboid formed by these has volume 5 cubic centimeter. The cuboid formed by 5 blocks has length 5cm, breadth 1cm and height 1cm i.e volume of this cuboid is 5×1×1=5 cubic centimeter

We can also understand this in a different way as

Volume of cuboid = length × breadth × height

Let us learn to find the volume of a cube

When the three dimensions of a cuboid (length, breadth, height) are equal, this is called a cube. Generally for a cube we do not call length, bradth & height for the three sides (We call the side of a cube) as all of these are equal.

∴ Volume of a cube = length × breadth × height

Attention

The unit of volume is cubic centimeter, cubic meter etc. because we multiply the side three times for the reason length, breadth height are same.

Look at see and understand

- The length of a cuboid is 8cm, breadth is 5cm and height is 4cm, what is the volume of cuboid?

  Volume of a cuboid = length × breadth × height

  = 8cm × 5cm × 4cm

  = 160 cubic centimeters

- A cube is of 10cm height, what is the volume of the cube?

  Volume of a cube = side × side × side

  = 10cm × 10cm × 10cm

  = 1000 cubic centimeters = 1000 cc

Let us understand capacity

The amount of water, oil, milk or any liquid can be filled is called it's capacity. In other words the amount of liquid that can be filled in a container is called it's volume. If a Jug can be filled by pouring 4 glass. If a bucket can be filled by a jug using it 10 times, then the capacity of backet is equal to the 10 times capacity of the jug.

Attention

If the shape of a container is small, capacity will be less as compared to a container whose shapeis large/big.

Unit of capacity is liter or mililiter 1cubic meter = 1000 liter

Example : A water tank 2.5m long 1.5m wide and 1m high. What is the capacity of this tank? {The maximum water can be made available in liter, when this is filled.

Volume of water tank

= 2.5m×1.5m×1m

= 3.75 cubic meter

= 3.75×1000 = 3750 litres

Let us see what you have learnt 6.3

1. Fill in the blanks
   (a) The space occupied by a solid is called it's _____.
   (b) Volume of a cuboid = length×breadth× _____.
   (c) Volume of a cube = side _____ × _____
   (d) 1 cubic meter = _____ liter
2. Fill in the blanks

Sr No.	Name of solid	length	breadth	height	volume
A	cuboid	5cm	4cm	2cm	_____
B	cube	5cm	5cm	5cm	_____

3. The length, breadth, height of a cuboid are 7m, 2.5m & 2m respectively. Find the volume of cuboid.

4. The side of a cube is 7m. What will be the volume of this cube and it's capacity in liters?

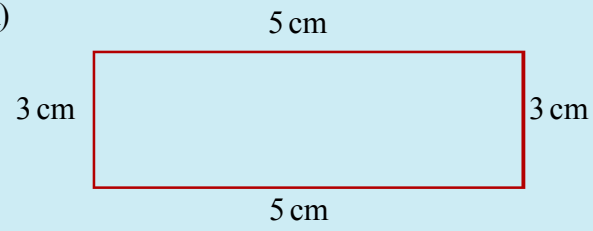
Let us Revise

- Any figure bounded by segments/curves, the measure sum of the lengths of segments/curves is called it's perimeter.
- Perimeter of rectangle = 2 × (length+breadth) units
- Perimeter of square = 4 × (measure of side) units
- Perimeter of triangle = (sum of the measures of all three sides.) units
- The measure of space occupied by a plane surface is called it's area.
- Area is written in square units.
- Area of a rectangle = length × breadth (square units)
- Area of a square = side×side (square units)
- The space occupied by any solid is called it's volume.
- Volume is written in cubic units
- Volume of a cuboid = (length × breadth × height) cubic units
- Volume of a cube = (side×side×side) cubic units
- The amount of liquid as water, oil, milk, petrol diesel etc. can be filled in a container is called its' capacity.
- One cubic meter = 1000 litres

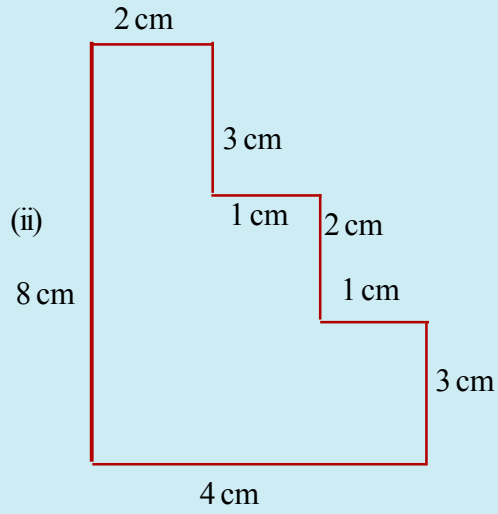
Excercise

1. Find the perimeter of the following figures:-

(i)



(ii)



2. The side of a square field is 100m.

   How much wire is needed to fence around this field? How much cost will be at the rate of ₹15 per meter

3. The length of a rectangular park is 100m and breadth is 50meters. How much will be the cost of laying the grass on it at the rate of ₹10 per sq meter?

4. Draw a rectangular figure with length 7cm and width 4cm. Divide it into 1cm side squares and write the area of this figure by counting the unit sq cm squares

5. The length and breadth of a courtyard are 25m and 20m respectively. How much will be the cost of laying stone in the courtyard at the rate of ₹60 per square meter?

6. The side of a cube is 6 meter. What will be the volume of this cube?

7. The length, breadth and height of a cuboid are 6m, 5m and 2m respectively. Find the volume of the cuboid.

Answers

Let us see what you have learnt?

6.1 1. (a) Addition (b) breadth (c) Four side (d) Theresides

2. (i) 17cm (ii) 20cm (iii) 8cm (iv) 9cm

3. 26cm 4. 32cm 5. 320m 6. 1280m

7. 200m

6.2 1. (a) area (b) breadth (c) side, side

2. (a) 16sq. meter (b) 14459m (c) 22599m (d) 1000 liter

3. (a) 150sq.m (b) 160sq.m

4. ₹9000 5. ₹9000

6.3. 1 (a) Volume (b) height (c) side, side (d) 1000 liter

2. (a) 4. cubic meter (b) 125 cubic meter

3. 35 cubic meter 4. 343 cubic meter

Excercise

1. (i) 16cm (ii) 24cm
2. 400cm, ₹6000
3. ₹50000
4. 28 sqaure centimeter
5. ₹30,000
6. 216 cubic meter
7. 60 cubic meter

7

GEOMETRY

From this lesson, you will learn

- Knowledge of different figures around us.
- Understanding the meaning of symmetry, to recognize symmetrical objects/figures.
- Recognition of simple and curved lines, straight line, segment and a ray.
- Recognition of cones in different figure.
- Recognition of angles as a cute, right and obtuse angles.
- Measuring and drawing angles with the help of a protractor.
- Understanding the meaning of circle, drawing a circle with and without using a compass.
- Recognising different elements related to a cirlce i.e. center, radius, diameter and circumfrence.
- Recognition of parallel and perpendicular lines in the surroudning environement.

You look different types/shapes of object around you like, a book, lunch box, door, window, hat, wall of your room, blackboard, pencil and sylinderical objects like the cricket wales, the hamdle of a cricket bat etc. These objects are made up of different shapes:

Some one is long enough, the other is wide enough.

Some one is round and the other is four sided (square type).

Some one has corners and the others do not have corner.

In some of them all the four/five/six sides are equal and in some one only opposite sides are equal.

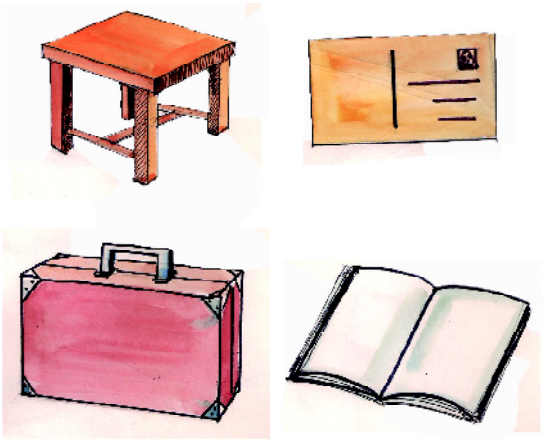
To know various properties of these objects/figures we need to read and understand some basic geometrical facts. Different plane and curved figures and to understand their properties, we need to understand geometrical facts.

7.1 Information regarding different types of figures/objects in our surrounding

Some objects are with plane surface, others with round surface and some have both types of plane surface.

Each object has got sume fixed shape but different from the other. The object we deal with is of what type, we need to understand for solving our daily life problems, this knowledge is useful in constructing the house, table, laying the marble stons/tiles on the flor and fixing. The household material in the house.

Given below the figures of different objects with plane/round/curved surface

Images of objects with plane surface	Images of objects with round/curved surface
	

Objects with plan surface : A box, tabletop, post card, top surface of a book.

Objects with round/curved surface :- Lamp, strainer, steel dollu tawa.

Let us see what you have learnt 7.1

1. What type of shap of the surface of a book?

   _____

2. Write the names of any three things with plane surface.

   _____

3. Write the name of any three things with curved surface.

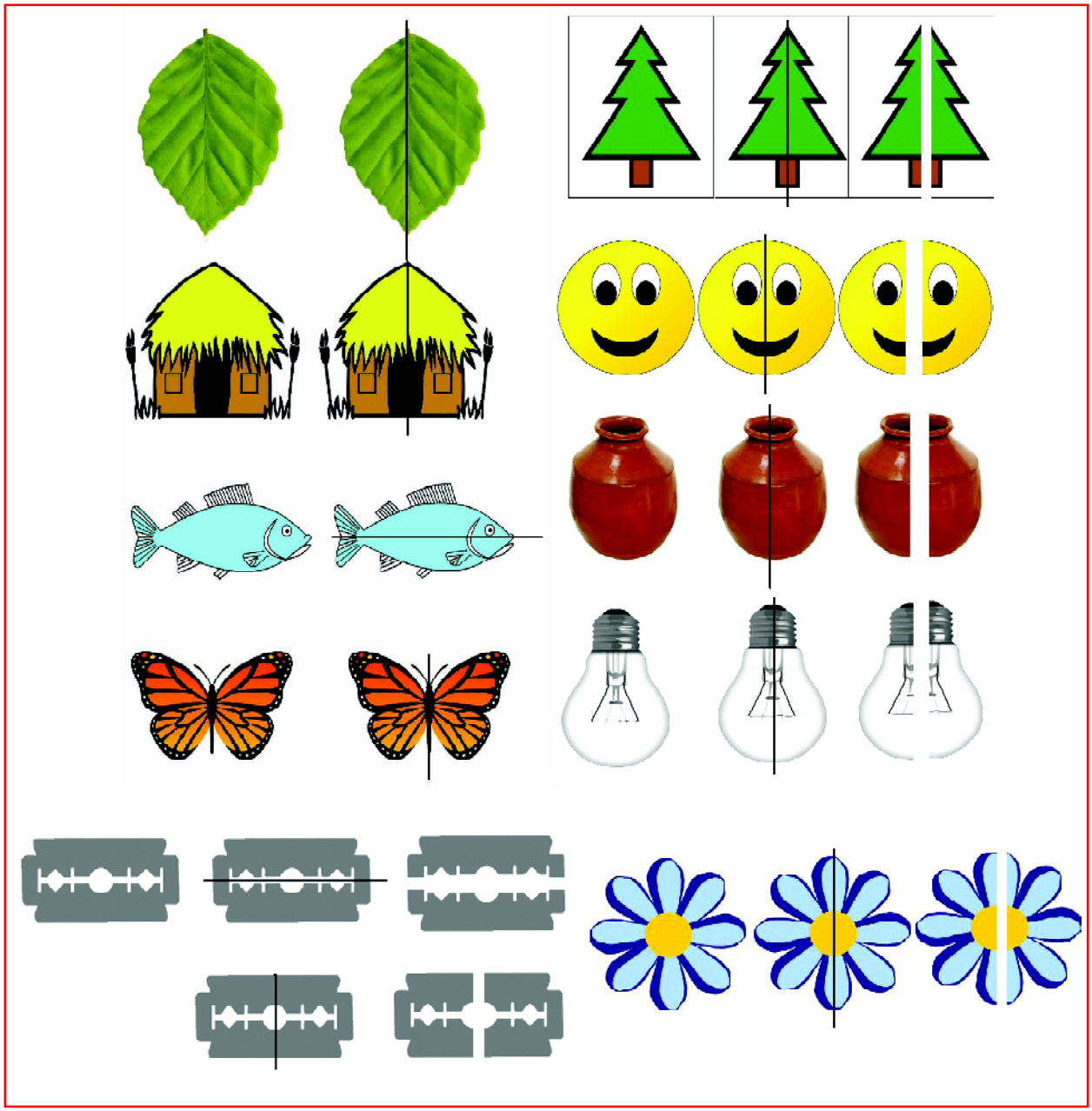
   _____

7.2 Let us understand the meaing of symmetry, symmetrical objects and figures.

The objects available in our surrounding can be divided in to two similar parts. First is where both parts are exaclty same/similar. Both parts when place one upon other they cover it properly. Such

types of figures are called symmetrical figures. Symmetry means same shape. Below are given such figures:-

Given below figures have been divided into two parts by drawing a line, observe carefully and understand:-



Attention

All the above figures have been divided into two equal parts by drawing a line. Both parts are equal and similar and cover each other completely.

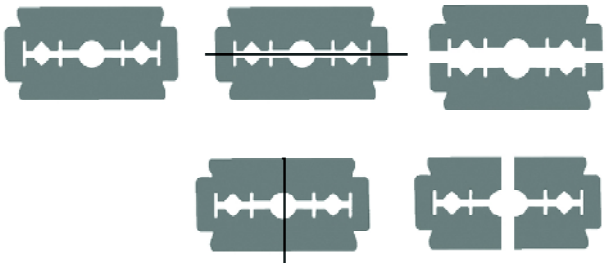
There are also certain figures/objects which cannot be divided into two equal/similar parts by any means. Hence the two parts cannot cover each other. Given below are such figures:-

Attention

The above drawn figures cannot be divided into equal parts by drawing a line in any manner such figures are called asymmetrical.

Line of symmetry

The line, which divides a figure into equal and similar parts, is called line of symmetry.



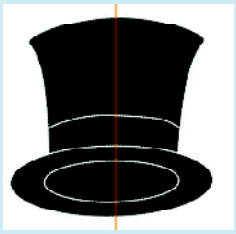
As:

Attention

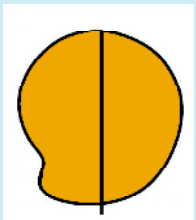
We can divide some figures into two equal parts by more then are method. Hence line of symmetry for a figure may be more than one. As give above the blade has been shown divided in two way by two methods.

Let us see what you have learnt 7.2

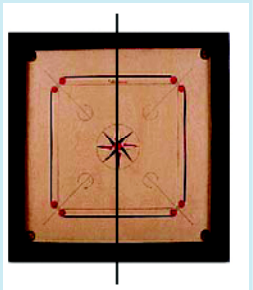
1. Given below some figures. Mark ($\surd$) the figure which combo divided two equal parts.
2. Given below some figures, lines have been drawn ($\surd$) the figure where then is a line of symmetry.



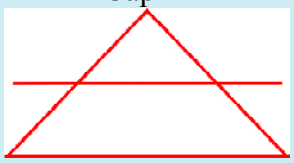
Cap



Fire

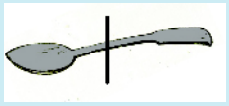


Carrom Board



Triangle

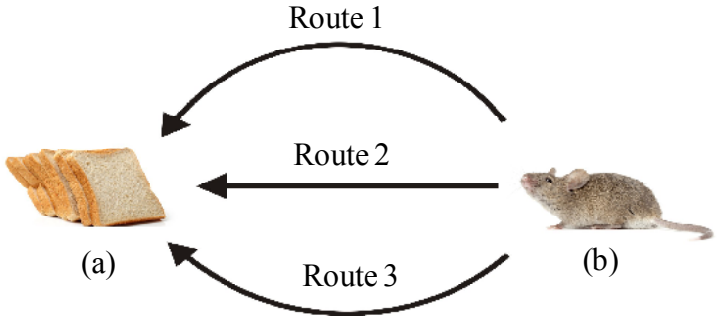
Strictly



Spoon

Let us learn about a segment

In the below given figure a rat at (b) on the right and a bread at a point a. There are three routes for the rat to reach the bread. You have to tell that by which route the rat will trand the least distance to reach the bread



In the above figure, the rat will travel the least distance through route no.2. You have seen above the straight distance between two points is the least distance between them. The least distance between two points is called a segment. In this way you can say that a segment is the least distance between two points in a segment there are two end points as shown below:-

Point A & B are called the end points of segment AB

7.3.1 Let us understand a 'ray' anda line

If we extend the segment from one of it's end point to an in finite length in the same direction, this is called a 'ray'

or

Remember:-

In a segment there are two end points, where as in a ray there is one end point from where the 'ray' starts the second end is not a finite place.

Line

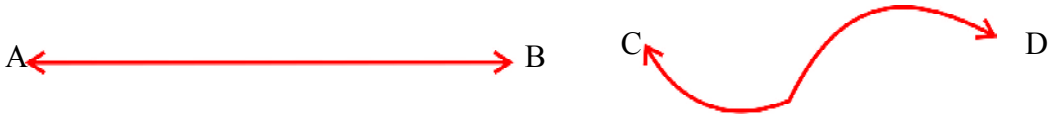
Let us draw in your note book a segment AB with the help of a scall and extend it indefinitely on both sides as shown below. This gives the figure of a line $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$

Remebers:-

When we extend a segment indefinitely on both sides, the figure so formed is called a line.

Straight/simple and curved lines

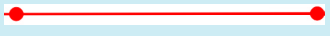
Given below the figures of two lines



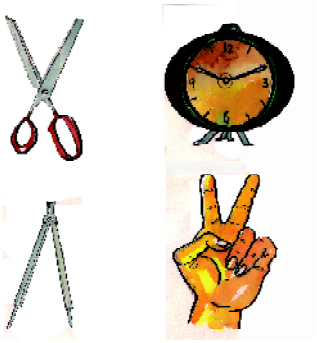
Line AB is a straight line which is draw with the help of a scale & a pencil. Such lines are called straight lines. Line CD is not a straight, such lines are called curved lines.

Let us see what have you learnt 7.3

Join the correct figure with it's name

Ray	
Segment	
Straight line	
Curved line	

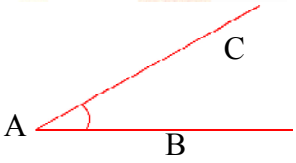
7.4 Let us learn about angle



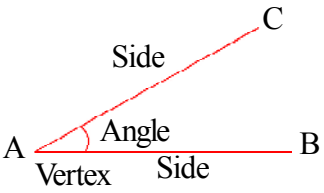
In figures given on the right side a pair of scissors, compass, clock and two fingers of hand, we see there is some band/inclination between the two wing of a scissor, two arms of a compass + the two hands of a clock and also between the two adjaseil fingers. There appears a shape like a corner.

Let us understand angle

On a paper from a point A, two rays have been drawn names AB & AC forming a shape like inclination.

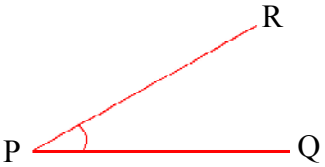


This is called an anlge. Point A is the vertex of this angle and the 'rays' $\overrightarrow{AB}$ and $\overrightarrow{AC}$ are the two arms of the angle



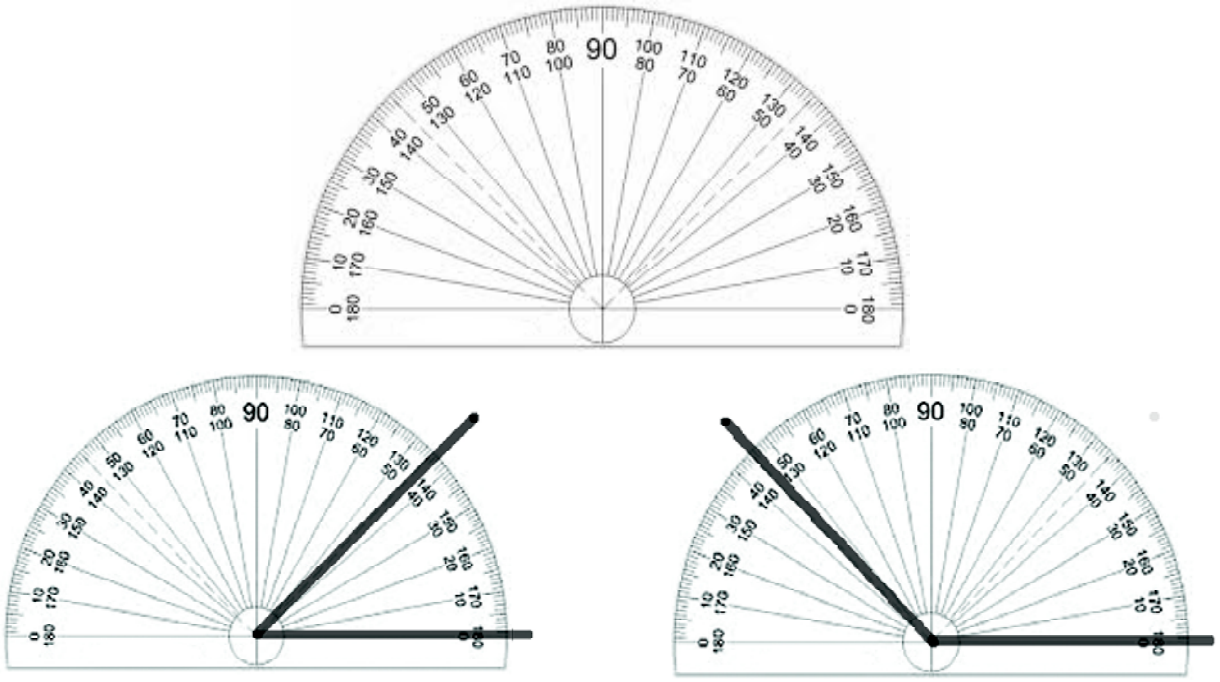
The symbol of angle is '<.' The angles is shown

Joining rays PQ & PR, an angles is formed at point P.
This is called angle QPR or $\angle$ QPR angle RPQ or $\angle$ RPQ
Vertex is written in the middle.



7.4.1 Let us now learn to measure an angle

The angle is measured with the help of a protractor. On the body of this, these marks be to 180 at eaqual distence each small part is called degree. This is the unit of angle measure. Degree is show in by 'o' As 50 degree = 50^{o}. The line on the protractor from 0 to 180 is called the base line. In the middle of this line there is a middle point.

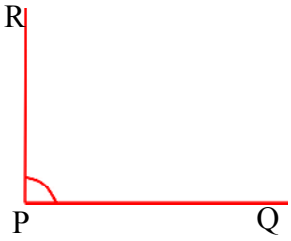


The middle point of the protractor is kept at the vertex of an angle. The base line is kept along one of the arms of the angle. In the above figure, the measure of an angle has been shown as 45° as the sencond arm of the angle is at 45° from the side of the first arm (Fig (ii) above). The meausre of this angle is 45°, we may also write $\angle ABC = 45^\circ$ $\angle CBA = 45^\circ$. Similarly in the figure above (iii) The measure of angle is 135°

7.4.2 Let us now understand the types of angles

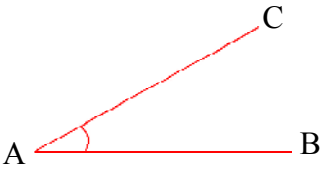
Right angle

The angle whose measure is 90° is called a right angle 1 right angle = 90 degree or 90°



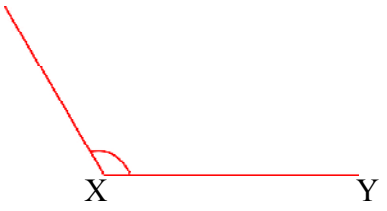
A cute angle

The angle whose measure is more than 0° and less than 90° is called an acute angle.



Obtuse angle

The angle, whose measure is more than 90° but less than 180°, is called an obtuse angle

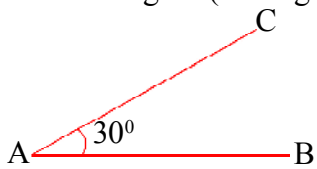


7.4.3 Let us learn to draw an angle of a given measure

For constructing an angle of measure 30°, we take the following steps:-

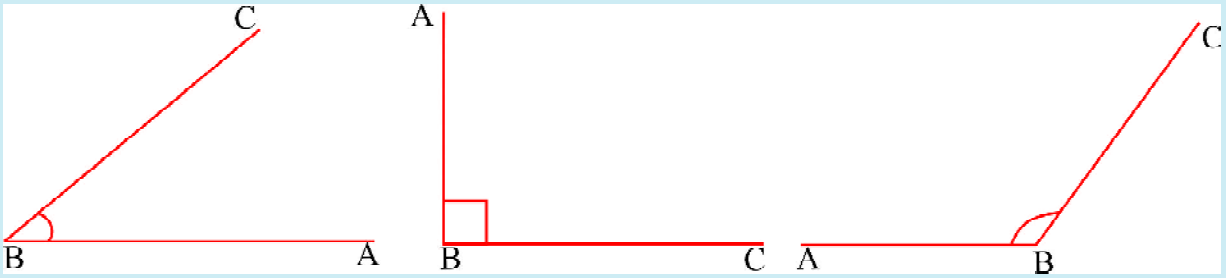
- Draw a segment AB on the copy.

- Place the mid point of protractor at the end point say (A) and the base line along AB (starting form A).
- Now read the marking on the protract or for from vertex B and put a mark 'C' on the copy where the 30^o mark is on the protractor. Now remove the protractor and join this point '.' with the vertex (A) In this way angle BAC or $\angle BAC$ is drawn of 30^o



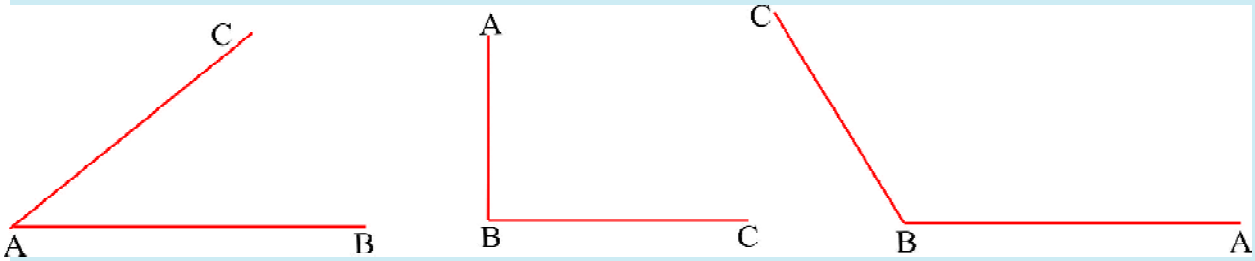
Let us see what have you learnt 7.4

1. Write the names of angles in the following figures



(i) (ii) (iii)

2. Measure the following angles with the help of protractor and write down their measure on the note book



(i) (ii) (iii)

3. Draw the angles of the following measures with the help of protractor.

   30^o, 45^o, 60^o, 75^o, 90^o, 145^o, 180^o

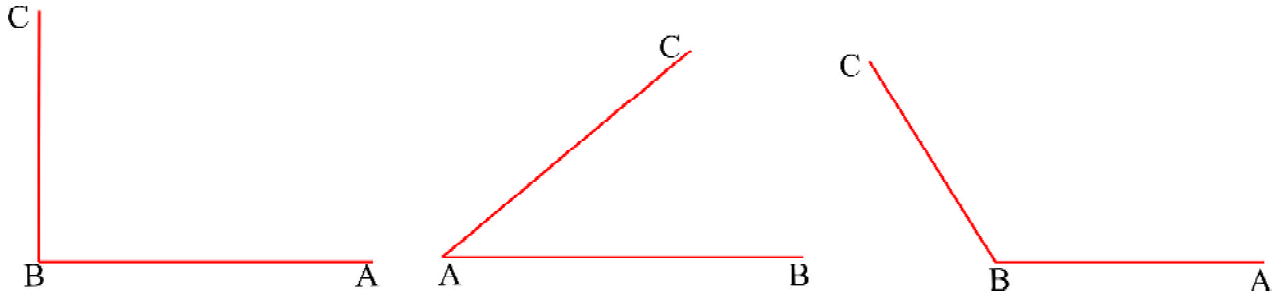
4. Fill in the blanks:-

   (a) The measure of an angle is 69^o is called _____ angle.

   (b) The measure of an angle is 90^o is called _____ angle.

   (a) The measure of an angle is 170^o called _____ angle.

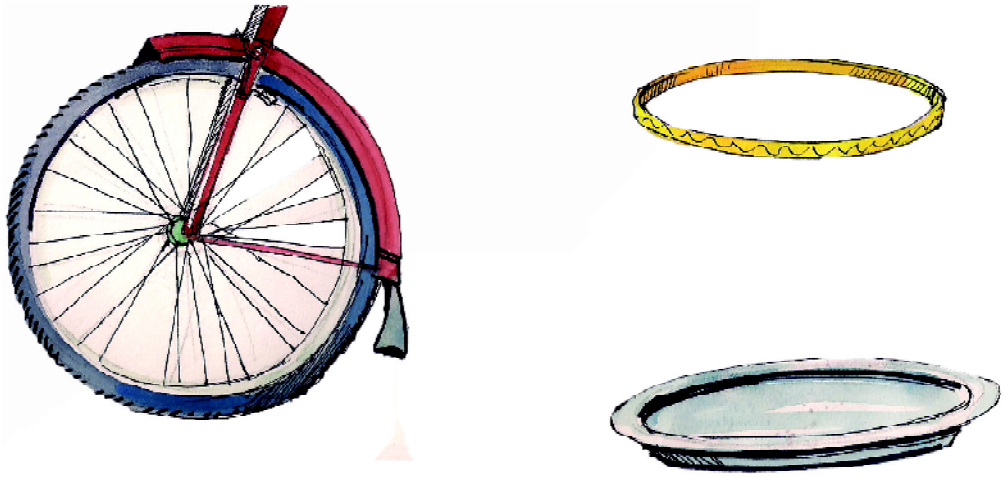
5. Observe the following figures and write down in the space given below then the types of angle.



(i) (ii) (iii)

7.5 Let us know about circle

You might have seen object the wheel of cycle, bangles, plate, coin etc. The shope of these objects is circular



See some more circular objects drawn below their pictures

The edge of Truck Wheel

One rupee coin

Glass Seige

Point

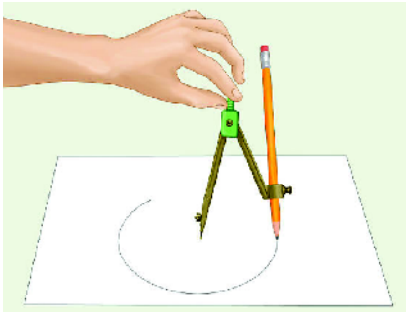
Place on a paper a one rupee coin and move a pencil around this coin. What shape is it?

Similarly a shape is drawn with the help of a bangle, these shapes are circular shapes.

7.5.1 Let us learn to draw circular figures

Take a compass. Fix a pencil on one side where the space is for the pencil. Tight it properly but make the tip of pencil as long so that the tip of other end of compass and pencil tip are at the same level when touches the paper.

- The pointed tip of the compass is placed at '0' on the scale
- Now adjust the pencil edge in such a way that it comes at 6cm mark on the scale
- Now the distance between the two edges of compass is 6cm.



- Now mark a point 'A' on the note book. The pointed edge of compass is placed at point 'A'.
- Now fix the pointed tip of the compass and move the other edge with pencil in such way that the pencil endge remain in touch with the copy unless it reaches the point from where it started moving along with the paper of note book.
- Now this figure is a cirlce.

7.5.2 Let us understand circle, center, radius, diameter chord and circumference of a circle

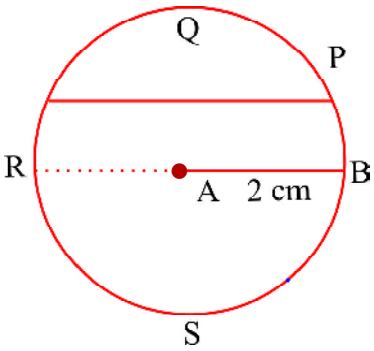
While constructing/drawing a circle the pointed tip of the compass is fixed at point. With the help of other edge where pencil is fixed, a curve is drawn at a fixed distance from this point. Hence a curve, what is drawn from a fixed point and always remains at the same distance from the fixed point is called a circle (blue colour).

Center and Radius

Let us see the construction of a circle:-

- With the help of a scall take 2cm length between the two tips of the compass.

- Take a point 'A' on a paper. nar
- Draw a circle by playing the pointed edge of compass at this point 'A'.
- Different points are taken on the circle say P, Q, R & S.
- On measuring you will find AP = AQ = AR = AS = 2cm



We have see that distance of all the points on the circle is some from the center point i.e. A. This equal distance called radius of cirlce.

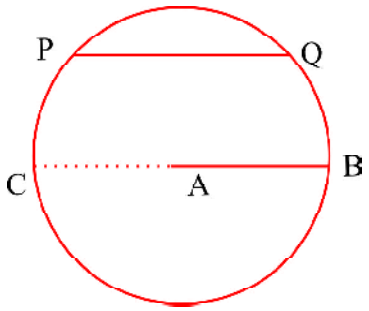
Attention

The fixed point around which the circle is drawn is called the center of circle.

All the points on the circle are at the same distance from the center. This distance is called radius of circle.

Diameter:-

- A circle is drawn with 'A' as center.
- Segment BA is proceduced to meet the circle at C.
- Two more points are on the circumfrence of the circle PQ is the chord of circle.
- The chord which passes through the center of the circle and joins the two points on the circle is called **diameter** of the circle. This diameter is also the longest **chord** of the circle. As CB passes through 'A' the center, Hence CAB or BAC is diameter.



Attention

The segment joining any two points on the circumference of the circle is called **chord.**

Cicumference

On a round plate or on a ball rap with a tape a fine wire, this will be the perimeter of the round plate or the ball. This is also called the circuference of the circular plate/ball. [ball is solid object only in one case when the wire is raped through the maximum thickness of the ball].

Relation between radius and diameter.

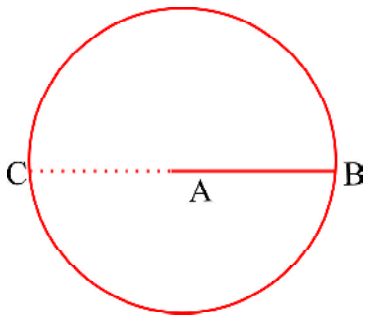
In the figure measure AB & AC

You see these are equal

CA = AB

CB is the diameter of the circle

Also CB = CA + AB



= radius + radius = 2 radius

$\therefore$ Diameter = 2 × Radius

Remember : The length of the diameter of a circle is twice the length of the radius of that equal.

Let us see and understand

The radius of a circle is 5cm what will be it's diameter?

You know that the the diameter is twice the radius of a circle

$\therefore$ Diameter = 2 × 5 = 10cm

This is also

Diameter = Radius + Radius

= 5cm + 5cm

= 10cm

Let us see what you have learnt 7.5

1. With the help of compass, draw the circles with the given radius:-

   (i) 5.8cm (ii) 6.6cm (iii) 4cm (iv) 3cm

2. With the help of compass draw the circles with given diameters:-

   (i) 8cm (ii) 5.6cm (iii) 4.4cm (iv) 5cm

3. Without the use of compass draw to circles using same circular objects

4. Fill in the blanks:-

   (i) The segment obtained, by joining two points on the circumference of a circle, is called _____.

   (ii) Diameter = 2×_____

   (iii) The diameter is the _____ chord of a circle.

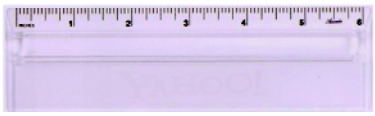
   (iv) Radius = $\frac{1}{2}$ × _____

7.6 Let us learn about parallel and perpendicular line

Parallel lines: Draw below the figure of a railway tracks will be these ever meet? No. As the distance between two tracks is always same. Similarly the distance between the two opposite edges of a scall is always same.

Such line which remain always at the same distance from each other and never meets each other are called parallel lines.

Railway Track Line



Scale

Remember: Two parallel lines are represented by the symbol '||'

The edge of the blackboard face

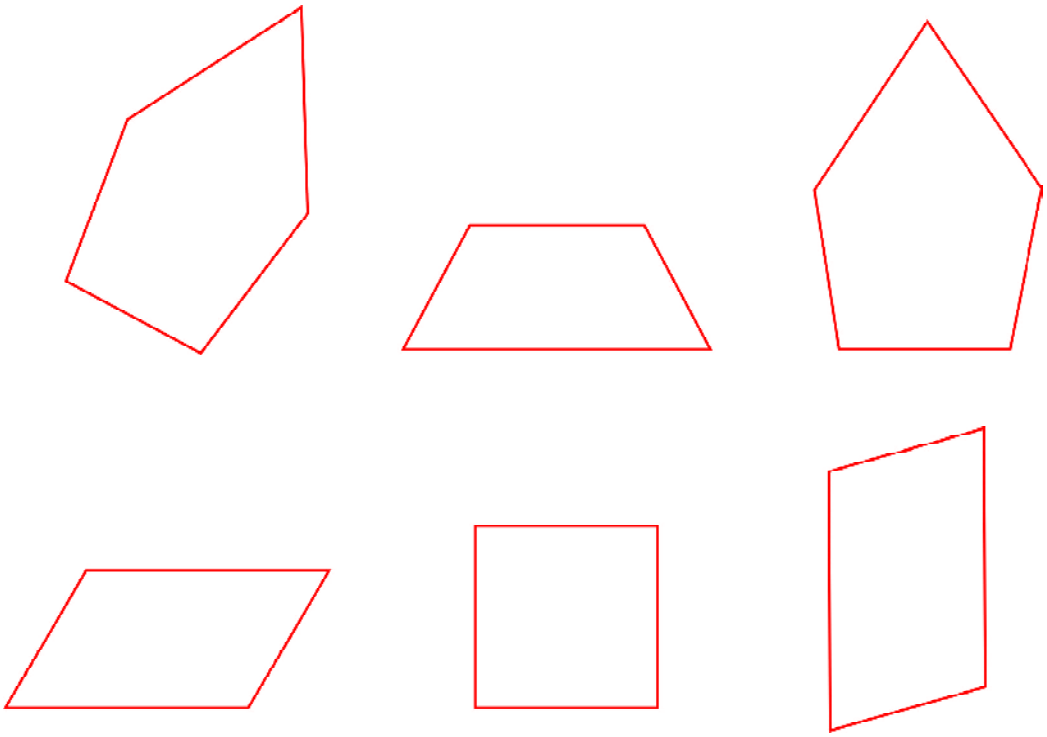
Table top surface

Remeber:

- Two straight lines, when the distance between them is same at all points, are called parallelling indefinitely on either side
- The parallel lines are represented by the symbol '||'.
- Parrallel lines never meet each other when extended indefinitely on either side.

Let see what have you learnt 7.6

1. Mark ( ) on the figures whose parallel lines are seen



2. Given below certain statements, read them carefully and mark (√) or (×) against each in the box, when this is true or false.

(i) Railway tracks are parallel ☐

(ii) The boundaries of a canal are not parallel ☐

(ii) Railway tracks are parallel ☐

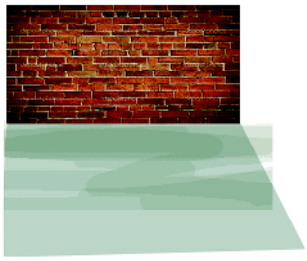
(iii) Sides of a triangle are parallel ☐

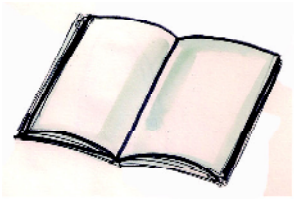
(iv) Opposite sides of a square are not parallel ☐

(v) Opposite sides of a kite are parallel ☐

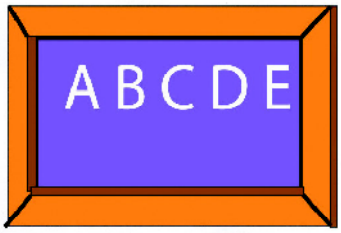
7.7 Let us learn about perpendicular lines

You look at the walls of your room. These make a right angle with the floor or these are perpendicular to their base. In other words these are straight and making 90^o angle with the base. There are many other things whose two side make an angle of 90^o. As two sides of a book, slate, chalk box, pencil boxex.





Book



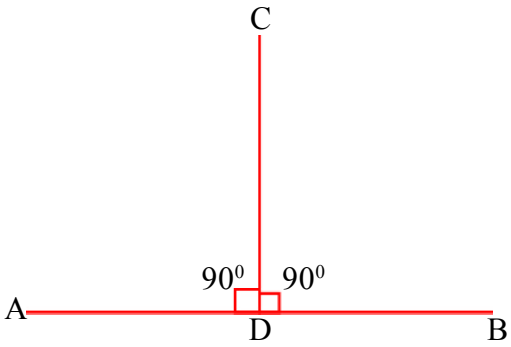
Slate

Chalk Box

Pencil Box

Look at and understand

In the given figure, ray meets $\overrightarrow{AB}$ line a point D. This makes two angles as $\angle CDA$ & $\angle CDB$ both are of 90^o measure. Hence DC is $\perp$ to AB the symbol for perpendicular is $\perp$



Attention

When two lines meet each other at 90^o angle, then these are perpendicular to each other.

Let us see what have you learnt 7.7

1. Mark ($\surd$) against the right statement and ($\times$) against a wrong statement:-

   (i) Railway tracks are perpendicular to each other.

   (ii) The opposite side of a rectangle are paraller.

   (iii) The side of a triangle are always perpendicular.

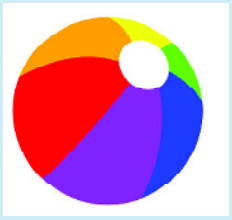
   (iv) The opposite edges of the top surface of a book are perpendicular to each other.

Let us Revise

- When a straightling divides a figure into exactly two equal parts, that figure is symmetrical and the line dividing this figure is called the line of symmetry.
- The figures, which are not divided into two equal parts by a straight line, are called asymmetric.
- When two rays are emanating from a point, these form an angle.
- The straight distance between two points is called a segment.
- An angle whose measure is 90^o is a right angle.
- The angle whose measure is less than 90^o but more then 0^o is called an cute angel.
- The angle whose measure is more than 90^o but less than 180^o is called an obtuse angle.
- A curve drawn from a fixed point, keeping distance constant from that point is called a circle. The fixed point is called the center of the circle.
- The length of the curve drawn is the circum forence of the circle.
- Each point on the circle is equidistant from the center.
- This distance is called the radius of the circle.
- The line joining any two points on the circumference of the circle is called the chord of the circle.
- The chord passing through the center is called diameter.
- The diameter is the longest chord of the circle.
- The diameter is twice the length of radius or diameter = $2 \times$ radius.
- Two different straight lines on a plane, When the distance between them remains same, these are called parallel line.
- On the same plane two such lines make an angle of 90^o measure, these are called perpendicularl lines.

Excercise

1. Mark ($\surd$) on the objects with plane surface:-



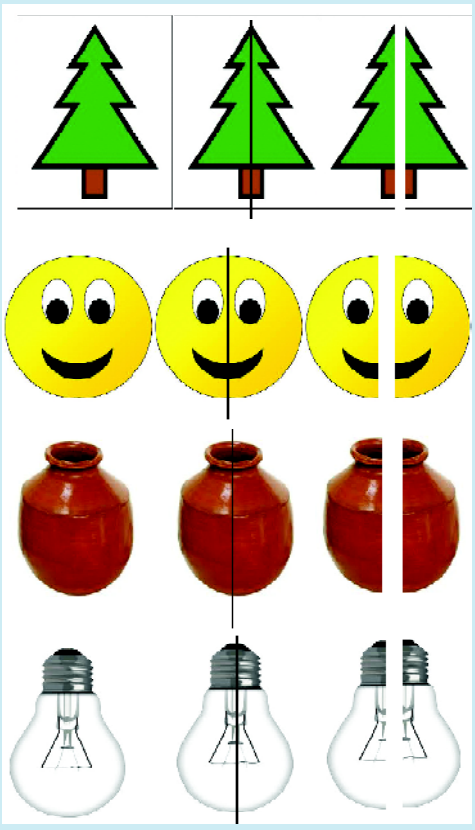
Ball

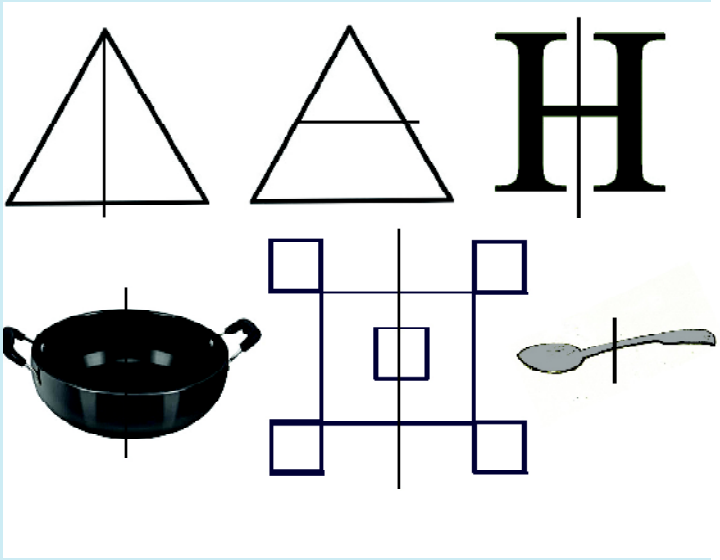
Brick

Strictly

Glass

2. Mark ($\surd$) on the symmetric figures:-





3. Write down the names of figures drawn below:-

.....

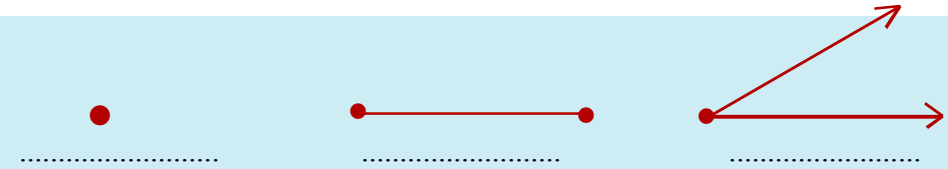
(i)

.....

(ii)

.....

(iii)



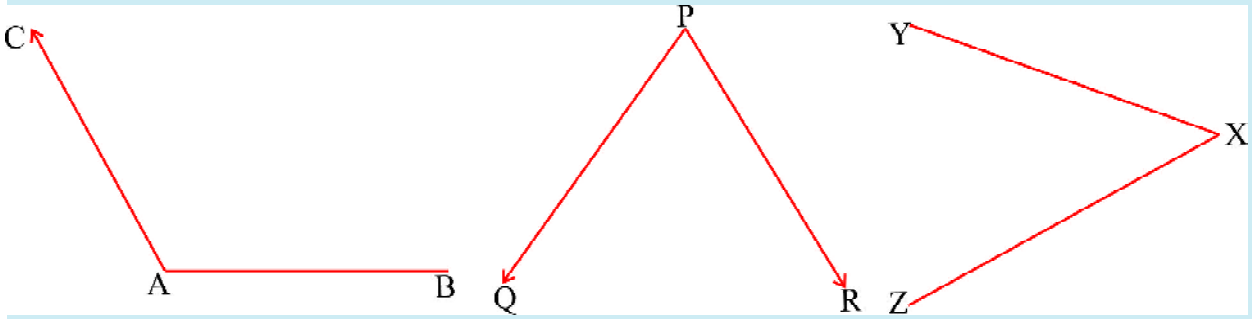
....

(i) (ii) (iii)

4. Look at the measure of an angle and write down the types of angle:-

40^o	90^o	120^o	170^o	60^o
.....	.....	.....	.....	.....
(i)	(ii)	(iii)	(iv)	(v)

5. Write down the names of angles of the following figures:-



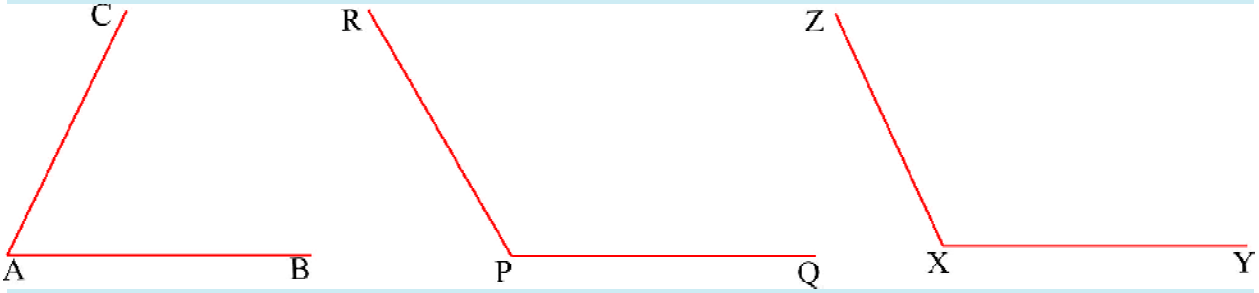
_____ _____ _____

(i) (ii) (iii)

6. Draw the following angles with the help of protractor and write down the types of angle:-

(i) 20^o (ii) 50^o (iii) 70^o (iv) 105^o (v) 90^o (vi) 130^o

7. Measure the following angles with the help of protractor:-



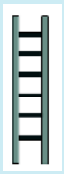
(i) (ii) (iii)

8. Draw the circle with a measure of diameter given below:-

(i) 8cm (ii) 10cm (iii) 7.2cm (iv) 2.6cm

9. From the same center, draw two circles of radius 3cm and 5cm.

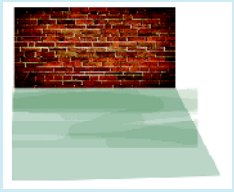
10. Recognise the pictures/figures and write whether it has parallel or perpendicular lines:-



Stairs

.....

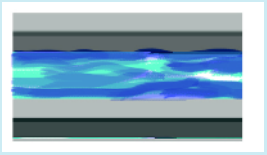
(i)



House Wall

.....

(ii)



Canal

.....

(iii)

Ground Pole

.....

(iv)

Street

.....

(v)

Table

.....

(vi)

Answers

Let us see what you have learnt

7.1

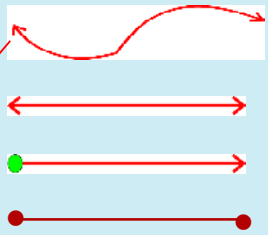
1. Plane
2. Book, Brick, Match box, (names of such objects)
3. Bowl, Glass, Kadhai (names of such objects)

7.3 Ray

Segment

Line

Curved line



7.3

1. $\angle PQR$, $\angle ABC$, $\angle XYZ$
2. 40^o, 90^o, 140^o,
4. Acute angle (ii) Right angle (iii) obtuse angle
5. (i) Right angle (ii) A cute angle (iii) Obtuse angle

7.5

4 (i) Chord

(ii) Radius

(iii) Longest

(iv) Diameter

7.6

1. (i) x (ii) √ (iii) × (iv) √ (v) √ (vi) √
2. (i) √ (ii) × (iii) × (iv) × (v) ×

7.7

(i) √ (ii) √ (iii) √ (iv) √

Answers

3. (i) Curved line (ii) Ray (iii) line
   (iv) Point (v) Segment (vi) Angle

4. (i) Acute angle (ii) Right angle (iii) Obtuse angle
   (iv) Obtuse angle (v) Acute angle

5. $\angle ABC$, $\angle PQR$, $\angle XYZ$

6. (i) Acute angle (ii) Acute angle (iii) Acute angle
   (iv) Obtuse angle (v) Right angle (vi) Obtuse angle

7. (i) 60^{o} (ii) 130^{o} (iii) 120^{o}

10. (i) Parallel lines (ii) Perpendicular line (iii) Parallel line
    (iv) Perpendicular line (v) Parallel line (vi) Perpendicular line

8

DATA HANDLING

From this lesson, you will learn

- What are data and the need of data?
- Methods of data collection.
- Understanding data in graphical form.

8.1 Understanding data and their importance

India's population is about 130 crore which is second in the world 74.26 % people in India as literate.

This time 64% votes were polled during the Loksabha Elections. India won the cricket match by 70 runs, 560 votes were polled in the village for the post of sarpanch. This year there was 26% increase in the sugercane crop. All these news you see in the television, read in the news paper or hear from people around you, these informations are related to our daily life. There are given in numbers. These are called data.

The information which is shown in numbers are called data.

Let us learn in this chapter about the methods of collection, classification and writing the data in frequency table also learn the method of representing data in the form of barchart, pie-chart and graphical form.

Remember:

- The infomation, which are given in the form of numbers, are called data.
- Collecting information directly in the form of numbers are called primary data.
- Information collected by other persons or other means are called secondary data.

8.2 Let us learn the methods of data collection

There are two methods of data collection.

1. **Direct method :** In this method the information is collected directly from different persons/ sources, visiting different places etc. As some one goes to different places like markets and collect information regarding the rate of paddy crop.

2. **Indirect method -** In this method, the information collected by other persons is used as contacting different people, reading in this news paper, throw T.V and Radio, Visiting different officers.

8.3 Let us learn to arrange the data in a systematic way

There are 97 families in a village. All families have different income. The families are grouped according to their income.

Sr. no.	Income group of family	No. of Families
1	With very high income	05
2	With high income	12
3	Average income	22
4	Low income	26
5	Very low income	32
	Total	**97**

Above data is arranged as per the income group. Data is written in order of income group. The data written in this manner saved the information easily. Below given table reflects the number of children of a primary school in a village —

Class	Total Students	Boys	Girls
5	22	12	10
4	26	13	13
3	32	15	17
2	35	20	15
1	42	19	23

From this table we can easily see the number of students in a particular class. Also no of boys and girls are easily known. These type of tables are useful in the distribution of mid-day meal etc.

Let us see what have you learnt 8.1

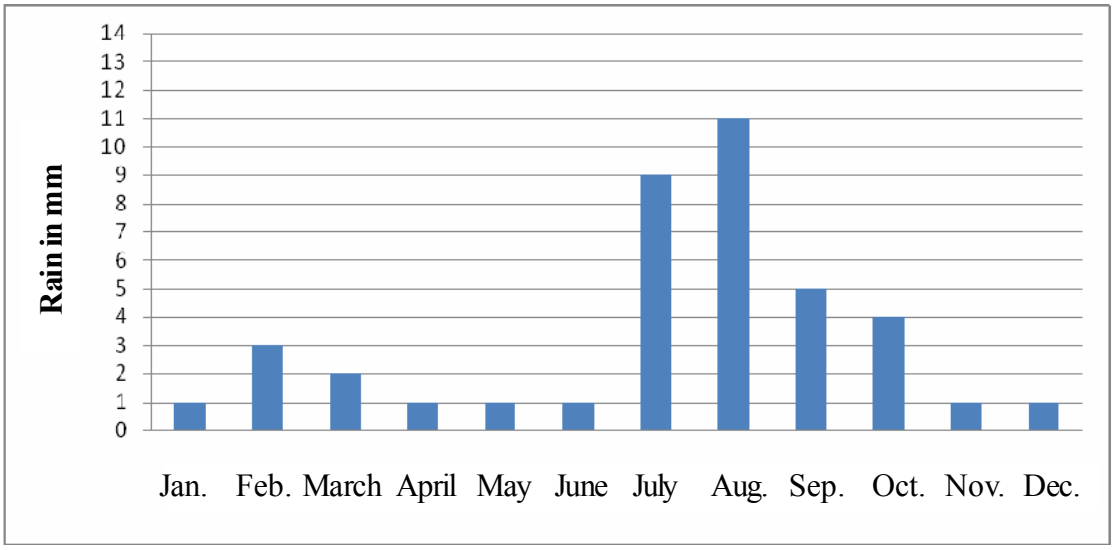
1. In the above table regarding the number of students in a class, answer the following
   (i) In which class girls are maximum?
   (ii) In which class boys are minimum?
   (iii) How many student's are there in class III?
   (iv) How many boys are in class V?
   (v) How many girls in class II?
2. What are data?

8.4 Let us understand the data with the help of graphs

We see the data, in the News paper, related to population, election results, temperature and the crops from the fields etc. The tables of the data can be prepared in different ways. We receive relevent information easily from the data. Data can be represented in different tables and by different graphs/Charts.

Let us under stand the barchart

Given below in the table, the non there data of rain is given. Alongside verticle line the data is for rain and the horizental line for months. Month wise data is represented in the form a barchart. This type of graph/ picture is called bargraph. The upper part of the bar coincides with the rain along the verticle line, and this shows the amount of rain in the particular month. As in the graph, the top of bar for february coincides with 3mm. The longest bar tells the maximum rain and the shortest for the minimum rain.



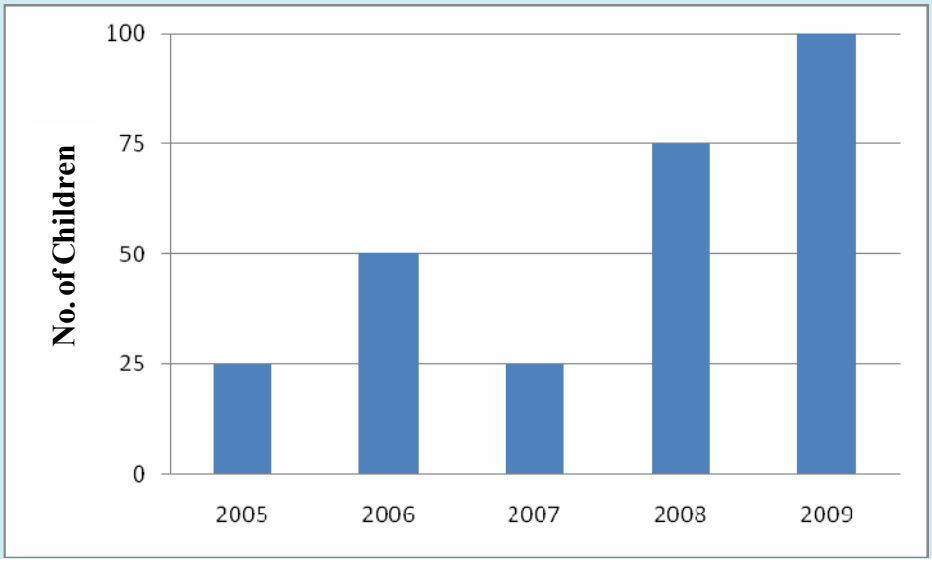
With the help of chart/Graph, we can easily get the information.

Fram the bar chart we get the following information:

- Maximum rain was in the month of August.
- Minimum rain was in the month of January.
- There was equal rainfall in the month of January, April, May, June, November and December.

Let us see what have your learnt 8.2

1. In the below given chart the data for the past 5 yrs related to vaccination is given



Observe the bar chart carefully and answer the following-

(i) In the year 2008 how many children were vaccinated?

(ii) In which year the minimum children were vaccinated?

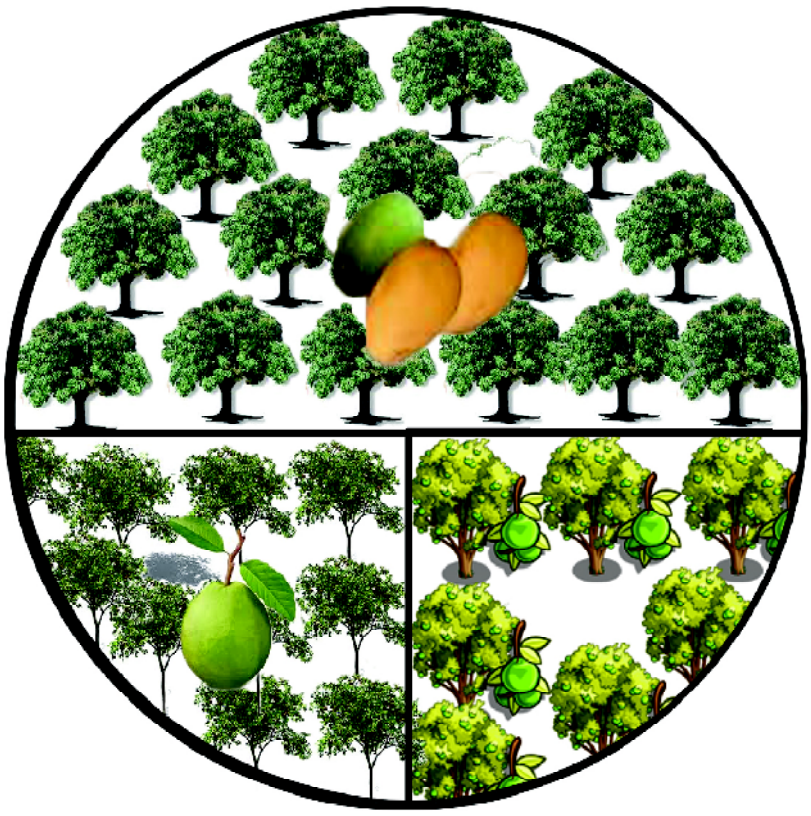
(iii) What is the difference between the vaccination figures of year 2009 and 2006?

(iv) Maximum vaccination was in which year?

8.5 Let us learn some more ways of representing data

Let us know about pie-chat.

For the number of fruittress in Rahis's garden, a circle has been used. This is called a circular or round chart.

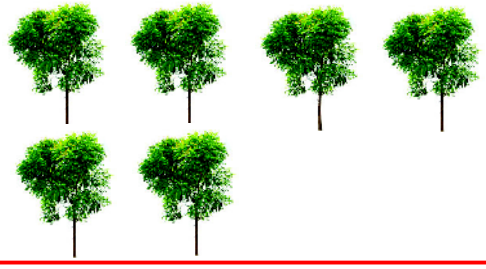


By looking at the picture we can easily understand that in Rahis's garden there are half part of Mango trees, one fourth of Guava and one fourth of Anwla trees. If there are total 100 trees, Then we can easily know that there are 50 Mango trees, 25 Gauva trees and 25 of Anwla trees.

Let us understand the pectograph

Uder a certain scheme, neemtrees were planted in many villages. For the purpose of representing the bigger information one tree may be taken for many number of trees.

In the given below example one Neem tree has been taken equal to 5 Neem trees.

Name of Village	No. of Trees (Mark in the picture)	No. of Trees	Total number of Trees
Hamirpur		4 × 5	20
Nangla		3 × 5	15
Gadi		4 × 5	20
Moujpur		7 × 5	35
Tatitiri		5 × 5	25
Banthla		8 × 5	40
Jaani		6 × 5	30

No. of village	No. of Trees (Mark in the picture)	No. of Trees	Total Number of Trees
Kusumpur		2×5	10
Jawali		5×5	25
Satheri		10×5	50

In the above pictograph one tree symbol represents 5 trees, hence we can easily find the number of trees planted in villages. Representing data by this method is called pictograph.

Let us see what have you learnt 8.4

1. Under the poor housing scheme eight villages of a district were selected and houses were contracted for the poor familes . No of houses constructed are shown in the pictogaph where.

One house  = 10 Houses

(one house represents 10 houses to save the space etc.)

Name of Village	No. of Houses (As maked in the figure)	Total Houses Constructed
Tickri		
Garhi		
Nangla		
Gouthra		
Tatiri		
Bassi		

Name of Village	No. of Houses (As maked in the figure)	Total Houses Constructed
Asaara		
Kandera		
Mazara		

(i) No. of houses constructed in a village, write the number of houses against each village.

(ii) In all how many houses were constructed?

Let us Revise

- To colled the pertaining pertaining to a subject, we call collecting data.
- The data collected by self/directly, is called primary data.
- Data collected from other sources is called secondary data.
- The graph represented by bars is called bar graph.
- The graph represented with the help of a circle/circular shape is called piechart.

Excercise

Select appropriate word from bracket and fill in the blanks.

(a) The collected information is called _____ (Graph/data)

(b) The data collected personally is called _____ data (Primary/secondary)

(c) The methods of data collection are _____ (One/Many)

(d) The method in which data represented in a circle is called _____chart (pie/square)

(e) The method representing the data by a bar is called _____ graph (bar/cirlce)

2. In the table below the data is given for the no of chidren receiving Govt. scholarship per year —

Year	2008	2009	2010	2011	2012
No. of Children receiving scholarship	18	27	31	19	22

Answer the following with the help of data given in the above table-

(i) How many children were given scholarship?

(ii) In which year the minimum number of children received scholarship?

(iii) In which year maximum number of children received scholarship?

3. Below given data pertains to the number of small scale Industries are being by self help groups —

Name the small scale Industry	**No. of self help groups**
Wooden toys	7
Making Papad	10
Pickle/Muraba making	12
Weaving Chattai	15
Making Bangles with Laakh	08

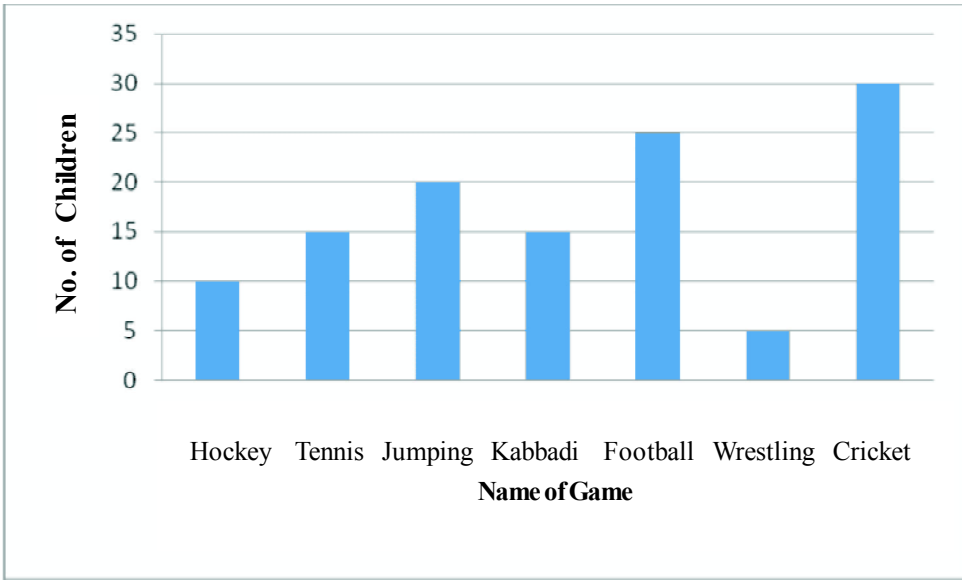
Answer the following questions, based on the above information.

(i) Which the industry involving maximum number of self Help Graphs?

(ii) No of industries involved in papad making.

(iii) Which Industry involved the least number of self help groups?

4. In a village different children play different games, which is shown below.



Look at the bar chart and answer the following questions.

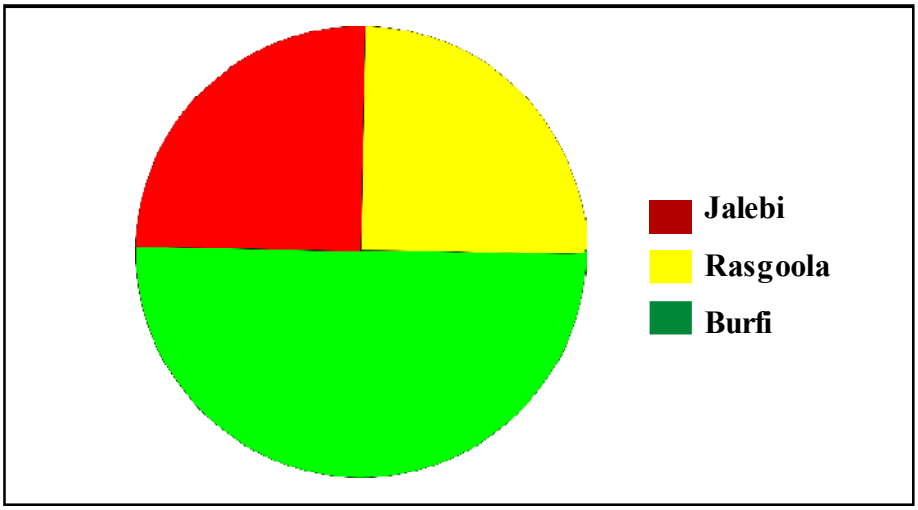
(i) What games, where equal number of children play game?

(ii) What game is played by least number of children?

(iii) How many children play Football?

(iv) How many children play cricket?

5. In a mela the choice of 100 people like the sweets is shown in the pie-chart

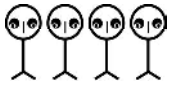
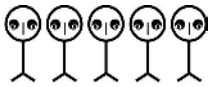
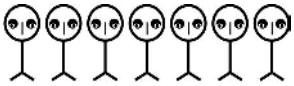
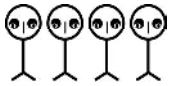
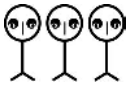


Look at the pie-chart and answer the questions-

(i) How many people like Jalebi?

(ii) Which sweets are liked by equal number of people?

6. Mid-day meal is served to children in schools of different villages. No of children receiving mid-day meal's shown by a pictograph one child = 10 children

Name of Village	Number of Children
Pathree	
Rampur	
Berla	
Kanva	
Baghra	

Look at the pietograph and answer the following

(i) How many children receive mid-day meal in Berla village?

(ii) Which are the villages where same number of children receive mid-day meal?

(iii) Which is the village where minimum number of children recieve mid-day meal?

Answers

8.1 Let us see how much have you learnt

1. (i) In class 1 (ii) Inclass 5 (iii) 32
   (iv) 12 (v) 15
2. Data is the collection of number which saved some information or recieve some information.
   (i) in the year 2005 (ii) 50 (iii) In the year 2009

Let us see what have your learnt 8.2

1. (i)

Tikri	-	30
Garhi	-	40
Nangla -	-	20
Gouthra	-	30
Tatiri	-	50
Bassi	-	20
Asara	-	10
Kandera	-	20
Mazra	-	30

   (ii) Totaltress - 250

Answers (Excercise)

1. (a) Data (b) Primary (c) Many (d) Piechart (e) barchart
2. (i) 22 (ii) 2008 (iii) 2010
3. (i) Weaving Chattai (ii) 10 (iii) Wooden Toys
4. (i) Tenis and Kabbadi (ii) Wrestling (iii) 25 (iv) 30
5. (i) Half the people (50) (ii) Rasgoolas and Barfi
6. (i) 70 (ii) Pathri and kanva (iii) Baghna