

CONTENTS

S.No.	Topic	Page No.
1.	Numbers upto 99,99,99,999	1
2.	Operations on Large Numbers	14
3.	Multiples and Factors	22
4.	Fractional Numbers	43
5.	Decimals	76
6.	Addition and Subtraction of Decimal Numbers	93
7.	Multiplication and Division of Decimal Numbers	101
8.	Simplification of Numerical Expressions	118
9.	Rounding Numbers	123
10.	Averages	134
11.	Profit and Loss	141
12.	Percentage	151
13.	Simple Interest	164
14.	Bills	173
15.	Temperature	180
16.	Triangles	185
17.	Data Handling	197
	Answers	203

UNIT - 1

NUMBERS UPTO 99,99,99,999

Do you remember numbers till 9,99,999?



Let us solve some problems.

1. Write the period, place and place value of the encircled digit in the following numerals.

(a) 4 **8**, 6 2 4

(c) 9 9, 7 **8** 3

(e) 1, 4 5, 3 **2** 6

(b) 3 **0**, 9 5 2

(d) **4**, 8 1, 6 5 9

(f) 3, **5** 7, 0 2 6

2. Rewrite the following in ascending order.

(a) 4,83,654; 43,865; 4,38,654; 4,38,854

(b) 91,089; 9,10,849; 9,19,098; 9,14,089

3. Write the number names for the following numerals.

(a) 53,701

(d) 4,40,404

(b) 91,001

(e) 9,00,009

(c) 8,08,808

(f) 6,08,316

4. Fill in the blanks.

(a) The smallest 5-digit numeral = _____

(b) The successor of 99,999 = _____

(c) The numeral for four lakh four = _____

(d) One lakh = _____ thousands.

(e) $3,00,000 + 8,000 + 50 + 1 =$ _____

Numbers Beyond 9,99,999

We know that the largest 6-digit number is
9,99,999

$$\begin{array}{r} 9,99,999 \\ + 1 \\ \hline 10,00,000 \end{array}$$



Let us see what happens when we add 1 to 9,99,999.

Let us now enter the number 10,00,000 in the Indian Place Value Chart.



See! we have added one more column to the left in the Indian Place Value Chart.

Lakhs		Thousands		Ones		
Ten Lakh	One Lakh	Ten Thousand	One Thousand	Hundreds	Tens	Ones
1	0	0	0	0	0	0

10,00,000 is read as TEN LAKH. It belongs to the period, LAKHS.

The smallest 7-digit number is 10,00,000 (ten lakh).

Now, let us read some 7-digit numbers.

Numeral	Number Name
39,84,000	Thirty nine lakh eighty four thousand.
18,00,046	Eighteen lakh forty six.
99,99,999	Ninety nine lakh ninety nine thousand nine hundred ninety nine.

Remember
While reading the numeral of a number, all the digits of a period and the name of the period (except ones) are read together.

99,99,999 is the greatest 7-digit number.

Worksheet 1

1. Write the number names for the following numerals using commas between periods. Also read them aloud.

- (a) 4935087 (d) 1011001 (g) 7183010 (j) 4904078
(b) 9300432 (e) 9005430 (h) 9999999 (k) 3520179
(c) 7080201 (f) 6358004 (i) 9090009 (l) 2200050

2. Complete the table by writing the period, place and place value of the encircled digits. The first one is done for you.

Numeral	Period	Place	Place Value
(a) 71,38,291	Lakhs	Ten lakh	70 lakh or 70,00,000
(b) 60,46,295			
(c) 83,21,069			
(d) 94,82,469			
(e) 61,80,843			
(f) 4,32,100			
(g) 9,08,768			
(h) 15,82,964			

3. Write the numerals using commas between periods.

- (a) Eighty one lakh thirty six thousand two hundred ninety six.
(b) Thirty four lakh seventeen thousand one hundred two.
(c) Seven lakh eight thousand nine hundred five.
(d) Forty lakh eighty nine thousand nine hundred five.

- (e) Ninety three lakh six thousand six.
- (f) Thirty eight thousand thirteen.
- (g) Sixty three lakh sixty thousand sixty.
- (h) Twenty lakh two.
- (i) Thirteen lakh six thousand five.
- (j) Forty eight lakh ninety thousand three hundred.

Introducing One Crore

We know that the largest 7-digit number is

99,99,999

$$\begin{array}{r} 99,99,999 \\ + 1 \\ \hline 1,00,00,000 \end{array}$$



Let us see what happens when we add 1 to 99,99,999.

Let us now enter the number **1,00,00,000** in the Indian Place Value Chart.

See! we have added one more column to the left in the Indian Place Value Chart.



Crores	Lakhs		Thousands		Ones			
	One Crore	Ten Lakh	One Lakh	Ten Thousand	One Thousand	Hundreds	Tens	Ones
1	0	0	0	0	0	0	0	0

1,00,00,000 is read as **ONE CRORE**. It belongs to the period, **CRORES**.

The smallest 8-digit number is 1,00,00,000 (one crore).

Now, let us read some 8-digit numbers.

Numeral	Number Name
4,00,00,000	Four crore.
9,10,00,000	Nine crore ten lakh.
6,78,16,000	Six crore seventy eight lakh sixteen thousand.
5,00,70,560	Five crore seventy thousand five hundred sixty.
7,57,55,941	Seven crore fifty seven lakh fifty five thousand nine hundred forty one.
9,99,99,999	Nine crore ninety nine lakh ninety nine thousand nine hundred ninety nine.

9,99,99,999 is the greatest 8-digit number.

Worksheet 2

- Write down the periods and corresponding places of an 8-digit number.
- Read aloud the following numerals. Also write their number names.
 - 4,86,29,183
 - 2,60,15,354
 - 7,98,71,010
 - 2,05,31,229
 - 9,00,71,318
 - 8,70,01,100
 - 5,10,00,700
 - 6,00,00,006
 - 4,58,79,515
 - 2,09,85,742
 - 9,43,02,001
 - 4,43,21,056
- Write down the smallest and greatest numerals of 8-digits.
- Write the numerals using commas between periods.
 - Five crore thirty lakh sixteen thousand nineteen.
 - Three crore one lakh forty seven thousand two hundred.
 - One crore fifteen thousand nine hundred sixty three.
 - Two crore ninety five lakh fifty two thousand two hundred seventy six.
 - Nine crore nine.

- (f) Six crore twenty thousand twenty.
- (g) One crore one lakh one thousand one.
- (h) Four crore forty lakh four hundred fourteen.
- (i) Eight crore thirteen lakh five.
- (j) One crore thirty two lakh nineteen.

Introducing Ten Crore

We know that the largest 8-digit number is

9,99,99,999

$$\begin{array}{r} 9,99,99,999 \\ + 1 \\ \hline 10,00,00,000 \end{array}$$



Let us see what happens when we add 1 to 9,99,99,999.

Let us enter the number **10,00,00,000** in the Indian Place Value Chart.

See! we have added one more column to the left in the Indian Place Value Chart.



Crores		Lakhs		Thousands		Ones		
Ten Crore	One Crore	Ten Lakh	One Lakh	Ten Thousand	One Thousand	Hundreds	Tens	Ones
1	0	0	0	0	0	0	0	0

10,00,00,000 is read as **TEN CRORE**. It belongs to the period, **CRORES**.

The smallest 9-digit number is 10,00,00,000 (ten crore).

Let us read some 9-digit numerals.

Numeral	Number Name
50,00,00,000	Fifty crore.
71,00,00,000	Seventy one crore.
35,56,00,000	Thirty five crore fifty six lakh.
41,03,11,800	Forty one crore three lakh eleven thousand eight hundred.
78,69,00,540	Seventy eight crore sixty nine lakh five hundred forty.
99,99,99,999	Ninety nine crore ninety nine lakh ninety nine thousand nine hundred ninety nine.

99,99,99,999 is the greatest 9-digit number.

Remember these relations

10 ones = 1 ten

10 tens = 1 hundred

10 hundreds = 1 thousand

10 thousands = 1 ten thousand

10 ten thousands = 1 lakh

10 lakhs = 1 ten lakh

10 ten lakhs = 1 crore

10 crores = 1 ten crore

Worksheet 3

1. Write the number names for the following numerals.

(a) 41,26,81,505

(e) 94,23,00,841

(i) 99,99,99,000

(b) 79,30,21,562

(f) 68,13,31,000

(j) 91,00,05,369

(c) 80,08,80,000

(g) 37,40,00,001

(k) 29,35,00,019

(d) 60,03,58,241

(h) 90,00,00,009

(l) 51,08,07,004

2. Complete the table by writing the period, place and place value of the encircled digits. The first one is done for you.

Numeral	Period	Place	Place Value
(a) 43, 86, 91, 708	Crore	Ten crore	Forty crore or 40,00,00,000
(b) 21, 86, 43, 010			
(c) 72, 83, 90, 478			
(d) 9, 01, 24, 456			
(e) 64, 23, 81, 016			
(f) 78, 92, 01, 569			

3. Write the numerals using commas between periods.

- Sixty one crore thirteen lakh forty eight thousand nine hundred.
- Eleven crore thirty six thousand sixteen.
- Nineteen crore three lakh seven hundred one.
- Fifty crore forty nine lakh thirty five thousand ten.
- Eighty crore eighty.
- Thirty five crore one lakh one thousand one.
- Twenty one crore thirty lakh seven hundred nine.
- Fourteen crore one lakh two.

International Place Value

Do you know we have another form of place value chart, called the International Place Value Chart?



Observe the International Place Value Chart carefully.

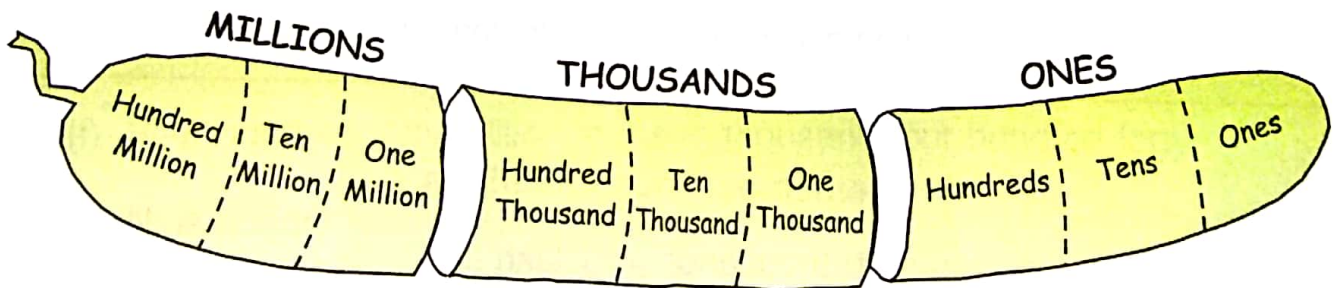
Millions			Thousands			Ones		
Hundred Million	Ten Million	One Million	Hundred Thousand	Ten Thousand	One Thousand	Hundreds	Tens	Ones
100,000,000	10,000,000	1,000,000	100,000	10,000	1,000	100	10	1



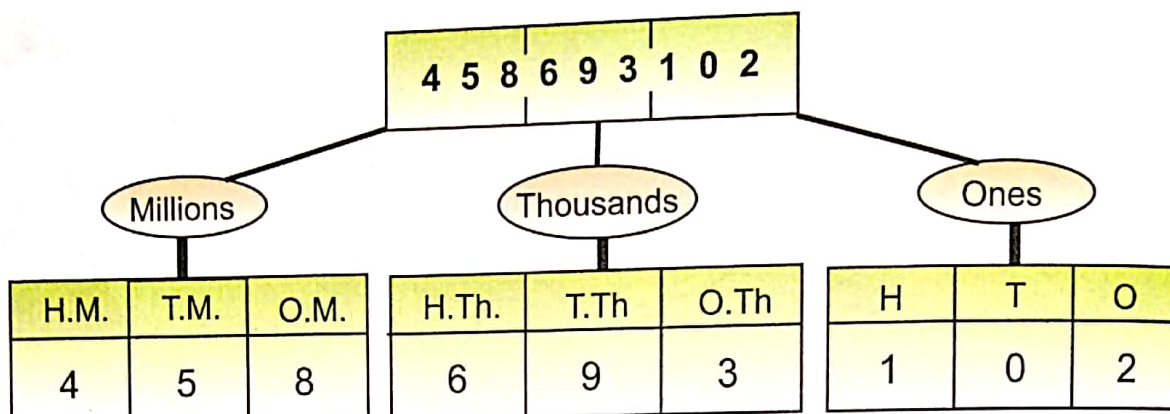
Do You Know ?

International Place Value Chart is being followed by most of the countries of the world.

The 9 places of a 9-digit number are grouped into 3 periods.



Observe the places of the numeral, 458693102.



Now, let us read some numerals in International system of numeration.

Remember

- Separate the periods using commas between them.
- Read all the digits in the same period together and name the period (except ones) along with them.

Numeral	Number Name
345,629,019	Three hundred forty five million six hundred twenty nine thousand nineteen.
148,003,681	One hundred forty eight million three thousand six hundred eighty one.
982,053,009	Nine hundred eighty two million fifty three thousand nine.

Remember these relations

100 thousands = 1 lakh

10 lakhs = 1 million

10 million = 1 crore

Worksheet 4

1. Rewrite the following numerals using commas in International system of numeration and then read them aloud.

(a) 493182

(c) 97864351

(e) 125605189

(b) 10489752

(d) 98700105

(f) 670157213

2. Write the number names for the following numerals.

(a) 409,846

(d) 8,021,832

(g) 271,804,010

(b) 65,329,561

(e) 550,930,816

(h) 30,000,003

(c) 410,800,143

(f) 900,040,801

(i) 753,458,214

3. Write the numerals using commas as per International system.

(a) Thirty four million two hundred three thousand five hundred one.

(b) Two hundred seventy nine million seventeen thousand five hundred ninety.

(c) One hundred one million seventeen thousand five hundred ninety.

(d) Eighteen million nine hundred fifty thousand eight.

(e) Nine hundred million nine thousand nine.

(f) Four hundred forty million fourteen thousand four hundred forty.

(g) Nine hundred three million five hundred.

(h) One hundred million fifteen thousand four hundred five.

Brain Teasers

1. Draw an Indian place value chart showing the periods and places of any 9-digit number.
2. Draw an International place value chart showing the periods and places of any 9-digit number.
3. Look carefully at the commas between periods and then write the number names for the following:

(a) 35,68,043

(c) 104,601,843

(e) 3,084,001

(b) 29,568,194

(d) 28,00,16,493

(f) 9,001,348

4. Fill in the blanks.

(a) 1 million = _____ lakhs

(b) 1 lakh = _____ thousands

(c) 1 crore = _____ million

(d) 100 million = _____ crore

5. Complete the table by writing the period, place and place value of the encircled digit. Look carefully at the commas between periods before you answer the question. The first one is done for you.

Numeral	Period	Place	Place Value
(a) 5, 8 3, 9 2 1	Thousand	Ten thousand	80,000
(b) 6 4,00, 9 2 5			
(c) 8 4 3, 0 1 3			
(d) 4 9 5, 6 9 8, 1 5 6			
(e) 7 , 8 1, 3 6, 2 4 8			
(f) 2 9, 4 3, 8 6, 1 0 0			

6. Form the smallest 8-digit number using the digits 7, 5, 0, 1, 2, 9, 8 and 4. Also write the number name of the numeral formed both in Indian system and in International system.
7. Write the successor (1 more) of the following:
- (a) 48,36,959 (b) 9,99,99,999 (c) 56,09,999
8. Write the predecessor (1 less) of the following:
- (a) 56,43,000 (b) 10,00,00,000 (c) 4,84,10,000
9. Find the sum of the place values of two fives in 35,46,52,983.

UNIT - 2

OPERATIONS ON LARGE NUMBERS

Do you remember operations?



1. Find the sum.

(a) $4,38,291 + 35,605 + 3,19,278$

(b) $95,262 + 6,15,893 + 3,20,503$

2. Find the difference.

(a) $3,84,962 - 5,73,248$

(b) $9,00,000 - 7,11,498$

3. Find the product.

(a) $4,908 \times 326$

(b) $11,321 \times 74$

4. Divide and check your answer.

(a) $4,182 \div 13$

(b) $2,000 \div 45$

5. Rama is a kite maker. In one season, he sold 37,043 red kites, 42,620 blue kites and 27,986 green kites. How many kites did he sell in all?

6. If a factory produces 1,285 toy cars every day, how many toy cars will it produce in a year of 293 working days?

7. In a year, Rahul earns ₹ 72,600. How much will he earn monthly?

8. Fill in the blanks.

(a) $784 + 361 + \boxed{} = 426 + \boxed{} + 784$

(b) $4,935 - \boxed{} = 4,935$

(c) $\boxed{} \times 1 = 846$

(d) $\boxed{} \div 48 = 0$

(e) $386 \times 5,000 = \boxed{}$

(f) $25 \times \boxed{} = 25,000$

Addition and Subtraction of Large Numbers

Let us add and subtract large numbers.

Remember

We have to add or subtract large numbers in the same way as we added and subtracted 5-digit and 6-digit numbers.

Example 1 : Add 2,45,61,386 ; 4,39,03,424 and 5,20,26,572.

$$\begin{array}{r} \text{Solution} \quad : \quad 24561386 \\ + \quad 43903424 \\ + \quad 52026572 \\ \hline \quad 120491382 \\ \hline \text{Sum} = 12,04,91,382 \end{array}$$

See! The periods have been separated with commas in Indian system.



Example 2 : Subtract 4,81,27,415 from 9,40,36,821.

$$\begin{array}{r} \text{Solution} \quad : \quad 94036821 \\ - \quad 48127415 \\ \hline \quad 45909406 \\ \hline \text{Difference} = 4,59,09,406 \end{array}$$

Worksheet 1

1. Find the sum.

(a) 2,92,342; 14,54,651; 46,81,509

(b) 4,14,142; 49,85,389; 26,14,758

- (c) 3,00,286; 13,03,089; 85,09,10,008
 (d) 60,32,85,862; 12,40,31,029; 7,01,96,253
 (e) 1,82,95,067; 7,06,53,248; 85,23,15,901
 (f) 8,43,26,198; 39,46,045; 1,83,49,730
 (g) 1,23,45,678; 89,43,261; 5,97,86,009
 (h) 4,02,36,754; 3,21,33,046; 2,95,17,354

2. Subtract.

- (a) 13,91,803 from 52,09,123 (e) 3,62,71,843 from 4,98,07,916
 (b) 25,18,624 from 40,00,000 (f) 3,89,04,392 from 8,13,00,896
 (c) 3,65,17,298 from 8,79,25,149 (g) 6,23,94,389 from 8,03,09,421
 (d) 73,82,005 from 90,28,583 (h) 1,98,76,432 from 5,23,45,678

Word Problems

We need to do addition and subtraction in our daily life. Let us study some examples.

Example 3 : In the year 1991, the population of Kerala, Punjab and Haryana was 2,90,11,237; 2,01,90,795 and 1,63,17,715 respectively. Find the total population of the three states in the year 1991.

Solution :

Population of Kerala in 1991	=	29011237
Population of Punjab in 1991	=	20190795
Population of Haryana in 1991	= +	16317715
Population of the three states in 1991	=	65519747

The total population of the three states in 1991 was 6,55,19,747.

Example 4 : Mr Ajay deposited ₹ 2,78,475 in a bank in his account. Later, he withdrew ₹ 1,55,755 from his account. How much money was left in his account in the bank?

Solution : Amount deposited = ₹ 278475
Amount withdrawn = - ₹ 155755
Amount left in his account = ₹ 122720

Mr Ajay has ₹ 1,22,720 in his bank account.

Worksheet 2

1. Solve the following word problems.

- A soap factory produced 26,92,645 soaps in one year. In the next year, it produced 8,67,205 soaps more. How many soaps did the factory produce in the second year?
- In one year, Mr Mohan earned ₹ 2,57,088, his wife earned ₹ 1,23,672 and their son earned ₹ 96,750. How much money did Mr Mohan's family earn in one year?
- In an examination conducted by the Delhi University, 15,83,693 candidates appeared. Out of these 7,49,865 passed. How many candidates failed in the examination?
- In an election, the winning candidates got 6,28,496 votes and his rival got 4,56,298 votes. If 3,846 votes were declared invalid, what was the total number of votes polled?
- Find the sum of the greatest 8-digit, 7-digit and 6-digit numbers.

Multiplication and Division of Large Numbers

Let us multiply large numbers.

Example 5 : Multiply 35,983 by 475.

Solution :

$$\begin{array}{r}
 35983 \\
 \times 475 \\
 \hline
 179915 \quad \leftarrow \text{Multiply 35983 by 5} \\
 + 2518810 \quad \leftarrow \text{Multiply 35983 by 70} \\
 + 14393200 \quad \leftarrow \text{Multiply 35983 by 400} \\
 \hline
 \mathbf{17091925} \quad \leftarrow \mathbf{\text{Product}}
 \end{array}$$

The product of 35,983 and 475 is 1,70,91,925.

Now, let us divide 5-digit, 6-digit and 7-digit numbers by 2-digit and 3-digit numbers.

Example 6 : Divide 3,74,949 by 65.

Solution :

$$\begin{array}{r}
 \mathbf{5768} \quad \leftarrow \mathbf{\text{Quotient}} \\
 65 \overline{) 374949} \\
 \underline{- 325} \\
 499 \\
 \underline{- 455} \\
 444 \\
 \underline{- 390} \\
 549 \\
 \underline{- 520} \\
 \mathbf{29} \quad \leftarrow \mathbf{\text{Remainder}}
 \end{array}$$

\leftarrow Divide 374 thousands by 65
 \leftarrow Divide 499 hundreds by 65
 \leftarrow Divide 444 tens by 65
 \leftarrow Divide 549 ones by 65

We get, Quotient = 5,768; Remainder = 29

Worksheet 3

1. Find the product.

(a) $3,847 \times 431$

(b) $8,123 \times 956$

(c) $6,098 \times 627$

(d) $10,513 \times 218$

(e) $11,627 \times 196$

(f) $90,125 \times 705$

(g) $25,079 \times 385$

(h) $38,215 \times 3,125$

(i) $46,239 \times 873$

(j) $7,653 \times 2,182$

2. Find the quotient and remainder.

(a) $46,028 \div 84$

(b) $74,862 \div 73$

(c) $90,768 \div 196$

(d) $57,389 \div 378$

(e) $9,00,864 \div 95$

(f) $8,88,888 \div 888$

(g) $1,29,736 \div 112$

(h) $60,90,839 \div 123$

(i) $68,931 \div 235$

(j) $14,50,145 \div 145$

Word Problems

We need to do multiplication and division in various situations in our daily life. Let us study some examples.

Example 7 : Anil runs 3,525 metres daily in the morning. How many metres will he run in one year? Convert your answer into kilometres.

Solution : Distance ran in one day = 3,525 metres
Distance ran in one year = $3,525 \times 365$
(We know that one year has 365 days.)

$$\begin{array}{r} 3525 \\ \times 365 \\ \hline 17625 \\ + 211500 \\ + 1057500 \\ \hline \hline 1286625 \end{array}$$

Anil ran 12,86,625 metres in one year.

Converting into kilometres

We know that 1000 metres = 1 kilometre

So, 12,86,625 metres = $1286625 \div 1000$
= 1,286 kilometres and 625 metres.

Example 8 : A box contains 144 pencils. How many boxes are needed to pack 1,00,080 pencils?

Solution : Total number of pencils = 1,00,080
Number of pencils in one box = 144
Number of boxes needed = $1,00,080 \div 144$
Thus, number of boxes needed is 695.

$$\begin{array}{r} 695 \\ 144 \overline{) 100080} \\ \underline{- 864} \\ 1368 \\ \underline{- 1296} \\ 720 \\ \underline{- 720} \\ 0 \end{array}$$

Worksheet 4

1. Solve the following word problems.

- A uniform set costs ₹ 1,325. What will be the cost of 567 uniform sets?
- One packet contains 385 sweets. How many sweets can be packed in 52,690 packets?
- A rocket travels 7,59,600 km in 240 hours. How many kilometres will the rocket travel in one hour?
- Mr Mohan earns ₹ 19,750 every month. How much will he earn in 8 years?
- During floods, 43,725 villagers became homeless. The government put up tents, each tent housing 265 villagers. How many tents were put up?
- The product of two numbers is 25,79,966. If one number is 431, find the other number.

Brain Teasers

1. Replace \square by the correct digit.

$$\begin{array}{r}
 \text{(a)} \quad 3 \ 8 \ 2 \ \square \ 6 \ 7 \\
 + \quad 6 \ \square \ 4 \ 8 \ \square \ 6 \\
 + \quad \square \ 8 \ \square \ 5 \ 6 \ \square \\
 \hline
 \square \ 9 \ 6 \ 9 \ 9 \ 6 \ 8
 \end{array}$$

$$\begin{array}{r}
 \text{(b)} \quad 9 \ 4 \ \square \ 0 \ 8 \ \square \ 4 \\
 - \quad 3 \ 8 \ 5 \ 2 \ \square \ 1 \ 5 \\
 \hline
 \square \ \square \ 4 \ 8 \ 2 \ 0 \ \square
 \end{array}$$

2. Find the product.

(a) $9,80,406 \times 708$

(b) $5,67,894 \times 625$

3. Divide.

(a) $99,99,999 \div 9,999$

(b) $6,85,432 \div 234$

4. Subtract 93,84,236 from the sum of 3,95,08,625 and 74,38,906.

5. The total number of men, women and children in a state is 93,86,493. If the number of men is 26,38,755 and that of women is 25,29,431, find the number of children.

6. A dealer purchased 285 washing machines. If the cost of one washing machine is ₹ 9,825, find the cost of the purchased washing machines.

7. Find the product of the greatest 5-digit and 3-digit numbers.

8. An engine pumps 2,85,000 litres of water in 5 hours. How many litres of water will the engine pump in one minute?

9. Find the value of $5,43,86,291 + 1,09,853 - 96,298$

10. Find the value of $7,96,358 - 2,83,579 - 3,00,718$

UNIT - 3

MULTIPLES AND FACTORS

MULTIPLES

Do you remember the multiplication tables?



$1 \times 2 = 2$ 1 times 2 is 2

$2 \times 2 = 4$ _____

$3 \times 2 = 6$ _____

$4 \times 2 = 8$ _____

$5 \times 2 = 10$ _____

$6 \times 2 = 12$ _____

$7 \times 2 = 14$ _____

$8 \times 2 = 16$ _____

$9 \times 2 = 18$ _____

$10 \times 2 = 20$ _____

The numbers 2, 4, 6, 8, 10 are the multiples of 2.

Now, let us write the multiples of the numbers, 4, 6, 9.

Remember

For getting the multiples of 4, 6 and 9, we have to recite the multiplication tables of these numbers.

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Multiples of 4 →	4	8	12	16	20	24	28	32	36	40
Multiples of 6 →	6	12	18	24	30	36	42	48	54	60
Multiples of 9 →	9	18	27	36	45	54	63	72	81	90

Worksheet 1

1. Write the next four multiples of the first number in each case:

(a) 5, 10, 15, _____, _____, _____, _____

(b) 7, 14, 21, _____, _____, _____, _____

(c) 10, 20, 30, _____, _____, _____, _____

(d) 15, 30, 45, _____, _____, _____, _____

(e) 12, 24, 36, _____, _____, _____, _____

2. Complete the following:

(a) 4th multiple of 5 is _____

(b) 5th multiple of 3 is _____

(c) 7th multiple of 8 is _____

(d) 6th multiple of 2 is _____

(e) 3rd multiple of 12 is _____

3. Write the multiples of 6 between 20 and 40.

4. Write the multiples of 7 which are less than 40.

5. Encircle the multiples of 11.

13 11 21 55 97 88 66 10

6. Encircle the multiples of 8.

32 16 19 40 46 56 88 80

More About Multiples

I. We know

$$2 \times 3 = 6 \rightarrow \text{Product}$$

Multiples of 2 : 2, 4, 6, 8, 10, ____, ____, ____, ____, ____

Multiples of 3 : 3, 6, 9, 12, 15, ____, ____, ____, ____, ____

6 is the product of 2 and 3 and 6 is one of the multiples of both 2 and 3.

$$2 \times 3 \times 5 = 30 \rightarrow \text{Product}$$

Multiples of 2 : 2, ____, ____, ____, 24, 26, 28, 30, ____, ____

Multiples of 3 : 3, ____, ____, ____, 21, 24, 27, 30, ____, ____

Multiples of 5 : 5, ____, ____, ____, 15, 20, 25, 30, ____, ____

30 is the product of 2, 3 and 5 and 30 is also one of the multiples of 2, 3 and 5.

II. We also know that the

First multiple of 2 : $2 \times 1 = 2$ (2 is a multiple of 2)

First multiple of 3 : $3 \times 1 =$ _____ (3 is a multiple of 3)

First multiple of 10 : _____ (_____)

First multiple of 15 : _____ (_____)

We conclude that

Every number is a multiple of itself.

III. Look at this now.

$$1 \times 1 = 1$$

$$1 \times 2 = 2$$

$$1 \times 3 = 3$$

$$1 \times 20 = \underline{\hspace{2cm}}$$

$$1 \times 35 = \underline{\hspace{2cm}}$$

We conclude that



Every number is a multiple of 1.

Worksheet 2

1. Fill in the blanks.

- (a) $3 \times 6 = 18$: 18 is a multiple of and .
- (b) $7 \times 8 = 56$: 56 is a multiple of and .
- (c) $9 \times 15 = 135$: is a multiple of 9 and 15.
- (d) $21 \times 6 = 126$: is a multiple of and 6.
- (e) $3 \times 5 \times 7 = 105$: 105 is a multiple of , and .
- (f) $11 \times 8 \times 2 = 176$: 176 is a multiple of , and .
- (g) Is 24 a multiple of 24? : (Yes / No)
- (h) Is 61 a multiple of 61? : (Yes / No)
- (i) Is 47 a multiple of 1? : (Yes / No)
- (j) $5 \times 4 \times 3 = 60$: is a multiple of 4, 5 and .
- (k) Is 19 a multiple of 2? : (Yes / No)

Even and Odd Numbers

Do you remember even and odd numbers?



EVEN NUMBERS

Even numbers are those numbers which are multiples of 2.

2, 4, 6, 8, 10,,,,,
are even numbers.

ODD NUMBERS

Odd numbers are those numbers which are not multiples of 2.

1, 3, 5, 7, 9,,,,,
are odd numbers.

Worksheet 3

1. Encircle the even numbers.

4 7 8 12 19 28 56 77

2. Encircle the odd numbers.

76 49 3 19 24 57 69

3. Fill in the blanks.

- (a) 75 is an _____ number. (even/odd)
- (b) 178 is an _____ number. (even/odd)
- (c) 1,082 is an _____ number. (even/odd)
- (d) 1,493 is an _____ number. (even/odd)
- (e) A number which is a multiple of _____ is called an even number.
- (f) Smallest even number : _____
- (g) Smallest odd number : _____

Common Multiples

Take two numbers say, 2 and 3

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

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

The common multiples of 2 and 3 are 6, 12, 18,,,

Among all these common multiples, 6 is the multiple which is the smallest.

So, Lowest Common Multiple (LCM) of 2 and 3 is 6.

Worksheet 4

1. Find the LCM in each case:

(a) 4, 6

Multiples of 4 : _____

Multiples of 6 : _____

Common multiples of 4, 6 are _____

LCM of 4, 6 : _____

(b) 6, 8, 12

Multiples of 6 : _____

Multiples of 8 : _____

Multiples of 12 : _____

Common multiples of 6, 8 and 12 are _____

LCM of 6, 8 and 12 : _____

(c) 5, 6, 10

Multiples of 5 : _____

Multiples of 6 : _____

Multiples of 10 : _____

Common multiples of 5, 6 and 10 are _____

LCM of 5, 6 and 10 : _____

2. Find the LCM of the given numbers by listing multiples of these numbers.

(a) 9, 18

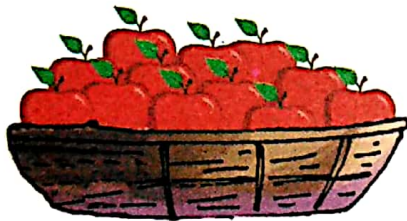
(c) 11, 22, 44

(e) 12, 14, 84

(b) 2, 12

(d) 6, 7, 14

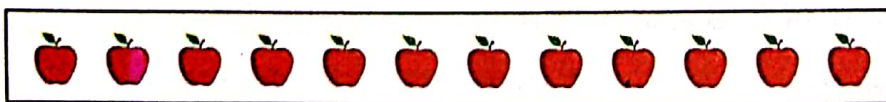
FACTORS



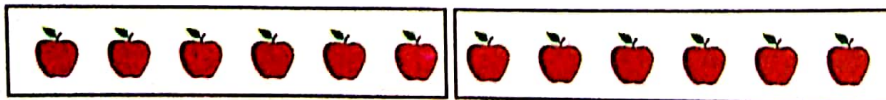
Let us divide
12 apples into
different groups.

Remember

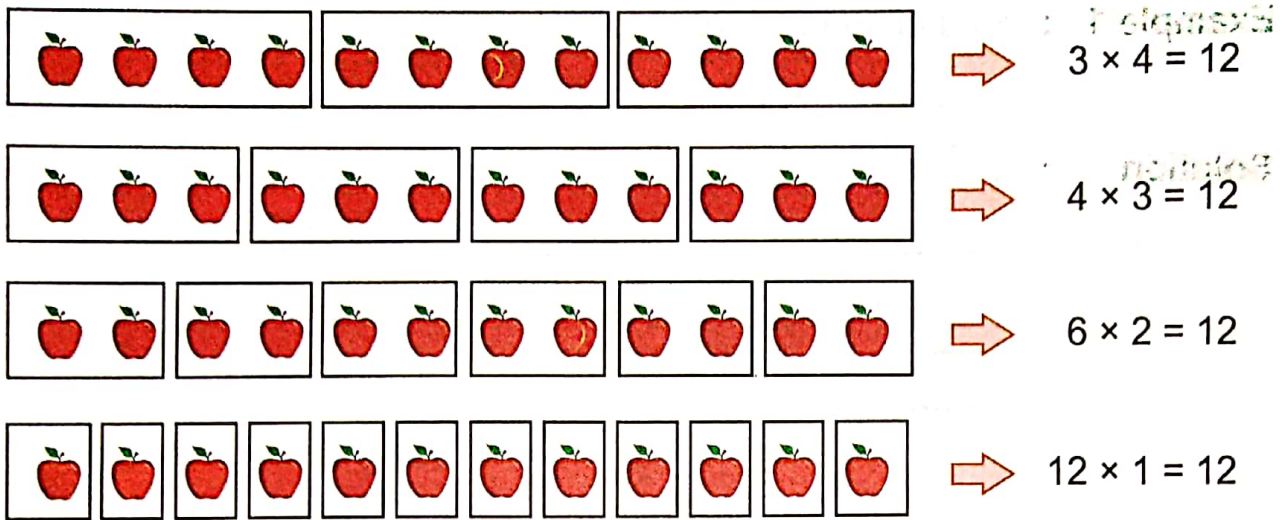
- Each group should have equal number of apples.
- No apple should be left out.
- Each grouping should be different.



⇒ $1 \times 12 = 12$



⇒ $2 \times 6 = 12$

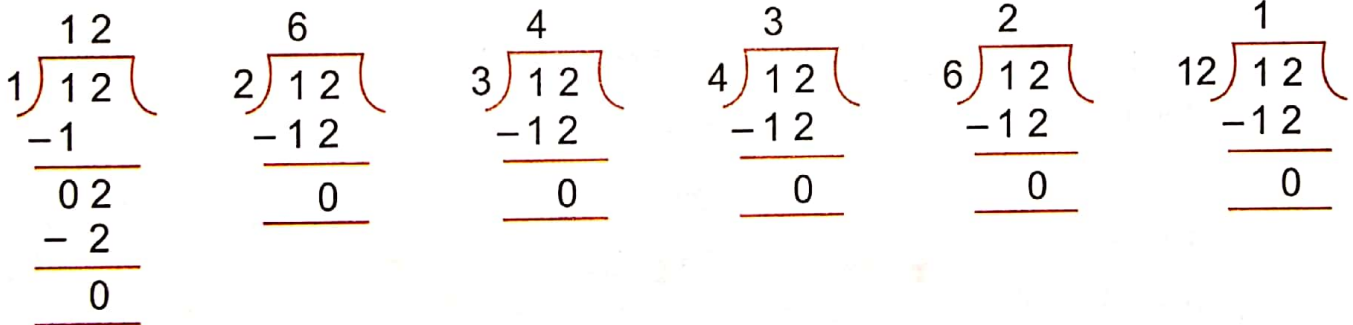


We find that 12 apples can be arranged in different groups having 12, 6, 4, 3, 2 and 1 apples in each.

1, 2, 3, 4, 6 and 12 are called the factors of 12.

If we divide 12 by each of its factors, there will not be any remainder left.

Let us see



When a number is divided by one of its factors, there is no remainder.

Remember
To find the factors of a number, we divide the number by 1, 2, 3, 4, 5, 6, 7, ..., ..., ..., ...

Example 1 : Find all the factors of 24.

Solution :

1	24
- 2	

04	
- 4	

0	

2	12
24	
- 2	

04	
- 4	

0	

3	8
24	
- 24	

0	

4	6
24	
- 24	

0	

5	4
24	
- 20	

4	

6	4
24	
- 24	

0	

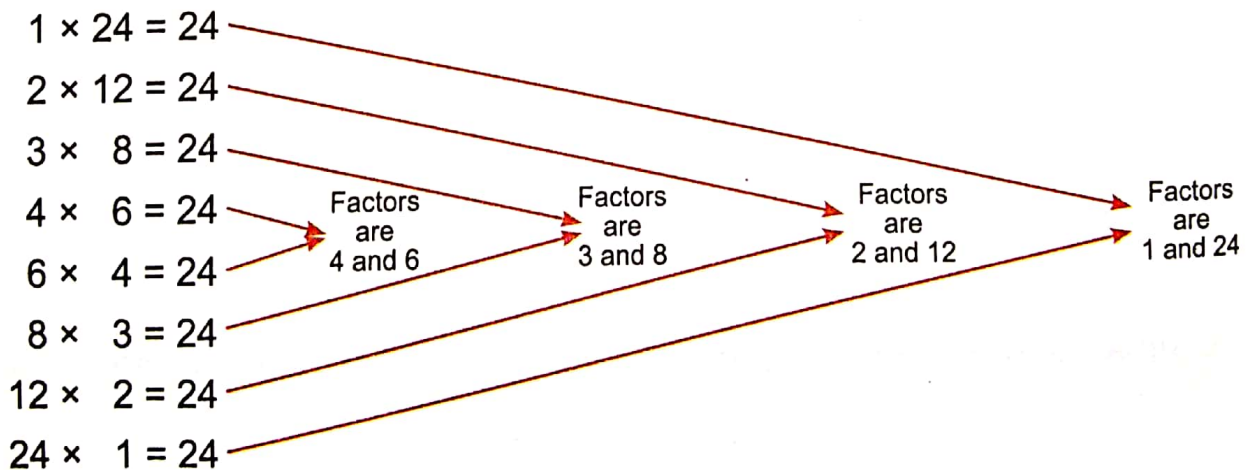
Same multiplication fact
 $4 \times 6 = 24$ and $6 \times 4 = 24$
STOP HERE!

Therefore, factors of 24 are 1 and 24; 2 and 12; 3 and 8; 4 and 6.

Thus, 1, 2, 3, 4, 6, 8, 12 and 24 are the factors of 24.

Another method:

List all the multiplication facts of 24.



So, the factors of 24 are 1 and 24; 2 and 12; 3 and 8; 4 and 6.

or 1, 2, 3, 4, 6, 8, 12 and 24 are the factors of 24.

Remember
 1 is a factor of every number. Every number is a factor of itself.

Worksheet 5

1. Answer the following questions. First one is done for you.

- (a) Is 5 a factor of 36? (No; $36 \div 5 = 7$ and remainder = 1)
- (b) Is 7 a factor of 77? (f) Is 15 a factor of 100?
- (c) Is 8 a factor of 62? (g) Is 20 a factor of 140?
- (d) Is 9 a factor of 70? (h) Is 6 a factor of 284?
- (e) Is 12 a factor of 120?

2. Fill in the blanks.

- (a) $2 \times 7 = 14$: 2 and _____ are the factors of 14.
- (b) $3 \times 8 = 24$: _____ and 8 are the factors of 24.
- (c) $5 \times 7 = 35$: 5 and 7 are the factors of _____.
- (d) $4 \times 5 = 20$: 4 and 5 are the _____ of 20.
- (e) $7 \times 8 = 56$: 7 and _____ are the _____ of 56.

3. Write all the factors of the following numbers.

- (a) 12 (c) 28 (e) 45 (g) 50 (i) 96 (k) 88
- (b) 32 (d) 35 (f) 60 (h) 72 (j) 84 (l) 71

Common Factors

I. Taking two numbers.

Let us take two numbers say, 8 and 12.

Factors of 8 : 1, 2, 4, 8

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

So, the common factors of 8 and 12 are 1, 2 and 4.

Among all these common factors, the factor which is the greatest is 4.

So, the Highest Common Factor (HCF) of 8 and 12 is 4.

II. Taking three numbers.

Take three numbers say, 6, 18 and 20.

Factors of 6 : 1, 2, 3, 6

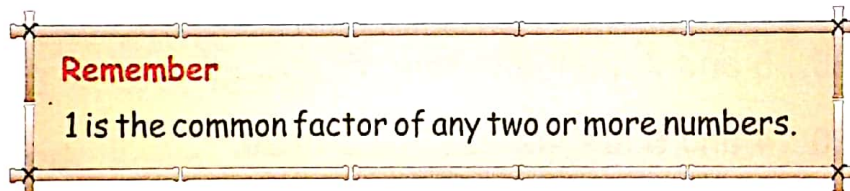
Factors of 18 : 1, 2, 3, 6, 9, 18

Factors of 20 : 1, 2, 4, 5, 10, 20

The common factors of 6, 18 and 20 are 1 and 2

Among these two factors, 2 is the greatest.

So, the Highest Common Factor (HCF) of 6, 18 and 20 is 2.



Worksheet 6

1. Find the common factors in each case:

(a) 10, 15

Factors of 10 : _____

Factors of 15 : _____

Common factors of 10 and 15 : _____

(b) 5, 10, 25

Factors of 5 : _____

Factors of 10 : _____

Factors of 25 : _____

Common factors of 5, 10 and 25 : _____

(c) 12, 18

Factors of 12 : _____

Factors of 18 : _____

Common factors of 12 and 18 : _____

(d) 21, 30

Factors of 21 : _____

Factors of 30 : _____

Common factors of 21 and 30 : _____

(e) 9, 24, 27

Factors of 9 : _____

Factors of 24 : _____

Factors of 27 : _____

Common factors of 9, 24 and 27 : _____

(f) 14, 17, 22

Factors of 14 : _____

Factors of 17 : _____

Factors of 22 : _____

Common factors of 14, 17 and 22 : _____

2. Find the HCF of the following:

(a) 20, 30

(d) 25, 35

(g) 9, 12, 15

(j) 5, 25, 35

(b) 19, 38

(e) 10, 16, 23

(h) 12, 16, 20

(k) 12, 20, 60

(c) 16, 28

(f) 20, 30, 40

(i) 8, 24, 36

Prime and Composite Numbers

Let us study the numbers and their factors.



Number	Factors	
1	1	
2	1, 2	← only 2 factors; 1 and itself
3	1, 3	← only 2 factors; 1 and itself
4	1, 2, 4	
5	1, 5	← only 2 factors; 1 and itself
6	1, 2, 3, 6	
7	1, 7	← only 2 factors; 1 and itself
8	1, 2, 4, 8	
9	1, 3, 9	
10	1, 2, 5, 10	
11	1, 11	← only 2 factors; 1 and itself
12	1, 2, 3, 4, 6, 12	
13	1, 13	← only 2 factors; 1 and itself
14	1, 2, 7, 14	

1 is a factor of every number.

Every number is a factor of itself.

From the above table, we can say that some numbers have **exactly 2 factors; 1 and the number itself.**

A number that has exactly two factors (1 and the number itself) is called a **PRIME NUMBER**. For example, 2, 3, 5, 7, 11, 13, 17 ... are prime numbers.

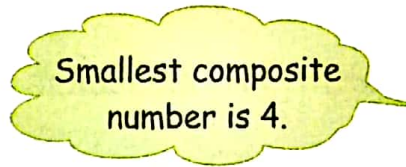
Now,

A number that has more than two factors is called a **COMPOSITE NUMBER**.
For example, 4, 6, 8, 9, 10, 12, 14, 15, 18, 20, 21 ... are composite numbers.

1 is neither a prime nor a composite number.



Smallest prime number is 2.



Smallest composite number is 4.

Worksheet 7

1. Fill in the blanks.

(a) Is 1 a prime number? _____ (Yes/No)

(b) Write the smallest —

(i) Prime number : _____

(ii) Composite number : _____

(iii) Odd prime : _____

(iv) Even composite : _____

(v) Odd composite : _____

2. Which of the following are prime numbers?

10, 12, 15, 17, 19, 21, 25, 33, 35, 37

3. Which of the following are composite numbers?

14, 15, 19, 20, 24, 27, 29, 30, 32

4. Write all the prime numbers between 20 and 30.

5. Write all the composite numbers between 40 and 50.

Prime Factorization

Let us take a number say, 12. It can be written in different ways.

$$12 = 1 \times 12$$

$$12 = 2 \times 6$$

$$12 = 3 \times 4$$

$$12 = 2 \times 2 \times 3$$

All the factors are not prime.
(12, 6 and 4 are composite numbers.)

All the factors are prime only.

The prime factorization of 12 is $2 \times 2 \times 3$.

Factorization in which every factor is prime, is called the **PRIME FACTORIZATION** of the number.

Worksheet 8

1. Tick (✓) the correct answer.

(a) Prime factorization of 28 is

• 1×28

• 4×7

• $2 \times 2 \times 7$

(b) Prime factorization of 42 is

• 2×21

• 42×1

• $2 \times 3 \times 7$

• 6×7

(c) Prime factorization of 36 is

• 4×9

• $2 \times 2 \times 9$

• $2 \times 2 \times 3 \times 3$

(d) Prime factorization of 84 is

• 42×2

• $2 \times 2 \times 3 \times 7$

• 4×21

• $2 \times 7 \times 6$

2. State the answer in Yes or No.

- (a) The prime factorization of 15 is 3×5 . _____
- (b) The prime factorization of 50 is $2 \times 5 \times 5$. _____
- (c) The prime factorization of 90 is $2 \times 5 \times 9$. _____
- (d) The prime factorization of 99 is $3 \times 3 \times 11$. _____
- (e) The prime factorization of 63 is 7×9 . _____
- (f) The prime factorization of 54 is 2×27 . _____

Methods of Prime Factorization

I. Factor Tree Method

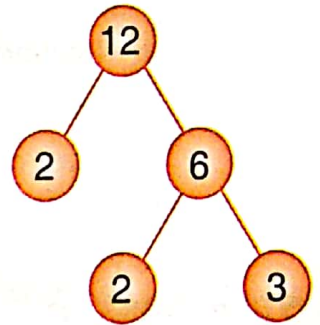
Let us take the composite number 12.

We can break 12 into two factors, i.e. 2 and 6.

Here, 2 is prime but 6 is composite.

We can again break 6 into two prime factors, i.e. 2 and 3.

The prime factorization of 12 is $2 \times 2 \times 3$.



A factor tree of 12

Remember

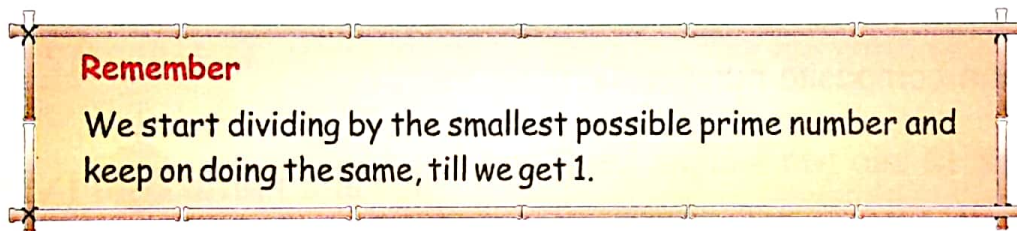
A prime factorization will contain no composite number.

II. Division Method

Let us take the composite number 36 and divide it by the smallest possible prime number.

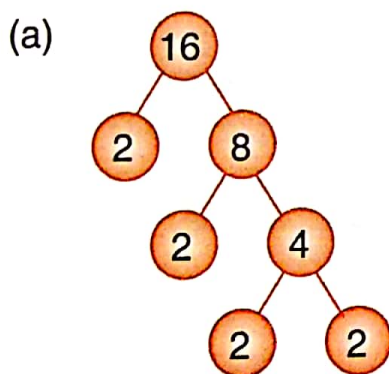
2		36	←	Divide 36 by the prime number 2 and write quotient (18) below.
2		18	←	Divide 18 by the prime number 2.
3		9	←	Divide 9 by the prime number 3.
3		3	←	Divide 3 by the prime number 3.
		1	←	STOP, when you get 1.

The prime factorization of 36 is $2 \times 2 \times 3 \times 3$.

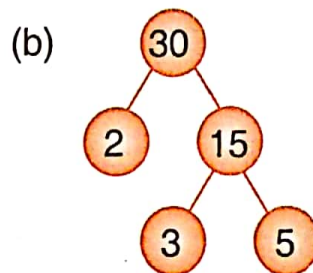


Worksheet 9

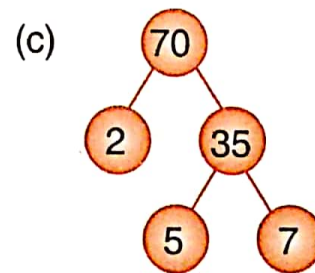
1. Fill in the blanks.



Prime factorization of 16 is _____



Prime factorization of 30 is _____



Prime factorization of 70 is _____

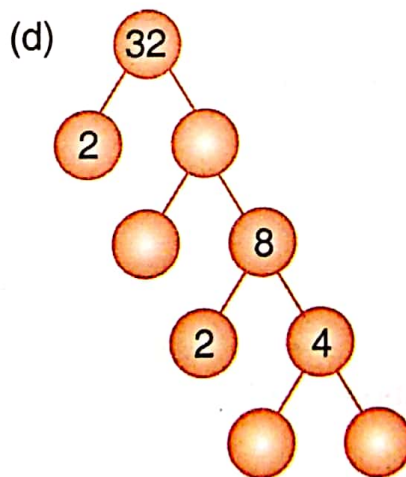
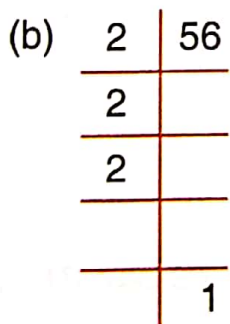
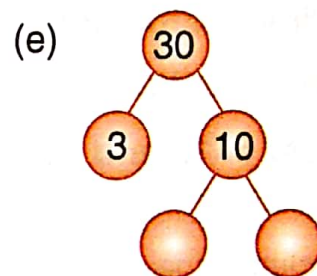
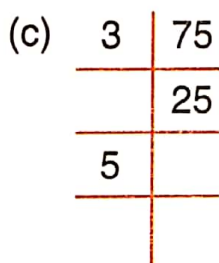
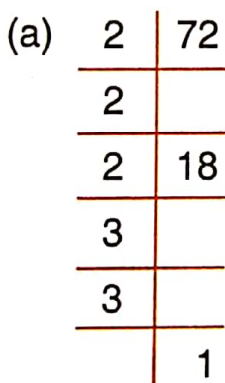
2. Using the Factor Tree Method, find the prime factorization of the following:

- (a) 8 (c) 34 (e) 21 (g) 38
 (b) 20 (d) 44 (f) 42 (h) 45

3. Using division method, find the prime factorization of the following:

- (a) 27 (c) 92 (e) 64 (g) 72
 (b) 34 (d) 48 (f) 45 (h) 99

4. Fill in the missing numbers.



Finding Lowest Common Multiple by Prime Factorization

Take two numbers, 12 and 30.

Let us find the prime factorization of 12 and 30.

2	12
2	6
3	3
	1

2	30
3	15
5	5
	1

Prime factorization of 12 : $2 \times 2 \times 3$

Prime factorization of 30 : $2 \times 3 \times 5$

LCM of 12 and 30 : $2 \times 3 \times 2 \times 5 = 60$

Includes the prime factorization of both 12 and 30.

2 and 3 both appear in the prime factorization of 12 as well as 30. They are to be included only once while finding LCM.

2 and 5 appear in the prime factorization of 12 and 30.

Thus, the LCM of 12 and 30 is 60.

Worksheet 10

1. Fill in the blanks.

(a) Prime factorization of 15 : _____

Prime factorization of 90 : _____

LCM of 15 and 90 = _____

- (b) Prime factorization of 18 : _____
Prime factorization of 24 : _____
LCM of 18 and 24 = _____
- (c) Prime factorization of 25 : _____
Prime factorization of 15 : _____
LCM of 25 and 15 = _____
- (d) Prime factorization of 27 : _____
Prime factorization of 42 : _____
LCM of 27 and 42 = _____
- (e) Prime factorization of 12 : _____
Prime factorization of 20 : _____
LCM of 12 and 20 = _____

2. Using prime factorization method, find the LCM.

- | | |
|---------------|---------------|
| (a) 16 and 20 | (f) 25 and 35 |
| (b) 18 and 27 | (g) 36 and 45 |
| (c) 12 and 22 | (h) 33 and 44 |
| (d) 15 and 24 | (i) 20 and 35 |
| (e) 8 and 16 | (j) 54 and 38 |

Brain Teasers

1. Write the first four multiples of:

- (a) 7 (b) 9 (c) 12 (d) 1 (e) 13

2. Fill in the blanks.

(a) $2 \times 3 \times 7 = 42$; 42 is a multiple of _____, _____, and _____.

(b) Fifth multiple of 9 : _____.

(c) Is 48 a multiple of 6? _____ (Yes/No)

(d) Least multiple of 65 is _____.

(e) $7 \times 3 = 21$: _____ and _____ are the factors of _____.

(f) 21 is multiple of _____ and _____.

(g) Is 8 a factor of 70? _____ (Yes/No)

(h) Is 1 a prime number? _____ (Yes/No)

3. Find the factors of the following:

- (a) 27 (b) 90 (c) 38 (d) 40

4. Is 217 divisible by 27?

5. Using factor tree method, find the prime factorization of the following:

- (a) 30 (b) 84

6. Using division method, find the prime factorization of the following:

- (a) 36 (b) 74

7. Find the LCM of:

- (a) 28 and 42 (b) 10 and 95

8. How many even numbers are there between 20 and 50?

9. Write all prime numbers between 50 and 80.

10. Write any 5 odd multiples of 3.

FRACTIONAL NUMBERS

Do you remember different types of fractions?



Fractions which express the value of the same part of a whole are called **Equivalent Fractions**.

e.g. $\frac{1}{2}, \frac{2}{4}, \frac{4}{8}, \frac{8}{16}$

Fractions whose numerators are greater than or equal to the denominators are called **Improper Fractions**.

e.g. $\frac{3}{2}, \frac{10}{7}, \frac{9}{7}, \frac{19}{11}, \frac{25}{13}$

Fractions having same denominators are called **Like Fractions**.

e.g. $\frac{2}{7}, \frac{1}{7}, \frac{9}{7}, \frac{11}{7}$

Fractions whose numerators are equal to one are called **Unit Fractions**.

e.g. $\frac{1}{2}, \frac{1}{7}, \frac{1}{11}, \frac{1}{16}$

Fractions whose numerators are smaller than denominators are called **Proper Fractions**.

e.g. $\frac{4}{7}, \frac{1}{5}, \frac{3}{11}, \frac{7}{11}$

Fractions having different denominators are called **Unlike Fractions**.

e.g. $\frac{1}{2}, \frac{2}{5}, \frac{4}{13}, \frac{8}{9}$

Improper fractions written as a combination of a whole and a proper fraction is called **Mixed Number**.

e.g. $3\frac{1}{10}, 8\frac{1}{5}, 1\frac{1}{2}, 2\frac{3}{4}$

Now solve these questions.



1. Write next 3 equivalent fractions.

(a) $\frac{2}{6}$, $\frac{4}{12}$, $\frac{6}{18}$, _____, _____, _____.

(b) $\frac{1}{7}$, $\frac{2}{14}$, $\frac{3}{21}$, _____, _____, _____.

(c) $\frac{5}{9}$, $\frac{10}{18}$, $\frac{15}{27}$, _____, _____, _____.

2. Convert the following into improper fractions. The first is done for you.

(a) $3\frac{1}{5} = \frac{16}{5}$ _____ $\frac{(3 \times 5) + 1}{5}$

(b) $5\frac{1}{7} =$

(c) $33\frac{1}{3} =$

(d) $2\frac{2}{9} =$

3. Convert the following into a mixed number. The first one is done for you.

(a) $\frac{50}{7} = 7\frac{1}{7}$ _____ $\begin{array}{r} 7 \\ 7 \overline{) 50} \\ \underline{-49} \\ 1 \end{array}$

(b) $\frac{11}{9} =$

(c) $\frac{23}{8} =$

(d) $\frac{78}{17} =$

4. Fill in the blanks.

(a) Fractions having same denominators are called _____.

(b) A fractional number whose numerator is greater than its denominator is called an _____ fraction.

(c) $\frac{1}{2}$, $\frac{1}{7}$, $\frac{1}{11}$, $\frac{1}{4}$ and $\frac{1}{3}$ are called _____ fractions.

(d) $3\frac{1}{8}$ is a _____ number.

(e) $\frac{8}{9} = \frac{\square}{72}$

Fractions in Lowest Terms

Let us take a fraction, $\frac{2}{3}$.

Numerator and Denominator are called the **TERMS** of a fraction.

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

(b) $\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$

When we multiply the numerator and denominator of a fraction by a common number, we get **higher** terms of the fraction.

(c) $\frac{4}{6} \div \frac{2}{2} = \frac{2}{3}$

(d) $\frac{8}{12} \div \frac{2}{2} = \frac{4}{6}$

When we divide the numerator and denominator of a fraction by a common factor other than 1, we get **lower** terms of the fraction.

In (c), we cannot further divide $\frac{2}{3}$ by a common number. It can be divided only by

the common factor 1.

$$\frac{2}{3} \div \frac{1}{1} = \frac{2}{3}$$

So, $\frac{2}{3}$ is in lowest terms.

Remember

To reduce a fraction into lowest terms, we go on dividing the numerator and denominator by their common factors till we are left with a fraction having 1 as the only common factor.

Example 1 : Reduce $\frac{18}{24}$ in its lowest term.

Solution : $\frac{18}{24} \div \frac{2}{2} = \frac{9}{12} \div \frac{3}{3} = \frac{3}{4}$ is the **Lowest Term** (because 3 and 4 have no common factor other than 1.)

Dividing by common factor 2 Dividing by common factor 3

Simplification of Fraction by using HCF

Example 2 : Let us reduce $\frac{12}{18}$ to the lowest term.

Solution : HCF of 12 and 18 is 6.

$$\frac{12}{18} \div \frac{6}{6} \begin{array}{l} \rightarrow \text{Numerator is divided by the HCF} \\ \rightarrow \text{Denominator is divided by the HCF} \end{array}$$

$$= \frac{2}{3} \text{ is the lowest term.}$$

Worksheet 1

1. Encircle the fraction in its lowest term. The first one is done for you.

(a) $\frac{2}{5}$, $\frac{4}{10}$, $\frac{8}{20}$, $\frac{6}{15}$

(d) $\frac{4}{5}$, $\frac{12}{15}$, $\frac{32}{40}$, $\frac{16}{20}$

(b) $\frac{4}{24}$, $\frac{6}{36}$, $\frac{1}{6}$, $\frac{3}{18}$

(e) $\frac{6}{10}$, $\frac{24}{40}$, $\frac{3}{5}$, $\frac{18}{30}$

(c) $\frac{5}{15}$, $\frac{2}{6}$, $\frac{4}{12}$, $\frac{1}{3}$

2. Tick (✓) those fractions which are in lowest term.

(a) $\frac{6}{10}$

(c) $\frac{1}{8}$

(e) $\frac{13}{15}$

(g) $\frac{21}{15}$

(b) $\frac{5}{32}$

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

(f) $\frac{81}{90}$

(h) $\frac{26}{42}$

3. Reduce into lowest terms.

(a) $\frac{9}{12}$

(c) $\frac{10}{22}$

(e) $\frac{28}{56}$

(g) $\frac{15}{45}$

(i) $\frac{36}{48}$

(b) $\frac{6}{20}$

(d) $\frac{18}{24}$

(f) $\frac{12}{60}$

(h) $\frac{48}{54}$

(j) $\frac{22}{55}$

Comparing Fractions

We know

In **Like Fractions**, the greater the numerator, the greater will be the value of the fractional number. and

$$\frac{3}{5} > \frac{1}{5}, \quad \frac{9}{18} < \frac{11}{18}$$

In **Unlike Fractions**, with same numerator, greater the denominator, the smaller will be the value of the fractional number.

$$\frac{3}{10} < \frac{3}{8}, \quad \frac{4}{12} > \frac{4}{15}$$

Now, let us compare the unlike fractions, $\frac{3}{4}$ and $\frac{5}{8}$

Method 1 : First, we convert the unlike fractions, $\frac{3}{4}$ and $\frac{5}{8}$ into like fractions. For that, let us first find the Lowest Common Multiple (LCM) of denominators, i.e. 4 and 8.

LCM of 4 and 8 is 8.

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

LCM divided by the denominator 4
 $8 \div 4 = 2$

$$\frac{3 \times 2}{4 \times 2} = \frac{6}{8}$$

$$\frac{5}{8}$$

LCM divided by the denominator 8
 $8 \div 8 = 1$

$$\frac{5 \times 1}{8 \times 1} = \frac{5}{8}$$

Now, we compare the like fractions, $\frac{6}{8}$ and $\frac{5}{8}$.

$$\frac{6}{8} > \frac{5}{8} \text{ (because } 6 > 5\text{)}$$

Method 2 : Quick method of comparing fractions.

Compare the fractions, $\frac{7}{3}$ and $\frac{5}{2}$.

$\frac{7}{3} \times \frac{5}{2}$ cross multiplication

$$\begin{array}{l} 7 \times 2 = 14 \\ 3 \times 5 = 15 \end{array} \rightarrow \frac{7}{3} < \frac{5}{2} \text{ (because } 14 < 15)$$



Worksheet 2

1. Compare the fractions by cross multiplication method.

(a) $\frac{1}{2}$ and $\frac{1}{4}$

(c) $\frac{9}{10}$ and $\frac{2}{5}$

(e) $\frac{3}{5}$ and $\frac{3}{7}$

(b) $\frac{3}{5}$ and $\frac{3}{4}$

(d) $\frac{4}{9}$ and $\frac{5}{18}$

(f) $\frac{11}{18}$ and $\frac{1}{6}$

2. Compare the fractions by taking the LCM.

(a) $\frac{7}{2}$ and $\frac{5}{3}$

(c) $\frac{1}{4}$ and $\frac{2}{5}$

(e) $\frac{3}{5}$ and $\frac{5}{6}$

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

(d) $\frac{3}{10}$ and $\frac{3}{4}$

(f) $\frac{2}{9}$ and $\frac{3}{7}$

3. Compare the following pairs of fractions.

(a) $5\frac{1}{2}$ and $\frac{5}{2}$

(c) $\frac{19}{7}$ and $2\frac{1}{6}$

(e) $1\frac{1}{2}$ and $\frac{5}{4}$

(b) $\frac{9}{7}$ and $1\frac{2}{7}$

(d) $4\frac{3}{4}$ and $\frac{20}{5}$

(f) $1\frac{1}{5}$ and $\frac{5}{4}$

Ascending Order and Descending Order

Let us arrange these unlike fractions in ascending order.

$$\frac{2}{5}, \frac{3}{2}, \frac{1}{4}, \frac{7}{10}$$

We convert these unlike fractions into like fractions by taking the LCM of the denominators.

LCM of 5, 2, 4, 10 is 20.

$$\frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20} \quad \text{LCM } 20 \div 5$$

$$\frac{3}{2} = \frac{3 \times 10}{2 \times 10} = \frac{30}{20} \quad \text{LCM } 20 \div 2$$

$$\frac{1}{4} = \frac{1 \times 5}{4 \times 5} = \frac{5}{20} \quad \text{LCM } 20 \div 4$$

$$\frac{7}{10} = \frac{7 \times 2}{10 \times 2} = \frac{14}{20} \quad \text{LCM } 20 \div 10$$

Now, we arrange these fractions in ascending order.

$$\frac{5}{20} < \frac{8}{20} < \frac{14}{20} < \frac{30}{20} \quad \text{which means } \frac{1}{4} < \frac{2}{5} < \frac{7}{10} < \frac{3}{2}$$

or the ascending order is $\frac{1}{4}, \frac{2}{5}, \frac{7}{10}, \frac{3}{2}$.

Worksheet 3

1. Arrange the following in ascending order.

(a) $\frac{5}{2}, \frac{1}{6}, \frac{3}{4}, \frac{3}{8}$

(b) $\frac{2}{9}, \frac{5}{12}, \frac{7}{4}, \frac{1}{6}$

(c) $\frac{11}{15}, \frac{9}{5}, \frac{13}{10}, \frac{7}{20}$

(d) $1\frac{1}{2}, \frac{11}{6}, 3\frac{2}{5}, \frac{7}{3}$



2. Arrange the following in descending order.

(a) $\frac{3}{10}, \frac{7}{15}, \frac{5}{6}, \frac{1}{30}$

(c) $\frac{9}{20}, \frac{2}{10}, \frac{7}{50}, \frac{1}{100}$

(b) $\frac{3}{14}, \frac{7}{5}, \frac{9}{7}, \frac{11}{10}$

(d) $2\frac{5}{6}, \frac{7}{18}, 4\frac{1}{4}, \frac{10}{9}$

Addition and Subtraction of Fractions

Let us add unlike fractions.

Example 3 : $\frac{3}{8} + \frac{1}{6}$

Solution : LCM of denominators 8 and 6 is 24.

$$\frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

$$\frac{1}{6} = \frac{1 \times 4}{6 \times 4} = \frac{4}{24}$$

Change the unlike fractions into like fractions.

$$= \frac{3}{8} + \frac{1}{6}$$

$$= \frac{9}{24} + \frac{4}{24}$$

Add the numerators. Denominator remains the same.

$$= \frac{9+4}{24}$$

$$= \frac{13}{24}$$

Now, let us subtract unlike fractions.

Example 4 : $\frac{3}{5}$ from $\frac{7}{10}$

Solution : $\frac{7}{10} - \frac{3}{5}$

For making them like fractions, let us get LCM.

LCM of 10 and 5 is 10.

$$\begin{aligned} &= \frac{7}{10} - \frac{6}{10} \\ &= \frac{7-6}{10} \\ &= \frac{1}{10} \text{ Lowest term} \end{aligned}$$

Example 5 : Add $\frac{3}{10}$, $\frac{7}{15}$ and $\frac{1}{6}$

Solution : First, convert unlike fractions into like fractions by finding the LCM of denominators.

Let us find the LCM of the denominators 10, 15, 6.

Check the Steps.

Step 2: Divide the numbers by the common factor of one or more numbers.

Step 3: Again, dividing the numbers by the common factor of one or more numbers.

2	10,	15,	6
3	5,	15,	3
5	5,	5,	1
1	1,	1,	1

Step 1: Write the numbers in a line.

15 is not divisible by 2, write 15 as it is.

5 is not divisible by 3, write 5 as it is.

Step 4: Stop when you get all quotients equal to one.

LCM of 10, 15, 6 is the product of all divisors.

$$\text{LCM} = 2 \times 3 \times 5 = 30$$

$$\text{We have, } \frac{3}{10} = \frac{3 \times 3}{10 \times 3} \text{ — (LCM } 30 \div 10) = \frac{9}{30}$$

$$\frac{7}{15} = \frac{7 \times 2}{15 \times 2} \text{ — (LCM } 30 \div 15) = \frac{14}{30}$$

$$\frac{1}{6} = \frac{1 \times 5}{6 \times 5} \text{ — (LCM } 30 \div 6) = \frac{5}{30}$$

$$\frac{3}{10} + \frac{7}{15} + \frac{1}{6} = \frac{9}{30} + \frac{14}{30} + \frac{5}{30} \text{ Like fractions}$$

$$= \frac{9 + 14 + 5}{30}$$

$$= \frac{28}{30} = \frac{14}{15} \text{ (Lowest term)}$$

Worksheet 4

1. Add.

$$(a) \frac{4}{7} + \frac{11}{14}$$

$$(d) \frac{5}{2} + \frac{1}{8} + \frac{3}{4}$$

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

$$(b) \frac{5}{8} + \frac{1}{6}$$

$$(e) \frac{2}{3} + \frac{1}{10} + \frac{7}{5}$$

$$(h) 4\frac{1}{6} + 2\frac{2}{5} + 1\frac{1}{3}$$

$$(c) \frac{1}{4} + \frac{2}{5} + \frac{7}{10}$$

$$(f) \frac{1}{3} + \frac{12}{33} + \frac{2}{11}$$

$$(i) 7 + \frac{9}{10} + \frac{2}{3}$$

2. Subtract.

(a) $\frac{1}{2} - \frac{3}{8}$

(d) $\frac{2}{3} - \frac{2}{8}$

(g) $4 - \frac{3}{8}$

(b) $\frac{9}{10} - \frac{3}{5}$

(e) $4\frac{1}{4} - \frac{3}{8}$

(h) $2\frac{1}{5} - 1\frac{1}{2}$

(c) $\frac{11}{12} - \frac{2}{3}$

(f) $3\frac{4}{5} - 2\frac{1}{10}$

Word Problems

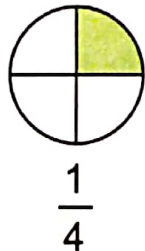
Let us study some examples.

Example 6 : Rohan ate $\frac{1}{4}$ of a cake on Monday and $\frac{1}{2}$ of the cake on Tuesday.

What fraction of the cake did he eat on these 2 days?

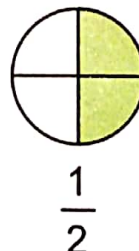
Solution : To find the total cake eaten, we add the two fractions.

Fraction of cake eaten on Monday



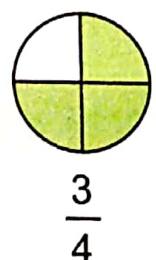
+

Fraction of cake eaten on Tuesday



=

Fraction of cake eaten on two days



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

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

LCM = 4

Rohan ate $\frac{3}{4}$ of the whole cake on these 2 days.

Example 7 : Meenu has a 10 metres long ribbon. She used $6\frac{1}{5}$ metres of it.
How much ribbon is left with her?

Solution : We subtract the two lengths to find the length of ribbon left.

$$\text{Total length of ribbon} = 10 \text{ m} = \frac{10}{1} \text{ m}$$

$$\text{Ribbon used} = 6\frac{1}{5} \text{ m} = \frac{31}{5}$$

$$\begin{aligned} \text{Ribbon left} &= \frac{10}{1} - \frac{31}{5} \\ &= \frac{10 \times 5}{1 \times 5} - \frac{31}{5} && \text{LCM} = 5 \\ &= \frac{50}{5} - \frac{31}{5} \\ &= \frac{19}{5} = 3\frac{4}{5} \text{ m} \end{aligned}$$

Meenu has $3\frac{4}{5}$ m ribbon left with her.

Worksheet 5

1. Solve the following word problems.

- (a) Anjali spent $\frac{1}{5}$ of her pocket money on comics and $\frac{3}{4}$ on sweets. How much of her pocket money did she spend altogether?

- (b) In a high jump contest, Ramesh jumped $3\frac{8}{9}$ m and Rakesh jumped $4\frac{1}{3}$ m. Who jumped more height and how much more?
- (c) During examination, Sonal studied for $3\frac{1}{2}$ hours. She studied science for $1\frac{1}{4}$ hours and mathematics for rest of the hours. How much time did she study mathematics?
- (d) Mr Gupta had $15\frac{2}{5}$ litres of petrol in his car. He went for a drive. By the time he reached home, he had only $2\frac{1}{3}$ litres of petrol left. How much petrol was used?
- (e) Ms Kumar bought $2\frac{2}{5}$ kg potatoes, 2 kg onions and $1\frac{2}{5}$ kg tomatoes. Find the total weight of vegetables Ms Kumar bought.
- (f) Neha used $1\frac{1}{2}$ m red ribbon, $\frac{3}{4}$ m yellow ribbon and 1 m white ribbon for her project. Find the total length of ribbon she used for her project.

Multiplication of Fractional Numbers

I. Multiplication of a fractional number and a whole number.

Example 8 : Multiply $\frac{1}{4}$ by 3.

Solution : We know that multiplication is repeated addition.

$$\frac{1}{4} \times 3 = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} \quad \text{--- Adding } \frac{1}{4} \text{ three times}$$

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

or we can use the quick method $\frac{1}{4} \times 3 = \frac{1 \times 3}{4} = \frac{3}{4}$

Example 9 : Multiply 4 by $\frac{3}{5}$.

Solution : $4 \times \frac{3}{5} = \frac{4 \times 3}{5}$ --- Product of whole number and numerator of a fractional number.

$$= \frac{12}{5} \quad \text{--- Denominator will remain same.}$$

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

Remember

To get the product of a whole number and a fractional number, we multiply the whole number and numerator of the fractional number. Denominator remains the same.

Worksheet 6

1. Multiply.

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

(f) $10\frac{1}{10} \times 15$

(k) $52 \times 2\frac{1}{13}$

(b) $\frac{1}{8} \times 18$

(g) $9 \times \frac{1}{3}$

(l) $49 \times 7\frac{1}{7}$

(c) $\frac{5}{8} \times 9$

(h) $6 \times \frac{4}{15}$

(m) $3\frac{5}{8} \times 32$

(d) $4\frac{1}{2} \times 4$

(i) $9 \times 3\frac{1}{3}$

(n) $45 \times 2\frac{1}{9}$

(e) $9\frac{1}{3} \times 27$

(j) $100 \times 3\frac{1}{10}$

(o) $50 \times \frac{17}{15}$

II. Multiplication of a fractional number by another fractional number.

Example 10: Let us multiply $\frac{2}{5}$ by $\frac{3}{7}$.

Solution : $\frac{2}{5} \times \frac{3}{7} = \frac{2 \times 3}{5 \times 7}$ ——— Multiplying the numerators separately.
————— Multiplying the denominators separately.

$$= \frac{6}{35}$$

Example 11: Multiply $1\frac{4}{5}$ by $9\frac{1}{3}$.

Solution : $1\frac{4}{5} \times 9\frac{1}{3} = \frac{9}{5} \times \frac{28}{3}$ ——— Improper fractions

$$= \frac{9 \times 28}{5 \times 3}$$

$$= \frac{3 \times 28}{5 \times 1}$$

Dividing 9 and 3 by their common factor 3.

$$= \frac{84}{5} = 16 \frac{4}{5}$$

Example 12: Multiply $\frac{1}{10}$, $\frac{2}{3}$ and $\frac{5}{8}$.

Solution : $\frac{1}{10} \times \frac{2}{3} \times \frac{5}{8} = \frac{1 \times \cancel{2}^1 \times \cancel{5}^1}{\cancel{2}_2 \times 3 \times \cancel{8}_4}$

$$= \frac{1 \times 1 \times 1}{2 \times 3 \times 4}$$
$$= \frac{1}{24}$$

Remember

To multiply two fractional numbers, we multiply the numerators and the denominators separately.

Worksheet 7

1. Multiply the following fractional numbers.

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

(b) $\frac{4}{7} \times \frac{1}{3}$

(c) $\frac{3}{8} \times \frac{5}{11}$

$$(d) \frac{2}{5} \times \frac{15}{16}$$

$$(e) \frac{2}{10} \times \frac{10}{4}$$

$$(f) 3\frac{1}{4} \times \frac{8}{9}$$

$$(g) 7\frac{1}{2} \times 8\frac{1}{3}$$

$$(h) 2\frac{2}{5} \times \frac{2}{15}$$

$$(i) \frac{6}{7} \times 3\frac{1}{2}$$

$$(j) \frac{1}{10} \times \frac{2}{3} \times \frac{5}{8}$$

$$(k) 1\frac{2}{5} \times \frac{4}{21}$$

$$(l) 3\frac{1}{3} \times \frac{6}{11}$$

$$(m) 5\frac{5}{6} \times 2\frac{1}{7}$$

$$(n) 1\frac{9}{13} \times 2\frac{4}{11}$$

$$(o) \frac{4}{5} \times \frac{7}{8} \times \frac{24}{35}$$

Properties of Multiplication of Fractional Numbers

Multiplication of two fractional numbers.

What is $\frac{2}{3} \times \frac{1}{5}$?

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

$$= \frac{2 \times 1}{3 \times 5} = \frac{2}{15}$$



Let us interchange the places of the fractional numbers.

$$\frac{1}{5} \times \frac{2}{3} = \frac{1 \times 2}{5 \times 3} = \frac{2}{15}$$

We observe that the product in both the cases is same.

So, $\frac{2}{3} \times \frac{1}{5} = \frac{1}{5} \times \frac{2}{3}$

If two fractional numbers are multiplied in either order, the product remains the same.

Multiplication of a fractional number by 1.

What is $\frac{3}{5} \times 1$?

$$\begin{aligned}\frac{3}{5} \times 1 &= \frac{3 \times 1}{5} \\ &= \frac{3}{5}\end{aligned}$$



If a fractional number is multiplied by one, the product is the fractional number itself.

Multiplication of a fractional number by 0.

What is $\frac{7}{11} \times 0$?

$$\begin{aligned}\frac{7}{11} \times 0 &= \frac{7 \times 0}{11} \\ &= 0\end{aligned}$$



If a fractional number is multiplied by zero, the product is zero.

Multiplication of three fractional numbers.



What is $\frac{1}{2} \times \frac{1}{5} \times \frac{3}{4}$?

$$\frac{1}{2} \times \frac{1}{5} \times \frac{3}{4}$$

$$= \left(\frac{1}{2} \times \frac{1}{5} \right) \times \frac{3}{4}$$

$$= \frac{1}{10} \times \frac{3}{4}$$

$$= \frac{3}{40}$$

$$\frac{1}{2} \times \frac{1}{5} \times \frac{3}{4}$$

$$= \frac{1}{2} \times \left(\frac{1}{5} \times \frac{3}{4} \right)$$

$$= \frac{1}{2} \times \frac{3}{20}$$

$$= \frac{3}{40}$$

Groupings are changed

Same Product

If three fractional numbers are multiplied in any order, the product remains the same.

Worksheet 8

1. Fill in the blanks.

(a) $\frac{1}{2} \times \frac{4}{5} = \square \times \frac{4}{5}$

(b) $\frac{7}{13} \times \square = \square \times \frac{9}{17}$

(c) $\frac{7}{9} \times \square = 0$

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

(e) $\left(\frac{1}{2} \times \frac{1}{3} \right) \times \frac{1}{5} = \square \times \left(\frac{1}{3} \times \frac{1}{5} \right)$

(f) $\frac{5}{6} \times 1 = \square$

$$(g) 2\frac{5}{7} \times \boxed{} = 0$$

$$(h) \boxed{} \times 1 = \frac{15}{28}$$

$$(i) \frac{11}{17} \times 0 = \boxed{}$$

$$(j) \frac{2}{5} \times \boxed{} \times \frac{5}{6} = \frac{3}{7} \times \frac{5}{6} \times \boxed{}$$

Word Problems

Let us study some word problems.

Example 13: Rahul has $\frac{3}{4}$ kg of toffees. He gives $\frac{2}{3}$ of it to his sister. How much toffee was given to his sister?

Solution : Quantity of toffees Rahul has = $\frac{3}{4}$ kg

Quantity of toffees given to his sister = $\frac{2}{3}$ of $\frac{3}{4}$ kg

$$= \frac{2}{3} \times \frac{3}{4} \text{ kg}$$

$$= \frac{\cancel{2}^1 \times \cancel{3}^1}{\cancel{3}^1 \times \cancel{4}_2}$$

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

Rahul's sister gets $\frac{1}{2}$ kg toffees.

Example 14 : In a class of 20 students, $\frac{3}{4}$ are girls. Find the number of girls in that class.

Solution : Total students = 20

$$\text{Number of girls} = \frac{3}{4} \text{ of } 20$$

$$= \frac{3}{4} \times 20$$

$$= \frac{3 \times \cancel{20}^5}{\cancel{4}_1}$$

$$= 15$$

There are 15 girls in the class.

Worksheet 9

1. Solve the following word problems.

- (a) Gita has 8 marbles. She gave $\frac{1}{4}$ of them to her younger brother. How many marbles did her brother get?
- (b) One plum cake weighs $\frac{3}{4}$ kg. If Mr Ramesh buys 5 such cakes, how many kilograms of cake did he buy?
- (c) The cost of one kilogram apples is ₹ $25\frac{1}{2}$. What is the cost of $1\frac{1}{2}$ kilogram apples?
- (d) Mr Gupta puts $3\frac{1}{4}$ litres of petrol in his car. If he uses $\frac{1}{3}$ of it, how many litres of petrol did he use?

- (e) Neha spends $\frac{3}{5}$ hours a day in morning exercises. How many hours does she spend in morning exercises in one week?
- (f) The thickness of Mathematics book of Class-V is $1\frac{1}{4}$ cm. What will be the thickness of a pile of 16 such books?

Reciprocal Fraction

Do You Know ?

$\frac{2}{11}$ is reciprocal of $\frac{11}{2}$

$\frac{1}{11}$ is reciprocal of 11

The reciprocal of 1 is always 1.



Observe the following fractions carefully.

Multiply the two fractions, $\frac{2}{3}$ and $\frac{3}{2}$.

$$\begin{aligned} \frac{2}{3} \times \frac{3}{2} &= \frac{2 \times 3}{3 \times 2} \\ &= \frac{6}{6} = 1 \end{aligned}$$

We know that

$\frac{3}{2}$ is reciprocal of $\frac{2}{3}$

Now, let us take another pair of fractions.

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

Multiply the two fractions.

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



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

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

In both the cases, the two fractions are reciprocals of each other.

When you multiply reciprocals, the product is one.

Remember

To get the reciprocal of a given fraction, we interchange the numerator and the denominator.

Worksheet 10

1. Find the reciprocals of the following:

(a) $\frac{2}{3}$

(d) $\frac{1}{18}$

(g) $5\frac{2}{3}$

(b) $\frac{5}{12}$

(e) 1

(h) $33\frac{1}{3}$

(c) $\frac{1}{12}$

(f) 8

(i) $3\frac{5}{8}$

2. State whether these are reciprocals of each other.

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

(c) $\frac{5}{9}, \frac{9}{5}$

(e) $5\frac{1}{3}, \frac{16}{3}$

(b) $\frac{3}{2}, \frac{3}{2}$

(d) $\frac{4}{11}, \frac{3}{11}$

(f) $\frac{2}{3}, 1\frac{1}{2}$

3. Fill in the blanks.

(a) $\frac{1}{8} \times \text{---} = 1$

(c) $\frac{5}{11} \times \text{---} = 1$

(e) $\text{---} \times 3\frac{1}{3} = 1$

(b) $\frac{1}{3} \times 3 = \text{---}$

(d) $\text{---} \times \frac{6}{13} = 1$

(f) $7\frac{1}{3} \times \text{---} = 1$

Division of Fractional Numbers

Remember

Division is the opposite of multiplication.

I. Division of a fractional number by a whole number.

Example 15: Divide $\frac{5}{8}$ by 7.

Solution : $\frac{5}{8} \div 7$

Remember

To divide, first change division sign to multiplication sign and multiply by the reciprocal of the divisor.

Here, dividend = $\frac{5}{8}$, divisor = 7

$$\frac{5}{8} \div 7 = \frac{5}{8} \times \frac{1}{7}$$

Change division to multiplication

$$= \frac{5 \times 1}{8 \times 7} = \frac{5}{56}$$

Reciprocal of the divisor

Example 16: Divide $5\frac{1}{5}$ by 10.

Solution : $5\frac{1}{5} \div 10$

$$= \frac{26}{5} \div 10$$

$$= \frac{26}{5} \times \frac{1}{10} \quad \text{--- Multiplying by the reciprocal of divisor, 10}$$

$$= \frac{26 \times 1}{5 \times 10} = \frac{26}{50} = \frac{13}{25}$$

II. Division of a whole number by a fractional number.

Example 17: Divide 3 by $\frac{2}{5}$.

Solution : $3 \div \frac{2}{5}$

Here, dividend = 3, divisor = $\frac{2}{5}$

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

$$= \frac{3}{1} \times \frac{5}{2} \quad \text{--- Multiplying by the reciprocal of divisor, } \frac{2}{5}$$

$$= \frac{3 \times 5}{1 \times 2} = \frac{15}{2}$$

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



III. Division of a fractional number by another fractional number.

Example 18: Divide $\frac{3}{8} \div \frac{4}{5}$.

Solution : Here, $\frac{3}{8} \div \frac{4}{5}$

$$= \frac{3}{8} \times \frac{5}{4} \quad \text{--- Multiplying by the reciprocal of divisor, } \frac{4}{5}$$

$$= \frac{15}{32}$$

Worksheet 11

1. Divide.

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

(e) $20 \div 3\frac{1}{3}$

(i) $10\frac{1}{3} \div 4\frac{1}{2}$

(b) $2\frac{4}{5} \div 6$

(f) $100 \div 33\frac{1}{3}$

(j) $8\frac{1}{4} \div 3\frac{5}{8}$

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

(g) $\frac{4}{5} \div \frac{7}{9}$

(k) $2\frac{1}{10} \div 1\frac{2}{5}$

(d) $18 \div \frac{3}{4}$

(h) $2\frac{2}{3} \div 1\frac{1}{6}$

(l) $6\frac{3}{5} \div 4\frac{7}{12}$

Properties of Division of Fractional Numbers

Division of a fractional number by 1.

What is $\frac{3}{5} \div 1$?

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

Multiplying by the reciprocal of one, that is one itself.

Similarly, $\frac{11}{15} \div 1 = \frac{11}{15} \times 1 = \frac{11}{15}$

A fraction divided by one is the fraction itself.

Division of a fractional number by 0.

What is $0 \div \frac{5}{6}$?

$$= 0 \times \frac{6}{5} = 0 \quad \text{--- Multiplying by the reciprocal of } \frac{5}{6}$$

Similarly, $0 \div \frac{3}{7} = 0 \times \frac{7}{3} = 0$

Zero divided by any fraction is zero itself.

Division of a fractional number by itself.

What is $\frac{7}{9} \div \frac{7}{9}$?

$$\frac{7}{9} \div \frac{7}{9} = \frac{7}{9} \times \frac{9}{7} \quad \text{--- Multiplying by the reciprocal of } \frac{7}{9}$$

$$= \frac{63}{63} = 1$$

Similarly, $\frac{6}{11} \div \frac{6}{11} = \frac{6}{11} \times \frac{11}{6} = \frac{66}{66} = 1$

A fraction divided by itself is one.

Worksheet 12

1. Fill in the blanks.

(a) $\frac{4}{5} \div \frac{4}{5} = \boxed{}$

(b) $\frac{9}{11} \div 1 = \boxed{}$

$$(c) 3\frac{1}{3} \div 1 = \boxed{}$$

$$(d) 9\frac{1}{3} \div 9\frac{1}{3} = \boxed{}$$

$$(e) 6\frac{3}{5} \div \boxed{} = 6\frac{3}{5}$$

$$(f) \frac{5}{7} \div \boxed{} = 1$$

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

$$(h) 0 \div \frac{1}{5} = \boxed{}$$

$$(i) \frac{6}{7} \div \boxed{} = \frac{6}{7}$$

$$(j) 0 \div \frac{3}{10} = \boxed{}$$

Word Problems

Let us study some word problems.

Example 19: John has $\frac{3}{4}$ metre long ribbon. He wants to cut it into 3 equal pieces. What is the length of each piece?

Solution : Length of ribbon = $\frac{3}{4}$

Number of pieces = 3

$$\text{Length of each piece} = \frac{3}{4} \div 3 = \frac{3}{4} \times \frac{1}{3}$$

$$= \frac{1}{4} \text{ metre}$$

Length of each piece is $\frac{1}{4}$ metre.

Worksheet 13

1. Solve the following word problems.

- (a) A piece of ribbon is $5\frac{3}{5}$ metres long. If it is cut into 14 equal pieces, what is the length of each piece?
- (b) The product of two fractions is 9. If one of the fraction is $2\frac{1}{7}$, find the other fraction.
- (c) It takes $\frac{1}{2}$ minute to cook one dosa. How many dosas can be cooked in $\frac{1}{4}$ hour?
- (d) Sheetal has $1\frac{3}{4}$ kg of sweets. She distributes $\frac{1}{4}$ kg to each of her friend. To how many friends did she distribute the sweets?
- (e) A pile of Class-V Mathematics books has thickness of $14\frac{2}{5}$ cm. If each book is $1\frac{1}{5}$ cm thick, find how many books make up the pile.

Brain Teasers

1. Find the sum.

(a) $\frac{7}{16} + \frac{1}{8}$

(c) $7 + 1\frac{1}{2} + \frac{9}{5}$

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

(d) $2\frac{1}{2} + 1\frac{1}{4} + 2\frac{4}{5}$

2. Subtract.

(a) $\frac{3}{8}$ from $\frac{1}{2}$

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

(b) $\frac{3}{16}$ from $\frac{1}{2}$

(d) $2\frac{1}{2}$ from $7\frac{3}{5}$

3. Find the value of

$$2\frac{3}{5} + 3\frac{1}{2} - 2\frac{1}{8}$$

4. Sheetal needs $1\frac{1}{2}$ metres red ribbon, $\frac{3}{4}$ metres yellow ribbon and 1 metre black ribbon to make a doll. Find the total length of ribbon needed.

5. Renu's mother bought 5 litres of milk. $2\frac{1}{2}$ litres milk was used for making sweets, $\frac{3}{4}$ litres for making tea. How much litres of milk is left?

6. Reduce into lowest terms.

(a) $\frac{8}{12}$

(b) $\frac{35}{63}$

(c) $\frac{44}{99}$

(d) $\frac{6}{10}$

7. Arrange in ascending order.

(a) $\frac{3}{4}, \frac{7}{10}, \frac{1}{2}, \frac{5}{8}$

(b) $1\frac{5}{6}, \frac{11}{9}, \frac{5}{16}, 3$

8. Find the product.

(a) $4\frac{1}{2} \times 4$

(c) $1\frac{7}{8} \times 3\frac{1}{5}$

(e) $\frac{4}{12} \times \frac{21}{18} \times \frac{35}{25}$

(b) $\frac{19}{25} \times 50$

(d) $3\frac{1}{4} \times 3\frac{3}{5}$

(f) $1\frac{1}{4} \times 2\frac{3}{5} \times 2\frac{4}{5}$

9. Solve these division sums.

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

(c) $9\frac{5}{8} \div 2\frac{1}{4}$

(e) $25 \div 2\frac{1}{7}$

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

(d) $\frac{7}{11} \div 8$

(f) $52 \div 2\frac{3}{5}$

10. State which of the following statements are true.

(a) The reciprocal of $\frac{9}{7}$ is $1\frac{2}{7}$.

(b) The multiplicative inverse of 1 is 1.

(c) $\frac{1}{2} \div \frac{1}{4}$ means how many quarters in $\frac{1}{2}$.

(d) The product of a fractional number and one is one.

(e) $\frac{4}{9} \div \frac{4}{9} = \frac{81}{16}$

(f) $0 \div \frac{2}{3} = \frac{2}{3}$

11. A box can hold 40 marbles. Three-fourth of the box was filled with marbles. How many marbles were there in the box?
12. A family consumes $2\frac{1}{2}$ litres of milk every day. What is the total consumption of milk by the family in the month of April?
13. Mrs Renu purchased $5\frac{1}{2}$ metres long cloth at ₹ 14 per metre and 8 metres polyester cloth at ₹ $18\frac{3}{4}$ per metre. How much money did Mrs Renu spend in all?
14. Mala has 36 toffees. She gives $\frac{4}{9}$ of them to her friend. How many toffees are left with her?

DECIMALS

Concept of Decimal

Arrange number 7 in the place value chart.

Hundreds	Tens	Ones
		7



If we multiply 7 by 10, we get 70.

Hundreds	Tens	Ones
	7	0

7 has jumped one column to the left.

If we divide 70 by 10, we get 7.

Hundreds	Tens	Ones
		7

7 has jumped back one column to the right.

We observe that when we multiply 7 by 10, 7 jumps one column to LEFT and when we divide 7 tens (70) by 10, 7 jumps one column to the RIGHT.

Let us divide 7 again by 10.

7 will jump one more column to the RIGHT.

So, we add one more column called TENTHS in the place value chart. Since $\frac{7}{10}$ is a fraction with a value less than 1, we separate $\frac{7}{10}$ by a point called the decimal point.

$$7 \div 10 = \frac{7}{10}$$

Hundreds	Tens	Ones	Decimal	Tenths
(100)	(10)	(1)	point (.)	(1/10)

$\frac{7}{10} = .7$ or $0.7 \rightarrow$ We read it as point 7 or decimal seven or zero decimal seven.

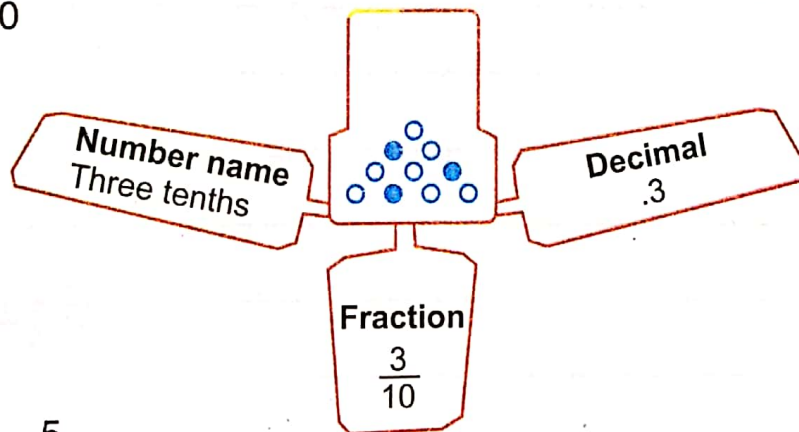
Remember
Decimal takes less space in writing. It is easier to compare two fractional numbers using decimals.

Decimals Used to Represent Tenths

Let us study some examples.

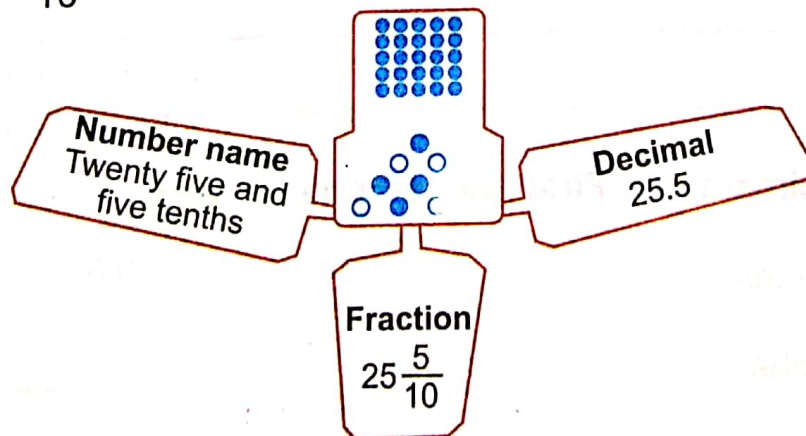
Example 1 : $\frac{3}{10}$

Solution :



Example 2 : $25\frac{5}{10}$

Solution :



Worksheet 1

1. Write as decimals.

(a) $\frac{3}{10}$

(c) $\frac{9}{10}$

(e) $\frac{7}{10}$

(g) $\frac{6}{10}$

(b) $\frac{5}{10}$

(d) $\frac{8}{10}$

(f) $\frac{1}{10}$

(h) $\frac{4}{10}$

2. Write as fractions.

(a) 0.2

(c) 0.7

(e) 0.5

(g) 0.8

(b) 0.4

(d) 0.6

(f) 0.9

(h) 0.3

3. Read and write the number names. First one is done for you.

(a) 7.5 Seven and five tenths

(b) 9.4

(c) 18.2

(d) 65.8

(e) 225.7

(f) 315.8

(g) 1238.7

(h) 2987.3

(i) 1087.3

4. Write in decimal form. First one is done for you.

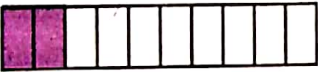
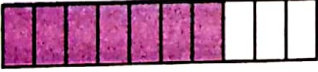
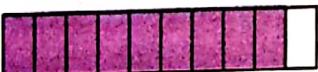
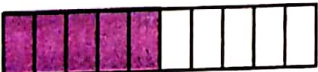

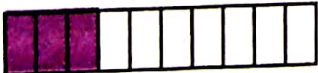
(a) Eight tenths

0.8

(b) Five tenths

- (c) Six and two tenths _____
- (d) Fifty three and seven tenths _____
- (e) Eighty two and three tenths _____
- (f) One hundred thirty five and five tenths _____
- (g) Five hundred eighty five and three tenths _____
- (h) Two hundred twenty seven and seven tenths _____

5. Fill in the blanks.

Picture	Number	Fraction	Decimal
(a) 	Two tenths	$\frac{2}{10}$	0.2
(b) 	Seven tenths	_____	_____
(c) 	_____	$\frac{9}{10}$	_____
(d) 	Five tenths	_____	_____
(e) 	_____	_____	0.1
(f) 	_____	$\frac{3}{10}$	_____

Introduction (Hundredth and Thousandth)

Let us study the place value of 7 in these numerals.

Thousands (1000)	Hundreds (100)	Tens (10)	Ones (1)	Decimal point (.)	Tenths (1/10)
4	3	7	8		
	4	3	7		
		4	3	.	7

7 tens = 70

7 ones = 7 × 1

7 tenths = 7 ÷ 10

If 7 moves one more column to the RIGHT, its place value becomes,

$$7 \div 100 = \frac{7}{100} = 7 \text{ hundredths.}$$

Thousands (1000)	Hundreds (100)	Tens (10)	Ones (1)	Decimal point (.)	Tenths (1/10)	Hundredths (1/100)
			0	.	0	7

If 7 moves one more column further to the RIGHT, its place value becomes

$$7 \div 1000 = \frac{7}{1000} = 7 \text{ thousandths.}$$

Hundreds (100)	Tens (10)	Ones (1)	Decimal point (.)	Tenths (1/10)	Hundredths (1/100)	Thousandths (1/1000)
		0	.	0	0	7

Fractions with denominators 10, 100 and 1000 are called DECIMAL FRACTIONS.

Decimal Part and Whole Number Part

A decimal consists of two parts.

- (1) Whole number part
- (2) Decimal part

These two parts are separated by a dot \odot

Let us take a decimal number say, 35.015

35	·	0 1 5
Whole number part		Decimal part



While reading a decimal number, the whole number part is read as a whole and the decimal number part in separate digits.

Let us read some decimal numbers.

3.5 = Three point five

61.83 = Sixty one point eight three.

928.009 = Nine hundred twenty eight point zero zero nine



Do You Know ?

$275 \frac{87}{100}$ is called a mixed fraction.

We read it as Two hundred seventy five and eighty seven hundredths.

Worksheet 2

1. Read the following decimals loudly.

(a) 5.3

(d) 182.135

(g) 1.839

(j) 2001.201

(b) 71.8

(e) 172.001

(h) 91.99

(c) 36.29

(f) 8432.804

(i) 100.100

2. Write the number names. The first one is done for you.

- (a) 63.85 = Sixty three and eighty five hundredths.
 (b) 15.72 (e) 45.05 (h) 100.97 (k) 15.674
 (c) 11.07 (f) 987.62 (i) 8257.85 (l) 67.005
 (d) 9.24 (g) 125.09 (j) 9.782 (m) 768.135

3. Write in decimal form. The first one is done for you.

- (a) Fifty seven and seven hundredths. 57.07
 (b) Sixty and one hundredths. _____
 (c) Twenty four and twelve hundredths. _____
 (d) Seventy six and five hundredths. _____
 (e) Two and four hundred seventy six thousandths. _____
 (f) Four and sixty seven hundredths. _____
 (g) Thirty two and fifty four thousandths. _____
 (h) Five thousand six hundred seventy two and four hundred seventy eight thousandths. _____

4. Write the whole number part and decimal number part in each of the following:

Decimal	Whole number part	Decimal number part
(a) 75.231	<u>75</u>	<u>231</u>
(b) 2.537	_____	_____
(c) 9.27	_____	_____
(d) 125.32	_____	_____
(e) 62.104	_____	_____
(f) 0.43	_____	_____
(g) 41.0	_____	_____

5. Write the decimals in words. The first one is done for you.

(a) 468.103 = Four hundred sixty eight point one zero three.

(b) 7.8 (d) 65.92 (f) 647.003 (h) 1.943

(c) 39.3 (e) 352.184 (g) 1482.309 (i) 81.88

6. Show each of the following decimals on a Place Value Chart.

(a) 8.4 (c) 0.9921 (e) 3.333 (g) 5.7679

(b) 19.34 (d) 9.009 (f) 0.075 (h) 182.95

7. Write as decimals.

(a) $15\frac{3}{10}$ (c) $101\frac{12}{100}$ (e) $11\frac{11}{100}$ (g) $76\frac{2}{1000}$

(b) $7\frac{8}{100}$ (d) $9\frac{153}{1000}$ (f) $46\frac{1}{10}$ (h) $5\frac{55}{100}$

Easy Way to Convert Fractions to Decimals

Let us take a number, $\frac{67}{100}$

Step 1 : See denominator. It is 100. No. of zeros is two

Step 2 : In numerator, count **two** digits from the right and move towards left, then, put a point (.)

Left ← $\overbrace{0.67}$ → Right

Thus, $\frac{67}{100} = .67$



In the same way,

$$\frac{27}{1000} = .027$$

Three zeros

Count three digits and put a decimal.
Since there are only two digits, we
will put a zero and then, a decimal.



Worksheet 3

1. Write in decimal form. First one is done for you.

(a) $\frac{9}{100}$

(d) $\frac{23}{100}$

(g) $\frac{7}{1000}$

(b) $\frac{3}{100}$

(e) $\frac{178}{100}$

(h) $\frac{92}{1000}$

(c) $\frac{12}{100}$

(f) $\frac{3572}{100}$

(i) $\frac{34}{1000}$

2. Write as fractions. First one is done for you.

(a) 0.67

(d) 0.05

(g) 0.731

(b) 0.42

(e) 0.03

(h) 0.908

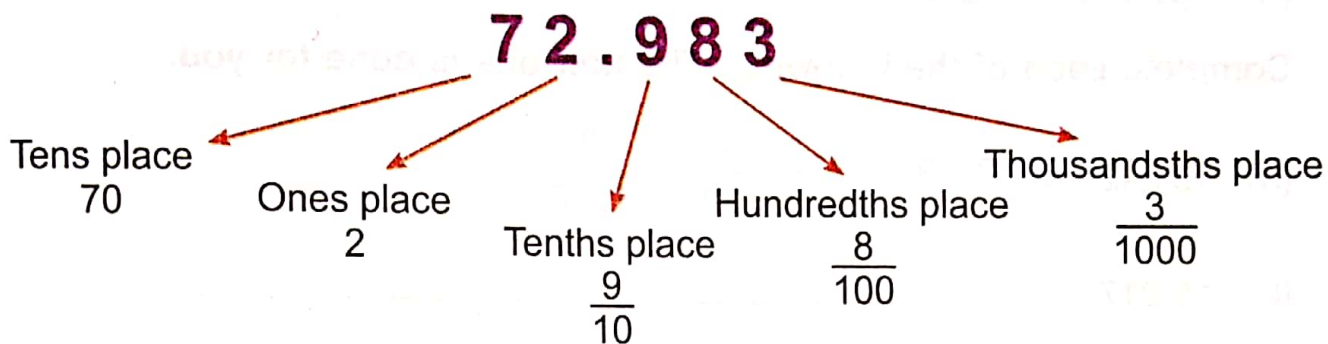
(c) 0.39

(f) 0.09

(i) 0.017

Expanded Form of a Decimal

Observe the place values of all the digits in 72.983



The number 72.983 can be written as:

7 tens	+	2 ones	+	9 tenths	+	8 hundredths	+	3 thousandths
70		2		$\frac{9}{10}$		$\frac{8}{100}$		$\frac{3}{1000}$

This is the expanded form of 72.983

Similarly, the expanded form of 528.497

$$= 5 \text{ hundreds} + 2 \text{ tens} + 8 \text{ ones} + 4 \text{ tenths} + 9 \text{ hundredths} + 7 \text{ thousandths}$$

$$= 500 + 20 + 8 + \frac{4}{10} + \frac{9}{100} + \frac{7}{1000}$$

Worksheet 4

1. Fill in the blanks. First one is done for you.

(a) 17.25 : 2 is in the tenths place.

(b) 892.416 : 4 is in the _____ place.

(c) 57.63 : 3 is in the _____ place.

(d) 908.007 : 7 is in the _____ place.

(e) 57.98 : 5 is in the _____ place.

(f) 139.081 : 0 is in the _____ place.

2. Complete each of the following. The first one is done for you.

(a) $19.892 = 10 + 9 + \frac{8}{10} + \frac{9}{100} + \frac{2}{1000}$

(b) $15.217 =$ _____

(c) $62.306 =$ _____

(d) $149.356 =$ _____

(e) $762.027 =$ _____

(f) $30.108 =$ _____

3. Write in the expanded form. The first one is done for you.

(a) $92.73 = 9 \text{ tens} + 2 \text{ ones} + 7 \text{ tenths} + 3 \text{ hundredths} = 90 + 2 + \frac{7}{10} + \frac{3}{100}$

(b) 14.657

(d) 24.405

(f) 453.762

(c) 803.316

(e) 127.253

(g) 15.006

4. Write the decimal form for each of the following:

(a) $5 + \frac{2}{10} + \frac{3}{100} + \frac{7}{1000} =$

(b) $70 + 3 + \frac{9}{10} + \frac{8}{1000} =$

(c) $6 + \frac{4}{100} + \frac{5}{1000} =$

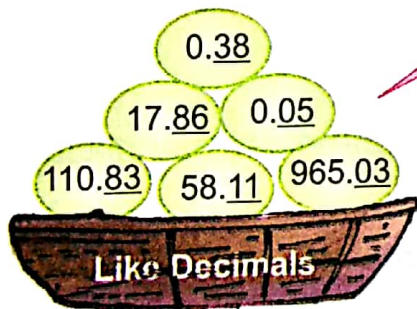
(d) $200 + 5 + \frac{3}{100} + \frac{6}{1000} =$

Like and Unlike Decimals

See these decimals:

Decimal Numbers	Whole Number Part	Decimal Part
36.2	36	2
4.85	4	85
61.059	61	059

Digits in the decimal part are called DECIMAL PLACES.



See us. We have the same number of decimal places. We are called LIKE DECIMALS.

Examples of Like Decimals

- 0.5 , 7.3 , 19.8 , 156.2 , 9.1
- 1.043 , 81.861 , 9.500 , 361.841 , 8.018

See us. We have different number of decimal places. We are called UNLIKE DECIMALS.

Examples of Unlike Decimals

- 0.1 , 15.38 , 251.2 , 0.153 , 161.28
- 59.8 , 6.81 , 0.008 , 115.83 , 41.049



Worksheet 5

1. Encircle the pairs of like decimals.

(a) 3.5, 1.68

(d) 1.382, 21.671

(g) 431.6, 431.67

(b) 11.27, 7.831

(e) 93.21, 93.217

(h) 0.5, 0.50

(c) 16.8, 7.3

(f) 0.101, 0.010

(i) 85.31, 85.310

2. Convert into a group of like decimals.

(a) 1.8, 31.629, 17.26, 5.01

(d) 0.105, 0.5, 0.05, 0.50

(b) 405.3, 45.38, 45.03, 45.8

(e) 6.72, 6.271, 6.2, 0.006

(c) 85.785, 201.3, 9.1, 16.65

(f) 143.85, 68.095, 8.09, 71.1

Ordering of Decimal Numbers

Do you remember how we compared whole numbers?



In the same way, we can also compare decimal numbers.

Remember

- First, we compare the whole number part.

$$43.8 > 3.89$$

- then, we compare the digits in the tenths place.

$$81.83 > 81.792$$

- next, we compare the digits in the hundredths place.

$$6.725 < 6.74$$

- lastly, we compare the digits in the thousandths place.

$$13.804 < 13.809$$

Worksheet 6

1. Compare the following pairs of decimal numbers.

- (a) 0.37 0.47 (f) 342.81 342.801
- (b) 182.6 181.32 (g) 4.123 4.13
- (c) 0.9 0.10 (h) 75.826 75.825
- (d) 6.96 6.69 (i) 71.780 71.708
- (e) 126.60 126.6 (j) 6.820 6.82

2. Arrange in ascending order.

- (a) 6.035, 6.53, 6.005, 6.359
- (b) 19.071, 19.170, 19.701, 19.017
- (c) 400.27, 400.072, 400.72, 400.7
- (d) 2.118, 2.811, 2.818, 2.881

3. Arrange in descending order.

- (a) 218.81, 281.82, 281.81, 218.9
- (b) 11.064, 11.604, 11.406, 11.1
- (c) 30.03, 30.031, 30.301, 30.3
- (d) 0.045, 0.040, 0.544, 0.005

Brain Teasers

1. Look at the given number and answer the questions that follow:

287.149

- (a) What digit is in tens place?
(b) What digit is in tenths place?
(c) What digit is in thousandths place?

2. Write as decimal number.

(a) $5\frac{3}{10}$

(c) $39\frac{18}{100}$

(e) $187\frac{7}{10}$

(b) $6\frac{91}{100}$

(d) $7\frac{394}{1000}$

(f) $99\frac{999}{1000}$

3. Write as fractions or mixed numbers.

(a) 0.42

(c) 0.86

(e) 20.108

(b) 0.005

(d) 12.82

4. Write the number names.

(a) 15.82

(b) 76.891

5. Present the following numbers on a place value chart.

(a) 6.82

(b) 14.257

6. Write in the expanded form.

(a) 4.82

(b) 16.57

(c) 108.003

7. Write the fraction for 0.0002.

8. Change the following into like decimals.
- (a) 4.8 ; 43.659 ; 0.48 ; 0.4 ; 436.82
- (b) 7.7 ; 7.77 ; 777.7 ; 7.777 ; 0.77
9. Ring the largest decimal.
- (a) 5.689 0.568 56.89 56.9
- (b) 37.8 33.8 34.43 37.3
10. Arrange the group of decimals in descending order.
- (a) 0.3 ; 0.333 ; 3.3 ; 33.3
- (b) 567.38 ; 576.83 ; 576.9 ; 567.3
11. Write decimal places to match the statements. The first one is done for you.
- (a) 8 in the hundredths place, 6 in the tenths place, 3 in the ones place, and 1 in tens place.
- (b) 9 in the ones place, 4 in the tens place, 6 in the hundredths place and 0 in the tenths place.
- (c) 7 in the thousandths place, 0 in the hundredths place, 1 in the tenths place, 5 in the ones place and 3 in the tens place.
- (d) 7 in the tenths place, 6 in the tens place, 4 in the hundredths place, 2 in the hundreds place and 0 in the ones place.

UNIT - 6

ADDITION AND SUBTRACTION OF DECIMAL NUMBERS

Addition of Decimal Numbers

We can add decimal numbers in the same way as we add whole numbers.

Let us add like decimals, 1.56 and 5.32



$$\begin{array}{r} 1.56 \\ + 5.32 \\ \hline 6.88 \\ \hline \end{array}$$

- Arrange the digits in the place value columns.
- The decimal point should come one below the other in column.
- Add the addends just as we add whole numbers.

Decimal point placed in sum also.

Now, let us add unlike decimals, 18.786 and 48.96

$$18.786 + 48.960$$

Converting into like decimals

Carry over

$$\begin{array}{r} \boxed{111} \\ 18.786 \\ + 48.960 \\ \hline 67.746 \\ \hline \end{array}$$

- Arrange the digits in the place value column.
- Decimal point should come one below the other.
- Add the addends.

Decimal point placed in sum also.

Worksheet 1

1. Add the following decimal numbers.

$$\begin{array}{r} \text{(a)} \quad 0.35 \\ + 0.42 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 59.623 \\ + 41.208 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{(e)} \quad 3.843 \\ + 7.025 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 1.74 \\ + 8.15 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{(d)} \quad 91.04 \\ 136.24 \\ + 2.81 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{(f)} \quad 483.905 \\ 16.240 \\ + 93.809 \\ \hline \hline \end{array}$$

2. Arrange in columns and add.

$$\text{(a)} \quad 0.35 + 0.62$$

$$\text{(f)} \quad 14.9 + 64.941$$

$$\text{(b)} \quad 1.123 + 2.451$$

$$\text{(g)} \quad 3.19 + 27.974 + 8.8$$

$$\text{(c)} \quad 0.66 + 0.34$$

$$\text{(h)} \quad 31.001 + 13.01 + 131.1$$

$$\text{(d)} \quad 8.496 + 2.564$$

$$\text{(i)} \quad 7.8 + 31.856 + 0.956$$

$$\text{(e)} \quad 25.08 + 5.8$$

$$\text{(j)} \quad 191.38 + 12.904 + 76.1$$

Properties of Addition of Decimal Numbers

We know that $5.6 + 3.8 = 9.4$

or

$$\begin{array}{r} 3.8 + 5.6 = 9.4 \\ \hline \end{array}$$

→ The sum remains the same.

↓
Order of addends is changed.

If we change the order of the addends, the sum remains the same.

Let us add 1.2, 2.4 and 1.1

$$\begin{array}{l} \begin{array}{l} \xrightarrow{\hspace{1.5cm}} \text{Groupings changed} \xleftarrow{\hspace{1.5cm}} \\ \hline (1.2 + 2.4) + 1.1 \\ = 3.6 + 1.1 \\ = \underline{4.7} \end{array} \qquad \begin{array}{l} \hline 1.2 + (2.4 + 1.1) \\ = 1.2 + 3.5 \\ = \underline{4.7} \end{array} \\ \xrightarrow{\hspace{1.5cm}} \text{Sum is same} \xleftarrow{\hspace{1.5cm}} \end{array}$$



The sum remains the same, even after changing the groupings of the addends.

We know

$$7.2 + 0 = 7.2$$

$$0 + 8.915 = 8.915$$

If zero is added to any decimal number or a decimal number is added to zero, the sum is the number itself.

Worksheet 2

1. Complete the following:

(a) $2.3 + 5.9 = \square + 2.3$

(b) $18.69 + \square = \square + 4.35$

(c) $9.8 + 16.21 + 8.36 = 16.21 + \square + 8.36$

(d) $0 + 9.105 = \square$

(e) $15.05 + \square = 15.05$

$$(f) \quad \boxed{} + 0 = 79.8$$

$$(g) \quad (4.11 + 8.06) + 3.1 = 4.11 + (\boxed{} + \boxed{})$$

$$(h) \quad \boxed{} + 3.81 = 15.2 + \boxed{}$$

Word Problems

Let us study the following word problem.

Example 1 : A man travelled 31.455 km by train, 12.25 km by bus and 1.325 km by scooter in one day. Find the total distance travelled by him in one day.

Solution	:	Distance travelled by train	=	31.455 km
		Distance travelled by bus	=	12.250 km
		Distance travelled by scooter	=	+ 1.325 km
		Total distance travelled	=	<u>45.030 km</u>

The man travelled a total distance of 45.030 km.

Worksheet 3

1. Solve the following word problems.

- (a) Mr Kumar purchased a saree for ₹ 485.55, a shirt for ₹ 269.40 and a tie for ₹ 65.25. Find the total money spent by Mr Kumar.
- (b) The height of Ram is 1.75 metres. His brother Shyam is 0.5 metres taller than Ram. What is the height of Shyam?

- (c) A shopkeeper had 32.5 kg apples, 25.25 kg mangoes and 9.75 kg pears. What is the total weight of fruits he had?
- (d) A milkman sold 26.55 litres milk on the first day, 35.755 litres milk on the second day and 42.5 litres milk on the third day. Find the total quantity of milk sold on 3 days.
- (e) Anjali spent ₹ 15.20 on icecream, ₹ 7.50 on chips and ₹ 3.75 on a pen. Find the total money spent by Anjali.

Subtraction of Decimal Numbers

We can subtract decimal numbers in the same way as we subtract whole numbers.

Let us subtract like decimals, 16.53 from 28.94

$$\begin{array}{r} 28.94 \\ - 16.53 \\ \hline 12.41 \\ \hline \end{array}$$

Decimal point placed in difference also.

- Arrange the digits in the place value column.
- The decimal point should come one below the other in column.
- Subtract just as we subtract whole numbers.



Now, let us subtract unlike decimals, 28.56 from 36.486

$$36.486 - 28.580$$

Converting into like decimals

$$\begin{array}{r} 36.486 \\ - 28.560 \\ \hline 7.926 \\ \hline \end{array}$$

Decimal placed in difference also.

- Arrange digits in the place value column.
- Decimal point one below the other.
- Subtract subtrahend and minuend.

Worksheet 4

1. Subtract.

$$\begin{array}{r} (a) \quad 3.8 \\ - 2.6 \\ \hline \end{array}$$

$$\begin{array}{r} (c) \quad 143.289 \\ - 68.114 \\ \hline \end{array}$$

$$\begin{array}{r} (e) \quad 153.288 \\ - 68.113 \\ \hline \end{array}$$

$$\begin{array}{r} (b) \quad 98.86 \\ - 26.62 \\ \hline \end{array}$$

$$\begin{array}{r} (d) \quad 36.81 \\ - 23.73 \\ \hline \end{array}$$

$$\begin{array}{r} (f) \quad 300.007 \\ - 125.235 \\ \hline \end{array}$$

2. Arrange in columns and subtract.

(a) 6.3 from 9.5

(e) 45.6 from 55.352

(b) 71.86 from 95.97

(f) 22.05 from 319.019

(c) 315.28 from 486.195

(g) 71.084 from 90.04

(d) 19.378 from 26.4

(h) 174.5 from 200.17

Properties of Subtraction of Decimal Numbers

$$3.85 - 0 = 3.85$$

$$11.635 - 0 = 11.635$$

When we subtract zero from a decimal number, we get the decimal number itself.

Worksheet 5

1. Complete the following:

(a) $3.85 - 0 = \boxed{}$

(d) $19.5 - 0 = \boxed{}$

(b) $29.38 - \boxed{} = 29.38$

(e) $413.5 - \boxed{} = 413.5$

(c) $11.8 - \boxed{} = 11.8$

(f) $25.593 - \boxed{} = 0$

Word Problems

Let us study the following word problem.

Example 2 : My mother had 11.55 metres long cloth. She used 5.75 metres cloth for stitching a frock. Find the length of the remaining cloth.

Solution : Length of cloth mother had = 11.55 m

Length of cloth used for frock = - 5.75 m

Length of remaining cloth = 5.80 m

5.80 m cloth is left.

Worksheet 6

1. Solve the following word problems.

- Raju got ₹ 50.45 as pocket money from his father. He spent ₹ 16.25 on icecream. How much money is left with him?
- Mrs Renu bought 2.750 litres of milk. She used 1.5 litres milk for making curd. Find the quantity of milk left.
- Rahul weighs 52.525 kg. His brother weighs 4.5 kg less than Rahul. Find the weight of his brother.
- Amit travelled a distance of 15.55 km. If he travelled 12.400 km by bus and the rest by scooter, find the distance covered by scooter.
- Neha saw a doll in the show-case of a shop. The cost of the doll was ₹ 75.35. She wanted to buy it, but she had ₹ 4.75 less than the cost of the doll. How much money did Neha have?

Brain Teasers

- Find the sum or difference of the following:
 - $111.1 + 11.11 + 1.111$
 - $200.8 - 178.865$
 - $43 - 28.625$
 - $85 + 8.583 + 85.1$
- The sum of two decimal numbers is 0.9. If one of them is 0.675, find the other.
- A tower is painted in red, white and black. If 25.5 m is painted red, 15.75 m in black and 10.25 in white, find the height of the tower.
- The sum of three decimal numbers is 95.3. If two decimal numbers are 43.82 and 26.058 respectively, find the third number.
- Complete the following magic square so that the decimal numbers from left to right and top to bottom add upto 4.5.

	1.1	
1.3	1.5	1.7
1.4		

UNIT - 7

MULTIPLICATION AND DIVISION OF DECIMAL NUMBERS

Multiplication of Decimal Numbers

I. Multiplication of a decimal number by a whole number.

Multiply 0.2×3

$$2 \times 3 = 6 \quad \text{---} \quad \text{Multiply the numbers ignoring decimal point.}$$

So, $0.2 \times 3 = 0.\underline{6}$ Number of decimal places in 0.2 is one. So, we keep only one decimal place in the product.

In the same way,

Let us multiply 4.18 by 5

$$418 \times 5 = 2090 \quad \text{---} \quad \text{Multiply the numbers ignoring decimal point.}$$

So, $4.18 \times 5 = 20.\underline{90}$ Same number of decimal places in the product as in the multiplicand.

Worksheet 1

1. Find the product.

(a) 0.3×3

(d) 0.005×15

(g) 71.8×248

(b) 0.3×4

(e) 2.4×23

(h) 7.37×56

(c) 0.412×2

(f) 16.3×17

(i) 1.001×96

2. If $3,485 \times 16 = 55,760$, find

(a) 348.5×16

(c) 3.485×16

(b) 34.85×16

(d) 0.3485×16

II. Multiplication of one decimal number by another decimal number.

Let us multiply 4.2 by 0.56.

First, multiply $42 \times 56 = 2352$

$$4.2 \times 0.56 = 2.\underline{352}$$

Number of decimal places in 4.2 = 1
Number of decimal places in 0.56 = 2
Number of decimal places in product = $1 + 2 = 3$

Now, let us multiply 3.59×2.24

We have, $359 \times 224 = 80416$

$$3.59 \times 2.24 = 8.\underline{0416}$$

Number of decimal places in 3.59 = 2
Number of decimal places in 2.24 = 2
Number of decimal places in product = $2 + 2 = 4$

Worksheet 2

1. Find the product of the following:

(a) 0.2×0.3

(e) 8.1×5.3

(i) 8.24×19.7

(b) 0.5×0.4

(f) 3.4×23.6

(j) 13.62×35.1

(c) 9.5×0.01

(g) 3.64×2.12

(k) 70.9×3.06

(d) 3.1×0.04

(h) 10.15×10.04

(l) 10.05×0.6

2. If $1,135 \times 72 = 81,720$, find the value of

(a) 113.5×7.2

(d) 1.135×7.2

(b) 11.35×7.2

(e) 1.135×0.72

(c) 11.35×0.72

(f) 0.1135×0.72

III. Multiplication of decimal number by 10, 100, 1000

Remember

To multiply a decimal number by 10, 100 or 1000, we just shift the decimal point in the product to the right by as many places as there are zeros in the multiplier.

Let us study these questions.

$$6.92 \times 10 = 69.2$$

Multiplier having one zero

Decimal point shifts one place to the right.

$$3.481 \times 100 = 348.1$$

Multiplier having two zeros

Decimal point shifts two places to the right.

$$16.846 \times 1000 = 16846.$$

Multiplier having three zeros

Decimal point shifts three places to the right.

Worksheet 3

1. Find the product orally.

(a) 0.2×10

(e) 4.02×100

(i) 0.1×100

(b) 1.18×10

(f) 19.32×100

(j) 7.538×100

(c) 13.293×10

(g) 71.821×1000

(d) 16.25×100

(h) 45.01×1000

2. Complete the following:

(a) $1.5 \times \square = 15$

(e) $0.5 \times \square = 500$

(b) $2.61 \times \square = 261$

(f) $10.3 \times \square = 10300$

(c) $14.326 \times \square = 14326$

(g) $3.08 \times \square = 30.8$

(d) $0.8 \times \square = 80$

(h) $0.001 \times \square = 1$

Properties of Multiplication of Decimal Numbers

Multiplication of two decimal numbers in either order.

$$\begin{array}{l} 1.2 \times 3.8 = 4.56 \\ 3.8 \times 1.2 = 4.56 \end{array} \left| \begin{array}{l} \text{Product is} \\ \text{the same} \end{array} \right.$$

If two decimal numbers are multiplied in either order, the product remains the same.



Multiplication of a decimal number by one.

$$3.29 \times 1 = 3.29$$

$$19.3 \times 1 = 19.3$$

Product of a decimal number and one is the decimal number itself.

Multiplication of a decimal number by zero.

$$2.4 \times 0 = 0$$

$$13.182 \times 0 = 0$$

Product of a decimal number and zero is always zero.

Worksheet 4

1. Complete the following:

(a) $5.8 \times 6 = \square \times 5.8$

(e) $\square \times 15.6 = 15.6$

(b) $0.8 \times 0 = \square$

(f) $\square \times 1 = 4.7$

(c) $9.3 \times \square = \square \times 3.4$

(g) $\square \times 1.8 = 15.5 \times \square$

(d) $13.26 \times \square = 13.26$

(h) $95.601 \times \square = 0$

Word Problems

Let us study the following word problem.

Example 1 : One box of apples weighs 25.25 kg. Find the weight of 7 such boxes of apples.

Solution : Weight of one box of apples = 25.25 kg

Weight of 7 such boxes of apples = 25.25

$\times 7$

176.75 kg

7 boxes of apples weigh 176.75 kg.

Worksheet 5

1. Solve the following word problems.

(a) Renu needs 5 pieces of ribbon of length 7.5 cm. What is the total length of ribbon needed?

- (b) One Mathematics book of Class-V costs ₹ 26.25. What is the cost of 15 such books?
- (c) It needs 2.75 metres of cloth to stitch one pyjama. What is the total length of cloth needed to stitch 6 such pyjamas?
- (d) The weight of one chair is 3.75 kg. Find the weight of 3 dozen chairs.
- (e) The cost of one kilogram of mangoes is ₹ 32.30. Find the cost of 2.5 kg mangoes.
- (f) A bag has 85.7 kg wheat. How much wheat will be there in 1,000 such bags?

Division of Decimal Numbers

I. Division of a decimal number by a whole number.

Division of decimal numbers is similar to division of whole numbers.

Example 2 : Divide 18.24 by 8

Solution : $18.24 \div 8$

Here, dividend = 18.24, divisor = 8

$$\begin{array}{r}
 2.28 \\
 8 \overline{) 18.24} \\
 \underline{- 16} \\
 22 \\
 \underline{- 16} \\
 64 \\
 \underline{- 64} \\
 0
 \end{array}$$

Decimal point will come directly above the decimal point in the dividend.

We get, Quotient = 2.28, Remainder = 0

Example 3 : Divide $0.695 \div 5$

Solution : Here, dividend = 0.695
divisor = 5

There is no whole number.

$$\begin{array}{r} 0.139 \\ 5 \overline{) 0.695} \\ \underline{- 5} \\ 19 \\ \underline{- 15} \\ 45 \\ \underline{- 45} \\ 0 \end{array}$$

Decimal point will come directly above the decimal point in the dividend.

We get, Quotient = 0.139, Remainder = 0

Worksheet 6

1. Divide the following:

(a) $0.95 \div 5$

(f) $16.5 \div 15$

(b) $3.44 \div 8$

(g) $0.077 \div 7$

(c) $4.9 \div 7$

(h) $88.88 \div 22$

(d) $25.41 \div 11$

(i) $35.49 \div 13$

(e) $31.5 \div 9$

(j) $57.5 \div 25$

Study this example.

Example 4 : $4.23 \div 5$

Solution :

$$\begin{array}{r} 0.846 \\ 5 \overline{) 4.23} \\ \underline{-40} \\ 23 \\ \underline{-20} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

Keep on adding zeros and divide till no remainder is left.



Worksheet 7

1. Divide the following:

(a) $0.5 \div 2$

(b) $3.4 \div 4$

(c) $12.6 \div 5$

(d) $6.05 \div 25$

(e) $11.7 \div 6$

(f) $12.06 \div 12$

(g) $9.2 \div 16$

(h) $3.75 \div 6$

(i) $8.5 \div 17$

(j) $14.4 \div 12$

II. Division of decimal numbers by 10, 100, 1000

Remember

To divide a decimal number by 10, 100, 1000, we just shift the decimal point in the quotient to the left by as many places as there are zeros in the divisor.

Let us study these questions.

$$56.8 \div 10 = 5.68$$

Divisor having one zero

Decimal point shifts one place to the left.

$$438.5 \div 100 = 4.385$$

Divisor having two zeros

Decimal point shifts two places to the left.

$$105.2 \div 1000 = .1052$$

Divisor having three zeros

Decimal point shifts three places to the left.

Worksheet 8

1. Find the quotient orally.

(a) $1.7 \div 10$

(f) $44.81 \div 1000$

(b) $4.9 \div 10$

(g) $1.3 \div 100$

(c) $19.2 \div 1000$

(h) $2.56 \div 1000$

(d) $57.98 \div 100$

(i) $148.5 \div 10$

(e) $601.8 \div 1000$

(j) $708.13 \div 100$

2. Fill in the boxes. The first one is done for you.

(a) $6.5 \div \boxed{10} = 0.65$ Decimal has shifted one place to the left.

(b) $3.7 \div \boxed{} = 0.37$

(e) $77.1 \div \boxed{} = 0.771$

(c) $15.81 \div \boxed{} = 1.581$

(f) $36.2 \div \boxed{} = 0.362$

(d) $8.19 \div \boxed{} = 0.819$

(g) $710.3 \div \boxed{} = 7.103$

III. Division of a decimal number by another decimal number.

Example 5 : Divide 1.6 by 0.4

Solution : Here, dividend = 1.6, divisor = 0.4

$$1.6 \div 0.4 = \frac{1.6}{0.4} \quad \text{Division expressed as a fraction.}$$

Let us change the divisor into a whole number.

$$\begin{aligned} \text{Now, we have, } \frac{1.6}{0.4} &= \frac{1.6 \times 10}{0.4 \times 10} && \text{0.4 has one decimal place.} \\ &= \frac{16}{4} && \text{So, multiply the numerator} \\ &= 4 && \text{and denominator by 10 to get} \\ &&& \text{equivalent fraction.} \end{aligned}$$

Example 6 : Divide 9.63 by 0.09

Solution : $9.63 \div 0.09 = \frac{9.63}{0.09}$

$$\begin{aligned} &= \frac{9.63 \times 100}{0.09 \times 100} && \text{Divisor 0.09 has two decimal} \\ &= \frac{963}{9} && \text{places. So, multiply numerator} \\ &= 107 && \text{and denominator by 100.} \end{aligned}$$

Worksheet 9

1. Divide the following:

(a) $2.8 \div 0.7$

(b) $3.6 \div 0.4$

(c) $3.2 \div 0.8$

(d) $8.5 \div 1.7$

$$(e) 0.75 \div 0.15$$

$$(f) 1.25 \div 2.5$$

$$(g) 5.6 \div 1.4$$

$$(h) 1.44 \div 1.2$$

$$(i) 0.993 \div 0.331$$

$$(j) 25.925 \div 0.425$$

IV. Division of a whole number by a decimal number.

Example 7 : Let us divide 6 by 0.2

Solution : $6 \div 0.2 = \frac{6}{0.2}$ ————— Division expressed as a fraction.

$$= \frac{6 \times 10}{0.2 \times 10}$$

————— Divisor has one decimal place. So, multiply both numerator and denominator by 10.

$$= \frac{60}{2}$$
$$= 30$$

Example 8 : Divide 36 by 0.45

Solution : $36 \div 0.45 = \frac{36}{0.45}$

$$= \frac{36 \times 100}{0.45 \times 100}$$
$$= \frac{3600}{45}$$
$$= 80$$

Example 9 : Divide 65 by 0.013

Solution : $65 \div 0.013 = \frac{65}{0.013}$
 $= \frac{65 \times 1000}{0.013 \times 1000}$
 $= \frac{65000}{13}$
 $= 5,000$

Worksheet 10

1. Find the quotient.

(a) $6 \div 0.2$

(b) $15 \div 0.05$

(c) $64 \div 0.32$

(d) $822 \div 1.644$

(e) $31 \div 0.5$

(f) $81 \div 0.27$

(g) $3622 \div 45.275$

(h) $125 \div 2.5$

(i) $100 \div 2.5$

(j) $625 \div 2.5$

V. Conversion of a fraction into a decimal number.

Example 10 : Convert $\frac{4}{5}$ into a decimal number.

Solution : $\frac{4}{5} = 4 \div 5$ ————— Fraction expressed as a division sum.

$$\begin{array}{r} 0 \\ 5 \overline{) 4} \\ \underline{-0} \\ 4 \end{array}$$

4 is less than 5. We place a zero in the quotient.

$$\begin{array}{r} 0. \\ 5 \overline{) 4} \\ \underline{- 0} \\ 40 \end{array}$$

Place a decimal next to zero.

Add zero to the remainder.

$$\begin{array}{r} 0.8 \\ 5 \overline{) 4} \\ \underline{- 0} \\ 40 \\ \underline{- 40} \\ 0 \end{array}$$

Continue the division till you get remainder zero.

Example 11 : Convert $\frac{37}{8}$ into a decimal number.

Solution :

$$\begin{array}{r} 4.625 \\ 8 \overline{) 37} \\ \underline{- 32} \\ 50 \\ \underline{- 48} \\ 20 \\ \underline{- 16} \\ 40 \\ \underline{- 40} \\ 0 \end{array}$$

Continue adding zeros to the remainder and divide till you get remainder zero.

Worksheet 11

1. Convert the following fractions into a decimal number.

- | | | | |
|-------------------|--------------------|---------------------|---------------------|
| (a) $\frac{3}{4}$ | (c) $\frac{1}{20}$ | (e) $\frac{18}{90}$ | (g) $\frac{11}{20}$ |
| (b) $\frac{7}{8}$ | (d) $\frac{8}{25}$ | (f) $\frac{12}{15}$ | (h) $\frac{31}{50}$ |

2. Convert the following into a decimal number.

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

(c) $16\frac{1}{5}$

(e) $4\frac{1}{4}$

(g) $1\frac{2}{25}$

(b) $5\frac{1}{5}$

(d) $4\frac{1}{20}$

(f) $4\frac{3}{8}$

(h) $1\frac{3}{4}$

Properties of Division of Decimal Numbers

Division of a decimal number by one.

$$4.8 \div 1 = 4.8$$

$$0.059 \div 1 = 0.059$$

A decimal number divided by one is the decimal number itself.



Division of a decimal number by zero.

$$0 \div 4.1 = \frac{0}{4.1} = \frac{0 \times 10}{4.1} = \frac{0}{41} = 0$$

$$0 \div 17.82 = \frac{0}{17.82} = \frac{0 \times 100}{17.82 \times 100} = \frac{0}{1782} = 0$$

Zero divided by any decimal number is zero.



Division of a decimal number by the same decimal number.

$$0.3 \div 0.3 = \frac{0.3}{0.3} = \frac{0.3 \times 10}{0.3 \times 10} = \frac{3}{3} = 1$$

$$5.21 \div 5.21 = \frac{5.21}{5.21} = \frac{5.21 \times 100}{5.21 \times 100} = \frac{521}{521} = 1$$

A decimal number divided by itself is one.



Worksheet 12

1. Fill in the boxes.

(a) $9.85 \div 1 = \boxed{}$

(e) $0 \div 19.1 = \boxed{}$

(b) $\boxed{} \div 0.3 = 1$

(f) $10.506 \div \boxed{} = 1$

(c) $0.4 \div 0.4 = \boxed{}$

(g) $\boxed{} \div 1 = 16.032$

(d) $\boxed{} \div 5.1 = 0$

(h) $\boxed{} \div 1.32 = 0$

Word Problems

Let us study the given word problem.

Example 12 : Rahul bought 25 balls for ₹ 56.25. Find the cost of one ball.

Solution : Cost of 25 balls = ₹ 56.25

Cost of one ball = ₹ $56.25 \div 25$

$$\begin{array}{r}
 2.25 \\
 25 \overline{) 56.25} \\
 \underline{- 50} \\
 62 \\
 \underline{- 50} \\
 125 \\
 \underline{- 125} \\
 0
 \end{array}$$

One ball costs ₹ 2.25.

Worksheet 13

1. Solve the following word problems.

- (a) 12 tins can hold 39.624 litres of oil. How much oil can one tin hold?
- (b) Cost of 23 metres of cloth is ₹ 608.35. Find the cost of one metre cloth.
- (c) I have a 7.5 metres long ribbon. I want to cut it into 1.5 m long pieces. How many pieces will I get?
- (d) 16.5 kg sugar is put in paper bags each containing 0.5 kg of it. How many bags are there?
- (e) I require 2.25 m cloth to stitch a skirt. How many skirts can be stitched with 20.25 m cloth?

Brain Teasers

1. Find the product of the following:

- (a) 8.05×16 (b) 14.89×2.6 (c) 7.8×0.005

2. Find the quotient for the following division questions.

- (a) $1.5 \div 12$ (b) $122.455 \div 0.05$ (c) $13 \div 0.13$

3. Convert into a decimal number.

- (a) $\frac{3}{20}$ (b) $5\frac{1}{50}$ (c) $7\frac{3}{8}$

4. If $504 \div 12 = 42$ and $504 \times 12 = 6,048$, find the value of

- (a) 5.04×12 (c) 0.504×0.12 (e) $50.4 \div 12$
(b) 50.4×12 (d) $5.04 \div 12$ (f) $0.504 \div 12$

5. Fill in the boxes.

(a) $3.5 \times 10 = \boxed{}$

(f) $1.98 \div 100 = \boxed{}$

(b) $1.5 \times 1000 = \boxed{}$

(g) $356.4 \div 1000 = \boxed{}$

(c) $7.5 \times \boxed{} = 750$

(h) $13.8 \div \boxed{} = 1.38$

(d) $95.65 \times \boxed{} = 95.65$

(i) $\boxed{} \div 3.6 = 0$

(e) $53.09 \div 10 = \boxed{}$

(j) $19.85 \times \boxed{} = 19.85$

6. Find the product of 0.2, 0.02 and 0.002

7. Divide 1010.101 by 1.01

8. 3.5 kg toffees are to be distributed among some children. If each child has to be given 0.5 kg toffees, how many children get the toffees?

9. Mr Ajay purchases 3 kg tomatoes at ₹ 8.75 per kilogram and 5.5 kg potatoes at ₹ 5.20 per kilogram. Find the total amount spent in all.

10. Which of the following have 15 as quotient?

(a) $0.075 \div 0.5$

(b) $0.075 \div 0.005$

(c) $0.75 \div 5$

UNIT - 8

SIMPLIFICATION OF NUMERICAL EXPRESSIONS

Do you remember the four basic mathematical operations?



Addition +
Subtraction -
Multiplication ×
Division ÷

Sometimes we may need to carry out two or more operations at a time. See the following carefully:

$$70 + 20 + 2 \quad \text{or} \quad 30 \times 6 - 25$$

These are called numerical expressions.

A mathematical expression in which two or more operations occur together is called a **NUMERICAL EXPRESSION**.

Remember

To solve a numerical expression, we follow the **Simplification Rule**

÷	D ivision	first
×	M ultiplication	second
+	A ddition	third
-	S ubtraction	last

DMAS



Let us solve some numerical expressions.

Example 1 : Solve $30 \times 16 - 10$

Solution : $30 \times 16 - 10$

First, multiply 30 by 16

$$= 480 - 10$$

Then, subtract

$$= 470$$

Example 2 : Solve $9 \div 3 + 6 \times 2$

Solution : $9 \div 3 + 6 \times 2$

First, divide

$$= 3 + 6 \times 2$$

Then, multiply

$$= 3 + 12$$

Lastly, add

$$= 15$$

Example 3 : Solve $20 - 3 \times 5 + 6$

Solution : $20 - 3 \times 5 + 6$

$$= 20 - 15 + 6$$

3×5

$$= 20 + 6 - 15$$

$$= 26 - 15$$

$20 + 6$

$$= 11$$

Worksheet 1

1. Solve the following numerical expressions.

(a) $3 \times 2 + 8 - 5$

(b) $18 + 4 \times 6 \div 2 - 9$

(c) $14 + 28 \div 7 \times 3 - 17$

(d) $8 - 2 \times 10 \div 2 + 2$

(e) $25 \div 5 \times 8 + 6 - 12$

(f) $27 - 9 + 4 \times 5$

(g) $17 \times 3 + 81 \div 9 - 60$

(h) $7 - 42 \div 3 + 16$

Numerical Expressions Involving Fractions

Example 4 : Solve $\frac{7}{8} \div \frac{5}{4} + \frac{3}{5} \times \frac{1}{4} - \frac{3}{10}$

Solution : $\frac{7}{8} \div \frac{5}{4} + \frac{3}{5} \times \frac{1}{4} - \frac{3}{10}$

First, divide $\left(\frac{7}{8} \div \frac{5}{4}\right)$

$$\frac{7}{10} + \frac{3}{5} \times \frac{1}{4} - \frac{3}{10}$$

Next, multiply $\left(\frac{3}{5} \times \frac{1}{4}\right)$

$$= \frac{7}{10} + \frac{3}{20} - \frac{3}{10}$$

Then, add $\left(\frac{7}{10} + \frac{3}{20}\right)$

$$= \frac{17}{20} - \frac{3}{10}$$

Lastly, subtract $\left(\frac{17}{20} - \frac{3}{10}\right)$

$$= \frac{11}{20}$$

Worksheet 2

1. Solve the following numerical expressions.

(a) $\frac{7}{8} - \frac{3}{8} + \frac{5}{8}$

(d) $\frac{5}{8} \div \frac{3}{4} - \frac{1}{2} \times 1\frac{1}{2}$

(b) $\frac{1}{2} + \frac{3}{10} \div \frac{3}{5}$

(e) $\frac{2}{5} \times \frac{5}{6} \div \frac{2}{3} + \frac{5}{12}$

(c) $2\frac{1}{2} + 3\frac{1}{8} \div 1\frac{1}{4} + 1\frac{1}{4}$

(f) $4\frac{1}{2} + 3\frac{1}{2} \div \frac{7}{12} - \frac{1}{2} \div 2$

Numerical Expressions Involving Decimal Numbers

Example 5 : Solve $1.7 + 2.5 - 1.8 \div 0.9$

Solution : $1.7 + 2.5 - 1.8 \div 0.9$

First, divide $\left(\frac{1.8}{0.9} = \frac{1.8 \times 10}{0.9 \times 10} = \frac{18}{9} = 2\right)$

$= 1.7 + 2.5 - 2$ Then, add $(1.7 + 2.5)$

$= 4.2 - 2$ Lastly, subtract $(4.2 - 2)$

$= 2.2$

Worksheet 3

1. Solve the following numerical expressions.

(a) $1.1 + 2.5 - 1.5$

(d) $5.3 + 6 \times 0.05 - 2.1$

(b) $2.3 + 1.2 \times 0.5 - 0.9$

(e) $2.5 \div 5 \times 0.4 + 2$

(c) $18.9 - 20.8 + 3.9$

(f) $3.6 \div 0.9 \times 0.5 - 2$

Brain Teasers

1. Solve the following numerical expressions.

(a) $108 \div 12 + 46 - 14$

(b) $16 + 9 - 3 \times 12 \div 6 - 5$

(c) $2 \times 1 - \frac{1}{4} \times \frac{1}{4} \div 2$

(d) $2\frac{1}{5} + 2\frac{5}{7} \times \frac{7}{19} - \frac{1}{4} \times 3$

(e) $3.5 + 6 \div 0.6 \times 2.5$

(f) $1.8 \times 2.4 - 2 \times 2.1 + 0.12$

(g) $36 - 11 - 15 - 2$

(h) $7 + 7 \times 7 \div 7 - 7 + 7$

2. Solve and compare the pairs of numerical expression.

(a) $15 - 3 \times 2 + 3$ $15 - 3 + 2 \times 3$

(b) $\frac{3}{5} \times \frac{2}{3} + \frac{7}{10}$ $\frac{3}{5} + \frac{2}{3} \times \frac{7}{10}$

UNIT - 9

ROUNDING NUMBERS



Raju has rounded off 493 to 500

Rounding Whole Numbers

Let us learn how to round off numbers.

Rounding off to the nearest ten (10)

Example 1 : Anil has 63 marbles.

Round 63 to the nearest tens.



Solution : 63 lies between 60 and 70 (multiples of 10).

63 is nearer to 60 than 70.

So, we can say that Anil has **about 60 marbles**.

Similarly, let us round the following numbers to the **nearest ten**.

- 43 → 40 — (43 is nearer to 40 than 50)
88 → 90 — (88 is nearer to 90 than 80)
158 → 160 — (158 is nearer to 160 than 150)
1023 → 1020 — (1023 is nearer to 1020 than 1030)
75 → 80 — (75 is halfway between 70 and 80,
so, we round 75 to 80)

- If the digit in the ones place is 0, 1, 2, 3 or 4, round to the nearest multiple of 10 which is smaller than the number.
- If the digit in the ones place is 5, 6, 7, 8 or 9, round to the nearest multiple of 10, which is greater than the number.

Worksheet 1

1. Round the following numbers to the nearest ten.

- | | | |
|--------|-----------|---------|
| (a) 31 | (e) 199 | (i) 85 |
| (b) 68 | (f) 349 | (j) 145 |
| (c) 43 | (g) 521 | |
| (d) 94 | (h) 1,099 | |

Rounding to the nearest hundred (100) and thousand (1000)

Let us study some examples to know how to round off numbers to the **nearest hundred and thousand**.

Example 2 : Round off the given numbers to the nearest hundred.

Solution : **O.Th H T O**

• $\underline{1}$ 4 2 \rightarrow 100 (142 is nearer to 100 than 200)

• $\underline{4}$ 8 6 \rightarrow 500

• $\underline{7}$ 9 9 \rightarrow 800

• 4 $\underline{3}$ 8 7 \rightarrow 4400

• $\underline{9}$ 5 0 \rightarrow 1000

If the digit in the tens place is 0, 1, 2, 3 or 4, we round to the nearest multiple of hundred which is less than the number.

If the digit in the tens place is 5, 6, 7, 8 or 9, we round to the nearest multiple of hundred which is greater than the number.

Remember

To round off numbers to the nearest thousand, look at the digit in the hundreds place.

Example 3 : Round off the given numbers to the nearest thousand

Solution : **T.Th O.Th H T O**

• $\underline{3}$ 8 4 6 \rightarrow 4,000

• $\underline{8}$ 0 3 9 \rightarrow 8,000

• 9 9 8 5 \rightarrow 10,000

• 3 5 0 0 \rightarrow 4,000

• 1 6 7 9 6 \rightarrow 17,000

Worksheet 2

1. Round the following numbers to the nearest hundred.

(a) 267

(f) 4,670

(b) 717

(g) 991

(c) 650

(h) 1,250

(d) 1,651

(i) 4,175

(e) 1,035

(j) 48,623

2. Round the following numbers to the nearest thousand.

(a) 3,849

(f) 47,601

(b) 8,103

(g) 9,999

(c) 1,111

(h) 75,456

(d) 1,094

(i) 49,708

(e) 32,493

(j) 66,205

Rounding to the nearest ten thousand (10,000) and lakh (1,00,000)

Let us study some examples to know how to round off numbers to the nearest ten thousand and lakh.

Remember

To round off numbers to the nearest ten thousand, look at the digit in the one thousands place.

Example 4 : Round off the given numbers to the nearest ten thousand.

Solution : T.Th O.Th H T O

- 4 6 2 7 9 → 50,000
- 8 0 1 5 3 → 80,000
- 6 5 0 0 0 → 70,000
- 9 6 2 5 1 → 1,00,000

Remember

To round off numbers to the nearest one lakh, look at the digit in the ten thousands place.

Example 5 : Round off the given numbers to the nearest lakh.

Solution : O.L T.Th O.Th H T O

- 2 5 6 1 5 7 → 3,00,000
- 8 4 5 1 0 5 → 8,00,000
- 7 5 0 0 0 0 → 8,00,000
- 9 5 6 3 9 2 → 10,00,000

Worksheet 3

1. Round the following numbers to the nearest ten thousand.

(a) 63,525

(e) 21,987

(b) 88,653

(f) 59,720

(c) 77,777

(g) 74,999

(d) 39,243

(h) 96,875

2. Round the following numbers to the nearest one lakh.

(a) 1,56,758

(e) 53,86,279

(b) 3,08,156

(f) 9,98,356

(c) 5,99,999

(g) 82,18,356

(d) 7,38,150

(h) 2,02,222

Rounding to the nearest ten lakh (10,00,000) and one crore (1,00,00,000)

Now, let us study some examples to know how to round off numbers to the nearest ten lakh and one crore.

Remember

To round off numbers to the nearest ten lakh, look at the digit in the one lakhs place.

Example 6 : Round off the given numbers to the nearest ten lakh.

Solution : T.L O.L T.Th O.Th H T O

• 4 1 8 6 2 9 1 → 40,00,000

• 6 9 4 8 0 6 1 → 70,00,000

• 8 5 1 0 0 0 0 → 90,00,000

• 9 7 0 0 0 0 0 → 1,00,00,000

Remember

To round off numbers to the nearest one crore, look at the digit in the ten lakhs place.

Example 7 : Round off the following numbers to the nearest one crore.

Solution : O.C T.L O.L T.Th O.Th H T O

- 2 7 5 6 1 3 1 5 → 3,00,00,000
- 9 1 8 4 6 2 5 6 → 9,00,00,000
- 1 5 0 0 0 0 5 9 → 2,00,00,000
- 9 6 5 6 8 7 2 5 → 10,00,00,000

Worksheet 4

1. Round the following numbers to the nearest ten lakh.

- (a) 38,60,123
- (b) 72,21,123
- (c) 11,11,111
- (d) 93,98,562
- (e) 52,08,008
- (f) 21,38,520
- (g) 49,28,619
- (h) 65,00,000

2. Round the following numbers to the nearest one crore.

- (a) 3,86,49,005
- (b) 8,25,00,000
- (c) 9,04,93,888
- (d) 3,33,33,333
- (e) 7,15,94,333
- (f) 3,98,26,560
- (g) 9,15,32,643
- (h) 7,18,02,956

Rounding Decimal Numbers

Decimal numbers can be rounded off in the way as that of whole numbers.

Rounding to the nearest ones

Remember

To round off decimal numbers to the nearest ones, look at the digit in the tenths place.

Example 8 : Round the given decimals to the nearest ones.

Solution : **Ones** **Tenths**

- 1 . 3 → 1.0
- 7 . 8 → 8.0
- 9 . 6 → 10.0
- 18 . 3 → 18.0

- If the digit in the tenths place is 0, 1, 2, 3 or 4, round to the nearest whole number which is smaller than the decimal number.
- If the digit in the tenths place is 5, 6, 7, 8 or 9, round to the nearest whole number which is greater than the decimal number.

Worksheet 5

1. Round the following decimal numbers to the nearest ones.

- | | | | | |
|---------|---------|----------|----------|----------|
| (a) 2.8 | (c) 9.6 | (e) 10.5 | (g) 52.6 | (i) 7.5 |
| (b) 4.1 | (d) 8.4 | (f) 40.8 | (h) 95.8 | (j) 99.6 |

Rounding to the nearest tenths and hundredths

Let us study some examples to know how to round off decimal numbers to the nearest tenths and hundredths.

Remember

To round off decimal numbers to the nearest tenths, look at the digit in the hundredths place.

Example 9 : Round the given decimals to the nearest tenths.

Solution : **Tens** **Ones** **Tenths** **Hundredths**

- 5 . 2 3 → 5.20
- 9 . 7 8 → 9.80
- 1 2 . 9 5 → 13.00
- 2 6 . 3 0 → 26.30

Remember

To round off decimal numbers to the nearest hundredths, look at the digit in the thousandths place.

Example 10 : Round off the given decimals to the nearest hundredths.

Solution : **Tens** **Ones** **Tenths** **Hundredths** **Thousandths**

- 7 . 1 2 3 → 7.120
- 8 . 4 8 6 → 8.490
- 0 . 8 9 9 → 0.900
- 1 1 . 4 8 5 → 11.490

Worksheet 6

1. Round the following decimal numbers to the nearest tenths.

(a) 7.14

(e) 0.95

(b) 4.58

(f) 89.76

(c) 10.05

(g) 72.84

(d) 19.96

(h) 5.94

2. Round the following decimal numbers to the nearest hundredths.

(a) 7.125

(e) 2.999

(b) 3.986

(f) 17.891

(c) 4.014

(g) 9.786

(d) 17.006

(h) 4.567

Brain Teasers

1. Round each of the following numbers to the nearest ten, hundred and thousand.

(a) 5,836

(b) 9,873

(c) 2,093

2. Round each of the following numbers to the nearest ten thousand and ten lakh.

(a) 58,58,392

(b) 99,80,565

(c) 44,44,444

3. Round each of the following decimal numbers to the nearest ones, tenths and hundredths.

(a) 3.081

(b) 18.546

(c) 9.987

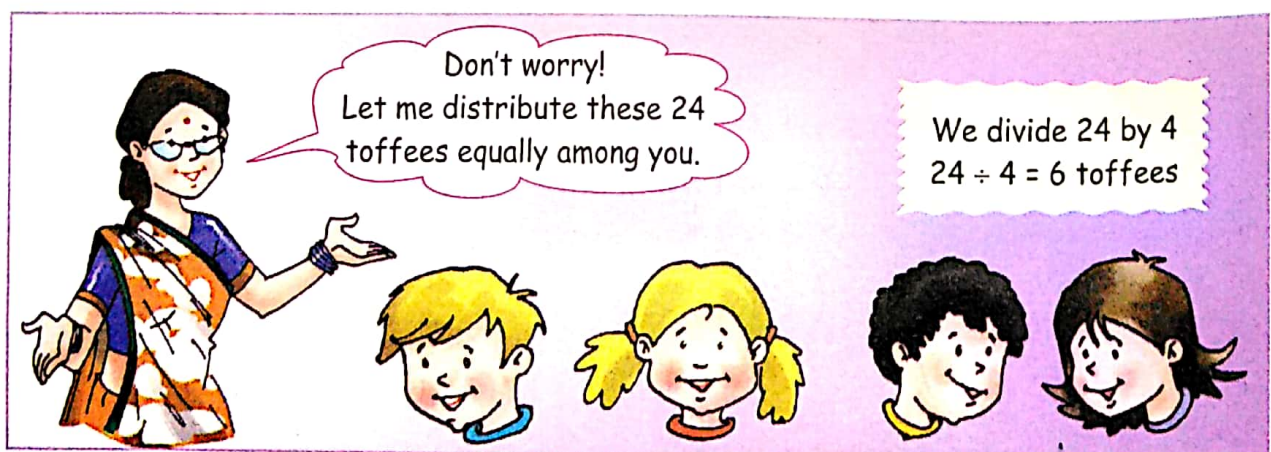
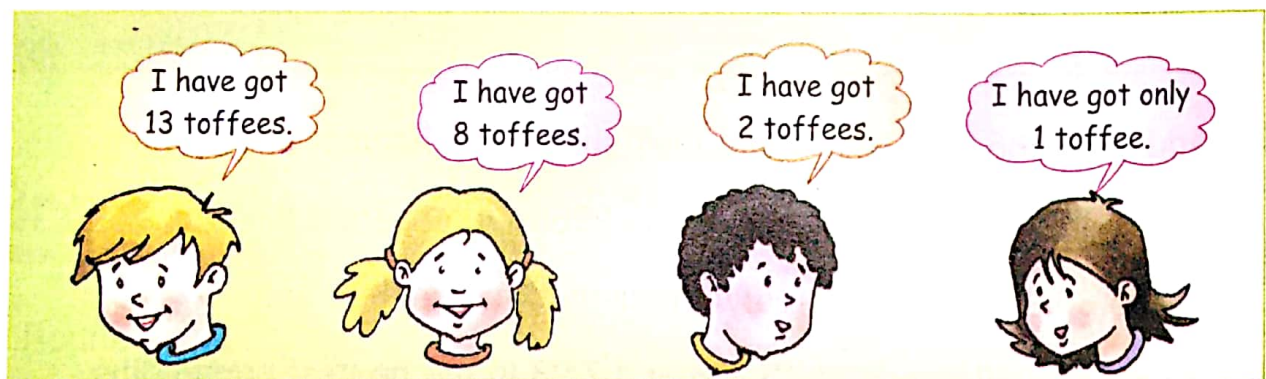
4. Population of some Indian States according to 1991 census is given below. Complete the table. The first one is done for you.

S. No.	State	Population	Population rounded to nearest one lakh	Population rounded to nearest ten thousand
(a)	Mizoram	6,84,217	7,00,000	6,80,000
(b)	Sikkim	4,03,612		
(c)	Kerala	2,90,11,237		
(d)	Punjab	2,01,90,795		
(e)	Goa	11,68,622		
(f)	Madhya Pradesh	6,61,35,862		

5. Add 571, 285, 199 and round their sum to the nearest hundred.
6. Round the product of 7,48,392 and 296 to the nearest ten crore.
7. Divide 60.35 by 25 and round quotient to the nearest one.
8. Round the difference of 13.256 and 7.93 to the nearest hundredths.

UNIT - 10

AVERAGES



We observe that on an **average** each child gets **6 toffees**.

or

We can say that the **average number of toffees** each child gets is **6**.



Remember

To find the average of a group of numbers, divide the sum of numbers by the total number of addends.

$$\text{Average} = \frac{\text{Sum of addends}}{\text{Total number of addends}}$$

Let us study an example.

Example 1 : Ram is a vegetable seller. His daily earnings for 7 days are ₹ 24, ₹ 29, ₹ 35, ₹ 23, ₹ 22, ₹ 27 and ₹ 29. What must be his average daily earning?

Solution : The total earning of Ram for 7 days

$$= ₹ 24 + ₹ 29 + ₹ 35 + ₹ 23 + ₹ 22 + ₹ 27 + ₹ 29$$

$$= ₹ 189$$

$$\text{Number of days} = 7$$

$$\text{Average daily earnings} = ₹ 189 \div 7$$

$$= 27$$

Ram's average daily earnings is ₹ 27.

Worksheet 1

1. Complete the table by finding the average of these sets. The first one is done for you.

Numbers	Sum of numbers	Total number of addends	Average
(a) 15, 21, 18, 26, 30	110	5	$\frac{110}{5} = 22$
(b) 3, 2, 7, 8, 5			
(c) 36, 14, 17, 42, 101, 36			
(d) Rs 28, Rs 40, Rs 22			
(e) 8 cm, 25 cm, 32 cm, 19 cm			
(f) 20, 30, 40, 50, 60, 70, 80, 90, 100, 110			

2. Find the average of $\frac{1}{10}$, $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$, $\frac{5}{10}$.

3. Fill in the blanks.

- (a) To find the average of 8 and 6, we divide 14 by _____.
- (b) The average of 11 and 9 is _____.
- (c) The average of 10, 100 and 1,000 is _____.
- (d) To find the average of 1, 2, 3, 14 and 10, we divide _____ by _____.
- (e) The average of 16 kg, 18 kg and 20 kg is _____ kg.

Word Problems

We need to find the average in many situations in our daily life. Let us study an example for the same.

Example 2 : The weights of four children in a medical test are given below:

Anshul — 34.2 kg

Neha — 36.8 kg

Prateek — 41.3 kg

Aparna — 40.5 kg

- Find the average weight.
- How many children have weight less than average?
- Name the children whose weights are above average.

Solution : (a) Total weight of 4 children = 34.2 kg

36.8 kg

41.3 kg

+ 40.5 kg

152.8 kg

Average weight of one child = $152.8 \text{ kg} \div 4$

= **38.2 kg**

- Two children are having their weights less than the average weight.
- The weight of Prateek and Aparna is above average.

Worksheet 2

1. Solve the following word problems.

- (a) The ages of six children chosen for a project work are 13 years, 16 years, 14 years, 17 years, 16 years and 14 years respectively. What is the average age of a child in the team?
- (b) Sachin scored 98, 25, 105, 62 and 65 runs in five matches. What was his average score per match?
- (c) Rama earned ₹ 65, ₹ 82, ₹ 79, ₹ 75, ₹ 90 and ₹ 83 in six days. Find his average earnings per day.
- (d) The temperature of a city in five days was 38.5°C , 41.2°C , 46.2°C , 31.4°C and 37.2°C . What was the average daily temperature?
- (e) Bharat scored the following marks in six subjects.

English	88
Hindi	64
Sanskrit	89
Maths	96
Science	87
Social Studies	80

Find his average score in six subjects.

- (f) In an office, twenty employees get a salary of ₹ 1,250 each and ten employees get a salary of ₹ 2,000 each. Find the average salary of each employee.

- (g) In series of four cricket matches, the runs scored by India and Australia are given below:

Match	India	Australia
First	102	208
Second	202	192
Third	360	241
Fourth	276	203

- (i) What is the average score of India in one match?
(ii) What is the average score of Australia in one match?
(iii) Which team performed better?

Brain Teasers

- Find the average of the following sets of numbers:
 - 60, 24, 126, 200, 185, 92
 - $\frac{2}{10}, \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}$
 - 26.5, 15.4, 16.8, 20.9, 10.9
- Find the average of first ten counting numbers.
- Find the average of the first five multiples of 5.
- The average age of three brothers is 15 years. If the age of two brothers is 15 years and 12 years, find the age of the third brother.

5. The heights of four members of a family are 1 m 60 cm, 1 m 50 cm, 1 m 10 cm and 1 m 16 cm respectively. Find the average height of one member of the family.
6. In a school, the number of girls and boys in three classes are given below:

Class	Girls	Boys
LKG	24	34
UKG	26	38
Class-I	28	39

- (a) Find the average number of girls in each class.
- (b) Find the average number of boys in each class.
- (c) Find the total number of students in all three classes.
- (d) What is the average number of students in each class?

UNIT - 11

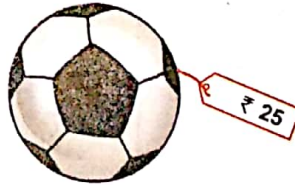
PROFIT AND LOSS



Sunil is a shopkeeper. He buys the following articles from a wholesale market at the given rates:



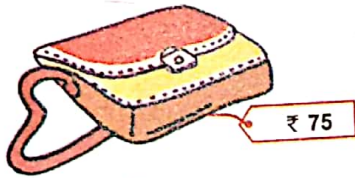
Walkman



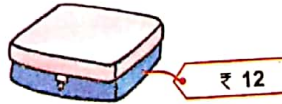
Football



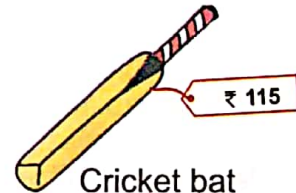
T-shirt



Bag



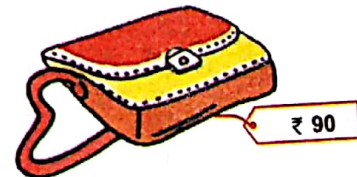
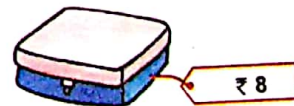
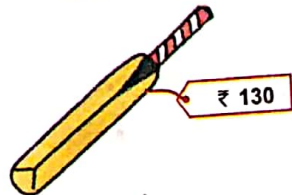
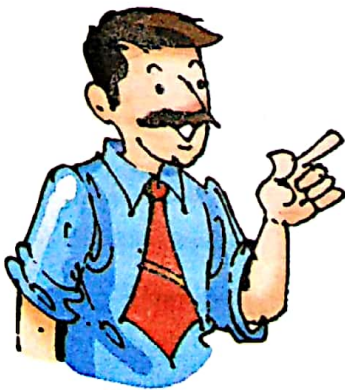
Tiffin box



Cricket bat

He sells these articles in his shop at the following rates:

SUNIL STORES



Rate at which an article is purchased is called **COST PRICE (C.P.)**.

Rate at which an article is sold is called **SELLING PRICE (S.P.)**.

Article	Purchased at	Sold at
Walkman	₹ 200	₹ 240
Football	₹ 25	₹ 30
T-shirt	₹ 125	₹ 140
Bag	₹ 75	₹ 90
Tiffin box	₹ 12	₹ 8
Cricket bat	₹ 115	₹ 130

Sunil purchases the walkman for ₹ 200. He sold it for ₹ 240.

Here, Cost Price = ₹ 200

Selling Price = ₹ 240



Hey! I am earning
₹ 240 - ₹ 200
= ₹ 40 more!

The extra money earned by selling an article is called **PROFIT or GAIN**.

When selling price (S.P.) is greater than the cost price (C.P.), we have a gain (profit).

Sunil purchases the tiffin box for ₹ 12. There were some defects in the tiffin box. So, he sold it for ₹ 8.

Here, Cost Price = ₹ 12

Selling Price = ₹ 8



Oh! I have lost
₹ 12 - ₹ 8
= ₹ 4.

The money lost by selling an article is called LOSS.

When cost price (C.P.) is greater than the selling price (S.P.), we have a loss.

Worksheet 1

1. Complete the following table. The first one is done for you.

	Cost Price	Selling Price	Profit	Loss
(a)	₹ 545	₹ 630	₹ 85	—
(b)	₹ 45	₹ 58		
(c)	₹ 146	₹ 135		
(d)	₹ 1,300	₹ 1,420		
(e)	₹ 25.65	₹ 23.80		

2. Solve the following questions.

- (a) If cost price of a book is ₹ 50.50 and selling price is ₹ 65, find the profit or loss.

- (b) If cost price of a doll is ₹ 195 and selling price is ₹ 181.25, find the profit or loss.
- (c) The cost price of a pen is ₹ 19 and the selling price is ₹ 24. Is there a gain or loss? How much?
- (d) The cost price of a washing machine is ₹ 8,450. If the selling price is ₹ 8,075, what is the gain or loss?

Study this situation.

Example 1 : Sunil buys a chair for ₹ 300. He pays ₹ 25 as transport charges and sells it to Mr Arun for ₹ 420. Find his profit or loss.

Solution	:	Cost price of the chair	=	₹ 300
		Transport charges	=	+ ₹ 25
		Actual cost price of the chair	=	<u>₹ 325</u>
		Selling price of the chair	=	₹ 420

Since S.P. is more than the C.P., Sunil makes a profit.

$$\begin{aligned} \text{Profit} &= \text{S.P.} - \text{C.P.} \\ &= ₹ 420 - ₹ 325 \\ &= ₹ 95 \end{aligned}$$

Thus, Sunil made a profit of ₹ 95.

Worksheet 2

1. Solve the following questions.

- (a) A vegetable seller bought potatoes for ₹ 200. He spent ₹ 20 on transport and then sold them for ₹ 290. Find the profit or loss.

- (b) Mr Gupta bought a car for ₹ 40,000. He spent ₹ 8,000 for painting it. If he sold the car for ₹ 53,000, find the gain or loss.
- (c) Ramlal purchased a plot for ₹ 35,000. He constructed a boundary wall around it which costed him ₹ 5,500. If he sold the house for ₹ 51,000, find the gain or loss.
- (d) A merchant bought a sofa-set for ₹ 8,000. He sold it to his friend for ₹ 10,000. If the merchant had spent ₹ 200 on transport, find his gain or loss.
- (e) A property dealer purchased a house for ₹ 1,50,000. He spent ₹ 15,000 on repairing the house. After six months, he sold the house for ₹ 2,15,000. Find the gain or loss made by the property dealer.

Determining Selling Price

Let us study some examples.

Example 2 : Sunil buys tomatoes from a wholesale market at ₹ 7 per kilogram. By selling it he gains ₹ 2 per kilogram. What is the selling price of the tomatoes?

Solution : Sunil has made a profit of ₹ 2. So, the selling price should be more than cost price.

$$\text{Cost Price} = ₹ 7$$

$$\text{Profit} = + ₹ 2$$

$$\text{Selling Price} = \underline{\underline{₹ 9}}$$

Thus, the selling price of the tomatoes is ₹ 9.

Example 3 : Anil buys a pen for ₹ 45. He had to sell it at a loss of ₹ 6. Find the selling price.

Solution : Anil has made a loss of ₹ 6. So, the selling price should be less than cost price.

$$\text{Cost Price} = ₹ 45$$

$$\text{Loss} = - ₹ 06$$

$$\text{Selling Price} = \underline{\underline{₹ 39}}$$

Thus, the selling price of a pen is ₹ 39.

Remember

$$\text{Selling Price} = \text{Cost Price} + \text{Profit}$$

$$\text{Selling Price} = \text{Cost Price} - \text{Loss}$$

Worksheet 3

1. Complete the table by filling the column of selling price. The first one is done for you.

Cost Price	Profit	Loss	Selling Price
(a) ₹ 58	₹ 8	—	₹ 66
(b) ₹ 85	—	₹ 11	
(c) ₹ 480	₹ 75	—	
(d) ₹ 1,200	—	₹ 195	
(e) ₹ 4,250	₹ 300	—	

2. Solve the following questions.

- (a) A shopkeeper purchased a saree for ₹ 375 and sold it at a gain of ₹ 90. Find the selling price of the saree.
- (b) A watchmaker bought an old watch for ₹ 120 and spent ₹ 20 on repairs. If he sold the watch at a gain of ₹ 25, find the selling price of the watch.
- (c) Rahul purchased a story book for ₹ 225. After reading it, he sold it to his friend at a loss of ₹ 120. Find the amount paid by his friend for the book.

Determining Cost Price

Let us study some examples.

Example 4 : Deepak sold a tape recorder for ₹ 1,500. He made a profit of ₹ 150. Find the cost price of the tape recorder.

Solution : Deepak has made a profit of ₹ 150. So, cost price will be less than the selling price.

$$\begin{array}{rcl} \text{Selling Price} & = & \text{₹ } 1500 \\ \text{Profit} & = & - \text{₹ } 150 \\ \hline \text{Cost Price} & = & \text{₹ } 1350 \end{array}$$

Thus, the cost price of the tape recorder is ₹ 1,350.

Example 5 : Sunil sold a perfume for ₹ 95 at a loss of ₹ 12. Find the cost price of the perfume.

Solution : Sunil has made a loss of ₹ 12. So, cost price should be more than the selling price.

$$\begin{array}{rcl} \text{Selling Price} & = & \text{₹ } 95 \\ \text{Loss} & = & + \text{₹ } 12 \\ \hline \text{Cost Price} & = & \text{₹ } 107 \end{array}$$

Thus, the cost price of the perfume is ₹ 107.

Remember

$$\text{Cost Price} = \text{Selling Price} - \text{Profit}$$

$$\text{Cost Price} = \text{Selling Price} + \text{Loss}$$

Worksheet 4

1. Complete the table by filling the column of cost price. The first one is done for you.

Selling Price	Profit	Loss	Cost Price
(a) ₹ 40	—	₹ 8	₹ 48
(b) ₹ 95	₹ 12	—	
(c) ₹ 123	₹ 18	—	
(d) ₹ 675	—	₹ 155	
(e) ₹ 5,000	₹ 840	—	

2. Solve the following questions.

- (a) Salim is a carpenter. He sold a chair for ₹ 900 making a profit of ₹ 250. Find the cost price of the chair.
- (b) A merchant sold a fan for ₹ 1,250 at a loss of ₹ 200. Find the cost price of the fan.
- (c) Mr Goel sold a scooter for ₹ 6,200. If he had made a profit of ₹ 1,050 on the scooter, find the cost price of the scooter.

Brain Teasers

1. Fill in the blanks.

Cost Price	Transport Charges	Selling Price	Profit	Loss
(a) ₹ 750	₹ 30	₹ 900		
(b) ₹ 10,200	₹ 75	₹ 10,075		

2. Fill in the blanks.

Cost Price	Selling Price	Profit	Loss
(a) ₹ 410		₹ 75	—
(b) ₹ 3,400		—	₹ 250
(c) ₹ 70,800	₹ 75,000		—
(d)	₹ 890	₹ 110	—
(e)	₹ 4,850	—	₹ 1,050

- Sushil bought six dozen bananas at ₹ 7 per dozen. He sold all the bananas for ₹ 50. Did he have a gain or loss? How much?
- A man purchased seven stools and eight tables. The cost of one stool was ₹ 150 and the cost of one table was ₹ 280. If he sold all the stools and tables for ₹ 3,100, find the gain or loss.
- An engineer spent ₹ 24,500 to assemble a computer. He sold it at a profit of ₹ 8,250. At what price did he sell it?
- A man sold a bag for ₹ 75, at a loss of ₹ 12. Find the cost price of the bag.

7. Three dozen oranges were sold for ₹ 60. If there was a loss of ₹ 6, find the cost price of one dozen oranges.

8. Fill in the blanks.

(a) If the cost price of an article is greater than the selling price, we have a _____

(b) Selling price = Cost price - _____

(c) Cost price = Selling price - _____

(d) Cost price + _____ = Selling price.

(e) Selling price + _____ = Cost price.

UNIT - 12

PERCENTAGE

Ramlal has a basket of 100 fruits.

Out of 100 fruits, there are 52 mangoes.

That means mangoes are 52 part of 100 fruits.

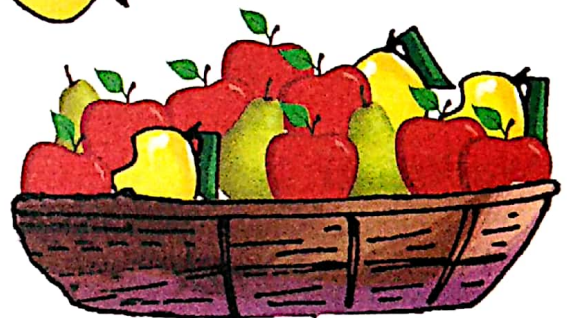
The fraction of mangoes will be $\rightarrow \frac{52}{100}$.



Out of 100 fruits, there are 21 apples.

So, apples are 21 part of 100 fruits.

Fraction of apples $\rightarrow \frac{21}{100}$.



Out of 100 fruits, there are 27 pears.

Here, pears are 27 part of 100 fruits.

Fraction of pears $\rightarrow \frac{27}{100}$.



In all the above fractions, that is $\frac{52}{100}$, $\frac{21}{100}$, $\frac{27}{100}$, the denominator is hundred.

Fraction whose denominator is equal to hundred is called PERCENTAGE.

Do You Know ?

Cent means 100. Per cent means for every 100.



Remember		
We have	We write	We read
$\frac{40}{100}$	40%	Forty per cent
$\frac{1}{100}$	1%	One per cent
$\frac{25}{100}$	25%	Twenty five per cent
$\frac{79}{100}$	79%	Seventy nine per cent

Worksheet 1

1. Fill in the boxes.

(a) $\frac{55}{100} = \boxed{}\%$

(e) $\frac{41}{\boxed{}} = 41\%$

(b) $\frac{4}{100} = \boxed{}\%$

(f) $\frac{11}{\boxed{}} = 11\%$

(c) $\frac{93}{100} = \boxed{}\%$

(g) $\frac{\boxed{}}{100} = 11\%$

(d) $\frac{125}{100} = \boxed{}\%$

(h) $\frac{\boxed{}}{100} = 132\%$

2. Solve the following questions.

(a) In a box, there are 100 chalks. Out of these, 65 chalks are blue and the rest are pink in colour. Complete the following statements:

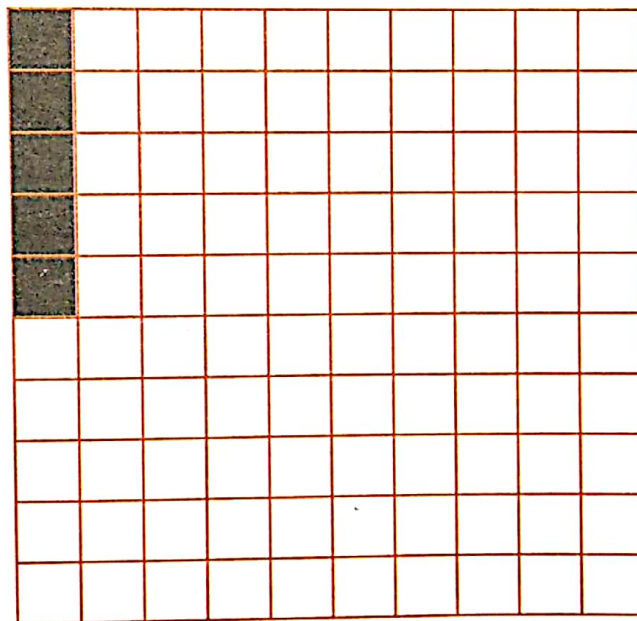
Fraction of blue chalks = = %

Number of pink chalks =

Fraction of pink chalks = = %

(b) Anuj had 100 stamps. 32 of them are foreign stamps and the rest are Indian stamps. Find the per cent of Indian stamps that Anuj had.

(c) Here is a big square divided into 100 small squares. 5 squares are shaded black to show 5%.



Now, shade the squares to represent the following per cents.

45 % (Green)

6% (Yellow)

20% (Blue)

Conversions

I. Convert percentage into fraction in lowest term

Example 1 : Convert 24% into a fraction.

Solution : $24\% = \frac{24}{100}$ ——— Divide 24 and 100 by HCF 4

$= \frac{6}{25}$ ——— Fraction in lowest form

Example 2 : Convert $6\frac{1}{4}\%$ into a fraction in lowest terms.

Solution : $6\frac{1}{4}\% = \frac{25}{4}\%$

$= \frac{25}{4 \times 100}$

$= \frac{25}{400}$ ——— Divide 25 and 400 by HCF 25

$= \frac{1}{16}$ ——— Fraction in lowest term

II. Convert percentage into decimal number

Example 3 : Convert 25% into a decimal number.

Solution : $25\% = \frac{25}{100}$ ——— Fractional form

$\frac{25}{100} = 0.25$ ——— Decimal shifted by 2 places to the left.

Example 4 : Convert 95% and 243% into decimal numbers.

Solution : (i) $95\% = \frac{95}{100} = 0.95$ → Decimal shifted by 2 places to the left.

(ii) $243\% = \frac{243}{100} = 2.43$ → Decimal shifted by 2 places to the left.

Worksheet 2

1. Express the following as a fraction in the lowest term.

(a) 3%

(c) 138%

(e) 80%

(b) 35%

(d) 675%

(f) 150%

2. Express the following percentages into decimals.

(a) 0.2%

(c) 2.75%

(e) 1.9%

(b) 5.6%

(d) 3.8%

(f) 9.5%

3. Complete the table given below. The first one is done for you.

Percentage (%)	Fraction with denominator 100	Fraction in lowest term	Decimal form
(a) 5%	$\frac{5}{100}$	$\frac{1}{20}$	0.05
(b) 20%			
(c) 46%			
(d) 98%			
(e) 17%			

4. Convert the following into fractions in the lowest terms.

(a) $\frac{3}{4}\%$

(c) $33\frac{1}{3}\%$

(e) $11\frac{1}{4}\%$

(b) $16\frac{2}{3}\%$

(d) $7\frac{1}{7}\%$

(f) $12\frac{1}{2}\%$

III. Convert fraction into percentage

Example 5 : Let us convert $\frac{4}{5}$ into a percentage.

Solution :

Method 1 :

$$\begin{aligned}\frac{4}{5} &= \frac{4 \times 20}{5 \times 20} \\ &= \frac{80}{100} \\ &= 80\%\end{aligned}$$

Method 2 :

$$\begin{aligned}&= \left(\frac{4}{5} \times 100\right)\% \\ &= \frac{400}{5}\% \\ &= 80\%\end{aligned}$$

Remember

We can convert a fraction into a percentage by two methods:

- (i) Convert a fraction into an equivalent fraction with denominator 100.
- (ii) Multiply the fraction by 100.

Example 6 : Convert $\frac{7}{25}$ and $2\frac{3}{4}$ into percentage.

Solution : (i) $\frac{7}{25} = \frac{7 \times 4}{25 \times 4} = \frac{28}{100} = 28\%$

Convert into equivalent fraction with denominator 100

(ii) $2\frac{3}{4} = \frac{11}{4} = \frac{11 \times 25}{4 \times 25} = \frac{275}{100} = 275\%$

IV. Convert decimal into percentage

Example 7 : Convert 0.2 into a percentage.

Solution :

Method 1 :

$$\begin{aligned} 0.2 &= \frac{2}{10} \\ &= \frac{2 \times 10}{10 \times 10} \\ &= \frac{20}{100} = 20\% \end{aligned}$$

Method 2 :

$$\begin{aligned} &0.2 \\ &= (0.2 \times 100)\% \\ &= 20\% \end{aligned}$$

Remember

We can convert decimal into percentage by two methods:

- (i) Convert decimal into equivalent fraction with denominator 100.
- (ii) Multiply the decimal by 100.

Example 8 : Convert 0.06 and 3.5 into percentage.

Solution : (i) $0.06 \rightarrow (0.06 \times 100)\% = 6\%$

(ii) $3.5 \rightarrow (3.5 \times 100)\% = 350\%$

V. Convert a whole number into a percentage

Example 9 : Convert 7 into a percentage.

Solution :

Method 1 :

$$7 = \frac{7 \times 100}{100} = \frac{700}{100} = 700\%$$

Method 2 :

$$7 = (7 \times 100)\% = 700\%$$

Remember

We can convert a whole number into percentage by two methods:

- (i) Convert whole number into equivalent fraction with denominator 100.
- (ii) Multiply the whole number by 100.

Example 10: Convert 5 and 19 into percentage.

Solution : (i) $5 \rightarrow (5 \times 100)\% = 500\%$

(ii) $19 \rightarrow (19 \times 100)\% = 1900\%$

Worksheet 3

1. Convert the following fractions into percentages.

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

(c) $\frac{3}{4}$

(e) $1\frac{2}{5}$

(b) $\frac{6}{10}$

(d) $\frac{9}{50}$

(f) $1\frac{1}{10}$

2. Convert the following into percentages.

(a) 6

(c) 28

(e) 9

(b) 15

(d) 13

(f) 1

3. Convert the following decimals into percentages.

(a) 0.45

(c) 2.25

(e) 0.01

(b) 0.09

(d) 7.6

(f) 0.135

4. Choose the correct number.

(a) $5\% = 5 \quad 0.5 \quad 0.05 \quad 0.005$

(b) $45\% = 4.5 \quad 0.45 \quad 0.045 \quad 45$

(c) $125\% = 0.125 \quad 12.5 \quad 1.25 \quad 125$

5. Solve the following questions.

- (a) Sneha scored 40 marks out of 50 in her Mathematics test. Find the percentage of marks scored by her.
- (b) In a packet of 25 toffees, 3 toffees are mango bite. What is the percentage of mango bite toffees?
- (c) In the month of April, a school worked for only 24 days. What is the percentage of working days?
- (d) In an orchard, there are 250 trees. 175 of them are apple trees. Find the percentage of apple trees.

Finding the Per Cent of a Number

Let us study these examples.

Example 11 : Find 30% of 60

Solution : 30% of 60 = $\frac{30}{100}$ of 60

$$= \frac{30 \times 60}{100}$$
$$= \frac{1,800}{100}$$
$$= 18$$

Example 12 : Find $33\frac{1}{3}\%$ of 1,500 kg

Solution : $33\frac{1}{3}\%$ of 1,500 = $\frac{100}{3}\%$ of 1,500

$$= \frac{100}{3 \times 100} \text{ of } 1,500$$

$$= \frac{100}{300} \times 1,500$$

$$= \frac{1,50,000}{300}$$

$$= 500 \text{ kg}$$

Worksheet 4

1. Find the value of the following:

(a) 50% of 10

(d) $6\frac{1}{4}\%$ of 800

(g) 75% of 300

(b) 60% of 700

(e) $16\frac{2}{3}\%$ of 1,200

(h) $3\frac{3}{4}\%$ of 80

(c) 24% of 75

(f) $33\frac{1}{3}\%$ of 300

2. Find the value of the following:

(a) 3% of ₹ 600

(d) 90% of 500 marks

(g) $12\frac{1}{2}\%$ of 1 kilogram

(b) 1% of 100 kg

(e) 150% of 20 litres

(h) $\frac{3}{4}\%$ of ₹ 8,800

(c) 20% of 5 kilometres

(f) 8% of 200 grams

3. Find which is more of the two.

(a) 15% of 200 or 20% of 100

(b) 34% of 250 or 18% of 150

Word Problems

Let us study these word problems.

Example 13 : A man purchased 30 eggs. 10% of the eggs were found to be broken. How many eggs were broken?

Solution :

$$\begin{aligned}\text{Number of eggs} &= 30 \\ \text{Broken eggs} &= 10\% \text{ of } 30 \text{ eggs} \\ &= \frac{10}{100} \times 30 \\ &= \mathbf{3 \text{ eggs}}\end{aligned}$$

3 eggs were broken.

Example 14 : In an examination, Anila scored 16 marks out of 25 marks. What is the percentage of marks scored by her?

Solution :

$$\begin{aligned}\text{Maximum marks} &= 25 \\ \text{Marks scored} &= 16 \\ \text{Percentage of marks scored} &= \left(\frac{16}{25} \times 100 \right) \% \\ &= \frac{1,600}{25} \% \\ &= \mathbf{64\%}\end{aligned}$$

Worksheet 5

1. Solve the following questions.

- Rohan gets 38 out of 50 in his monthly test of Mathematics. Express his marks in percentage.
- In a class of 45 students, 60% are boys. Find the number of boys in the class.

- (c) In an orchard of 400 trees, 35% are mango trees, 42% are apple trees and the rest were grape vines. How many grape vines are there?
- (d) Mr Mahesh earns ₹ 2,700 per month. He spends $33\frac{1}{3}\%$ on food. Find the amount spent on food.
- (e) Anil got 440 marks out of 800 and Gopi got 486 marks out of 900 in an examination. Who scored better?

Brain Teasers

1. Write each of the following as a percentage.

- (a) 7 tenths (b) $\frac{328}{100}$ (c) 0.07 (d) $5\frac{1}{5}$

2. Express as a fraction in lowest term.

- (a) 35% (b) $16\frac{2}{3}\%$ (c) $2\frac{3}{4}\%$ (d) 90%

3. Express as a decimal.

- (a) 71% (b) 9.5% (c) 101% (d) 759%

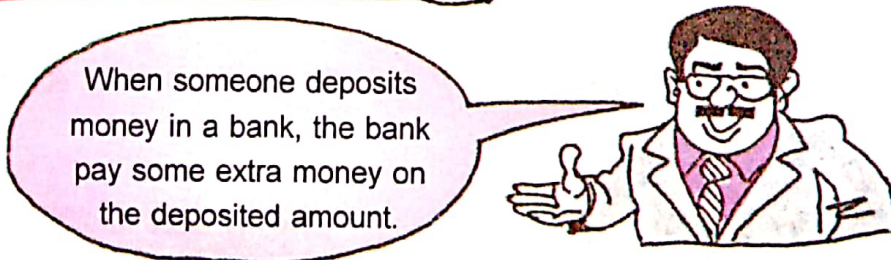
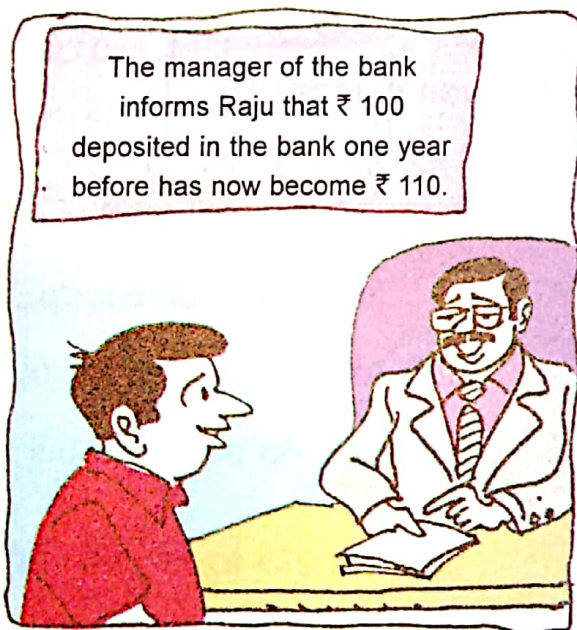
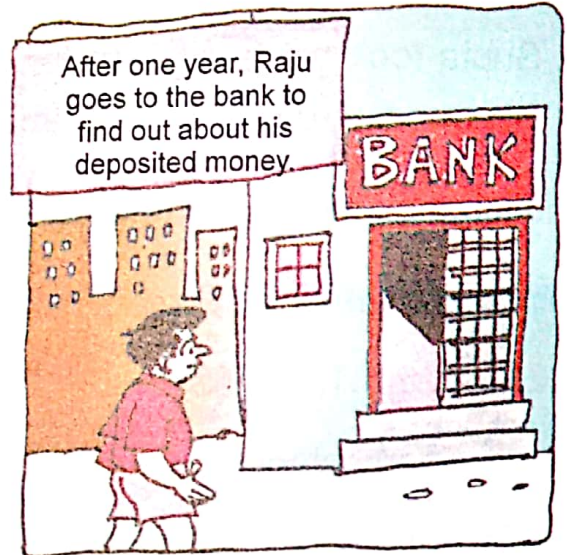
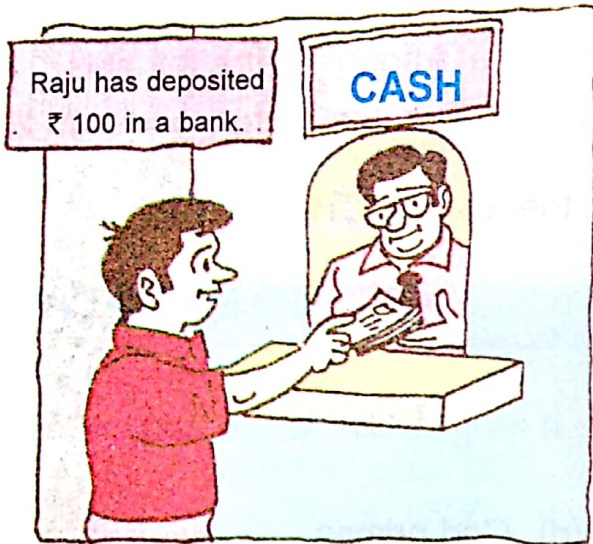
4. Find the value of

- (a) $33\frac{1}{3}\%$ of 429 metres (d) 20% of 1 kg
- (b) 50% of 4 metres (e) $6\frac{1}{4}\%$ of 1 litre
- (c) 100% of 200 grams (f) $12\frac{1}{2}\%$ of Rs 32

5. A school contributed ₹ 3,500 for flood relief fund. Sonal donated 10% of the fund. How much money was donated by Sonal?
6. Mr Arun earns ₹ 5,500 per month. He spends 70% for household expenses, 25% on children and saves the rest. How much money did Arun save?
7. Mr Gupta took his family out for dinner. The amount of the bill was ₹ 375. Mr Gupta paid 10% of the bill amount as tip. Find the money given as tip.
8. Find the percentage of the letter ' M' in the word MATHEMATICS.
9. Some numbers are below:
5, 2, 18, 26, 31, 42, 65, 7, 13, 35
- Find the percentage of
- | | |
|-------------------|--------------------|
| (a) Even numbers | (d) Odd primes |
| (b) Odd numbers | (e) Multiples of 5 |
| (c) Prime numbers | (f) Even primes |
10. Find 28% of 10% of ₹ 500.

SIMPLE INTEREST

Read it carefully and find out what Raju is doing in these pictures.



Money deposited (put) in a bank is called **PRINCIPAL**.

The extra money paid by the bank is called **INTEREST**.



The period of time after which money is withdrawn is called **TIME**.

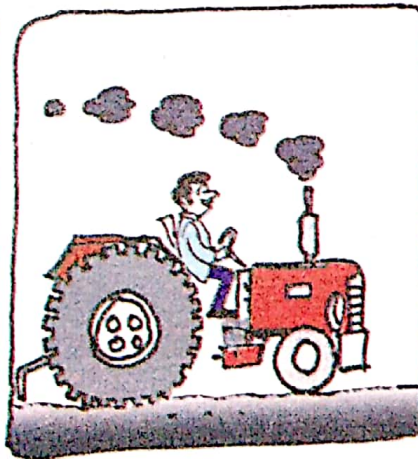
The extra money paid by the bank for every ₹ 100 after one year is called **RATE OF INTEREST**.



Do You Know ?

The bank also gives loans.

The bank has given Ramu a loan of ₹ 6,000 to purchase a tractor.



After three years, Ramu returns back the loan alongwith 10% interest charged by the bank.

Here, the money borrowed (loan) is the **Principal** and the extra money to be paid is called the **Interest**.

Worksheet 1

1. Fill in the blanks:

- (a) The money deposited in a bank is called _____.
- (b) The extra money paid by the bank is called _____.
- (c) The period of time for which money is kept in a bank is called _____.
- (d) The money borrowed from a bank is called _____.
- (e) Extra money charged by the bank for every hundred rupees deposit is called _____.

Simple Interest

Factors determining simple interest

The simple interest we calculate depends on three factors.

- (a) Principal
- (b) Rate of Interest
- (c) Time



Calculating simple interest

Let us study these examples.

Example 1 : Calculate the simple interest on ₹ 500 at 15% interest per year.

Solution : Simple interest on ₹ 100 for 1 year = ₹ 15

$15\% = \frac{15}{100}$ means ₹ 15 interest for every ₹ 100 deposited.

Simple interest on ₹ 1 for 1 year = ₹ $\frac{15}{100}$

$$\begin{aligned} \text{Simple interest on ₹ 500 for 1 year} &= \frac{15}{100} \times 500 \\ &= ₹ 75 \end{aligned}$$

So, the interest at the end of one year will be ₹ 75.

Example 2 : Calculate the simple interest on ₹ 500 for 2 years at 15% interest per year.

Solution : For 1 year, the simple interest is = ₹ $\frac{15}{100} \times 500 = ₹ 75$

So, for 2 years, the simple interest will be

$$\begin{aligned} \text{₹ } \frac{15}{100} \times 500 \times 2 &= ₹ 150 \\ \text{Rate of Interest} \quad \text{Principal} \quad \text{Time} \end{aligned}$$

$$\begin{aligned} \text{Simple Interest} &= \text{Principal} \times \text{Rate of Interest} \times \text{Time} \\ \text{S.I.} &= P \times R \times T \end{aligned}$$

Example 3 : Mr Sunil deposited ₹ 800 in a bank at $4\frac{1}{2}\%$ rate of interest per annum. Calculate the simple interest he will get after $2\frac{1}{2}$ years.

Solution : Principal = ₹ 800
 Rate of Interest = $4\frac{1}{2}\%$ per annum
 = $\frac{9}{2}\%$ per annum

$$= \frac{9}{2 \times 100} \text{ per annum}$$

$$\text{Time} = 2\frac{1}{2} \text{ years}$$

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

$$\begin{aligned} \text{Simple Interest} &= P \times R \times T = 800 \times \frac{9}{200} \times \frac{5}{2} = \frac{800 \times 9 \times 5}{200 \times 2} \\ &= ₹ 90 \end{aligned}$$

Worksheet 2

1. Find the simple interest at the end of one year for the following:

- (a) ₹ 400 at 5% interest per annum.
- (b) ₹ 1,800 at 12% interest per annum.
- (c) ₹ 2,500 at $4\frac{1}{2}\%$ interest per annum
- (d) ₹ 3,200 at $6\frac{1}{2}\%$ interest per annum.

2. Complete the table by calculating the simple interest.

Principal	Rate of Interest	Time	Simple Interest
(a) ₹ 600	7%	2 years	
(b) ₹ 500	$8\frac{1}{2}\%$	2 years	
(c) ₹ 3,000	12%	$3\frac{1}{2}$ years	
(d) ₹ 2,500	$7\frac{1}{2}\%$	$2\frac{1}{2}$ years	

3. Solve the following questions.

- (a) A man deposited ₹ 4,500 in a bank which paid him an interest of 11% per annum. How much simple interest will he get at the end of 5 years?
- (b) Rahul borrowed ₹ 650 from Sohan at 8% interest per annum. Find the simple interest Rahul has to pay Sohan after $4\frac{1}{2}$ years.
- (c) Ramlal borrowed ₹ 3,000 from Arun to purchase a tractor. Arun charged him an interest of $4\frac{1}{2}$ % per annum. How much simple interest will Ramlal pay to Arun after 3 years?

Concept of Amount

Let us study some examples.

Example 4 : Rahul had deposited ₹ 100 in a bank for 2 years at 10% simple interest per annum. How much money will he get after 2 years from the bank?

Solution : Here, Principal = ₹ 100

Rate of Interest = 10% or $\frac{10}{100}$ per annum

Time = 2 years

First, we will find the Simple Interest.

$$\begin{aligned}\text{Simple Interest} &= 100 \times \frac{10}{100} \times 2 \\ &= ₹ 20\end{aligned}$$

$$\begin{aligned}\text{Amount Rahul will get after 2 years} &= ₹ 100 + ₹ 20 \\ &= ₹ 120\end{aligned}$$

We observe that the amount we get back after a certain period of time is the sum of the **Principal** and **Interest**.

$$\text{Amount} = \text{Principal} + \text{Interest}$$

We also have,

$$\begin{aligned}\text{Principal} &= \text{Amount} - \text{Interest} \\ \text{Interest} &= \text{Amount} - \text{Principal}\end{aligned}$$

Example 5 : Sarita deposited ₹ 3,000 in a bank at 8% interest per annum.

What amount will she get back after $3\frac{1}{2}$ years?

Solution : Here, Principal = ₹ 3,000

$$\text{Rate of Interest} = 8\% = \frac{8}{100}$$

$$\text{Time} = 3\frac{1}{2} \text{ years} = \frac{7}{2} \text{ years}$$

$$\text{Simple Interest} = 3,000 \times \frac{8}{100} \times \frac{7}{2}$$

$$= ₹ 840$$

Amount received at the end of two years

$$= \text{Principal} + \text{Interest}$$

$$= ₹ 3,000 + ₹ 840$$

$$= ₹ 3,840$$

Worksheet 3

1. Find the amount for the following:

Principal	Interest	Amount
(a) ₹ 1,500	₹ 150	
(b) ₹ 750	₹ 35	
(c) ₹ 15,000	₹ 980	
(d) ₹ 4,500	₹ 215	

2. Fill in the blanks:

Principal	Simple Interest	Amount
(a) ₹ 800	—	₹ 905
(b) —	₹ 75.50	₹ 450
(c) ₹ 25,000	—	₹ 31,000
(d) —	₹ 515	₹ 1,680

3. Calculate the amount for the following:

- (a) ₹ 4,000 at 9% per annum for 3 years.
(b) ₹ 750 at $3\frac{1}{2}\%$ per annum for 2 years.
(c) ₹ 3,200 at $7\frac{1}{2}\%$ per annum for $3\frac{1}{2}$ years.
(d) ₹ 900 at 5% per annum for $5\frac{1}{2}$ years.

4. Solve the following questions.

- (a) Arun took a loan of ₹ 600 for $1\frac{1}{2}$ years with interest at the rate of 4% per annum. Find the interest he pays after $1\frac{1}{2}$ years. Also calculate the amount he pays back after $1\frac{1}{2}$ years.

- (b) Amit deposited ₹ 4,800 in his account. The bank pays an interest of 6% per annum. What amount will Amit get back after 3 years?
- (c) A man borrowed ₹ 700 from his friend. He promised to return back the amount after 6 months at an interest of 8% per annum. How much money will he pay back after 6 months?
- (d) Surender deposited ₹ 2,500 in a bank at 12% interest per annum. He withdraws his money after $2\frac{1}{2}$ years. Out of this amount, he buys an almirah for ₹ 3,000. How much money is left with him?

Brain Teasers

1. Name the three factors that determine simple interest.
2. Find the amount if principal is ₹ 625 and interest is ₹ 55.
3. Calculate the simple interest on ₹ 1,200 at $3\frac{1}{2}\%$ interest per annum for 6 months.
4. Sohan deposited ₹ 6,000 in a bank at $7\frac{1}{2}\%$ per annum for 3 years. Mohan deposited ₹ 6,000 in another bank at 11% per annum for $2\frac{1}{2}$ years. Who will get more simple interest?
5. A farmer borrowed ₹ 2,400 at 12% interest per annum. At the end of 3 years, he repayed ₹ 1,200 and a cow for the balance amount. Find the cost of the cow.
6. Mr Kannan had deposited ₹ 2,500 in a bank at 12% per annum. After $3\frac{1}{2}$ years, he withdraws this amount. Out of this money, he wants to buy a dressing table costing ₹ 4,000. How much more money does he need?

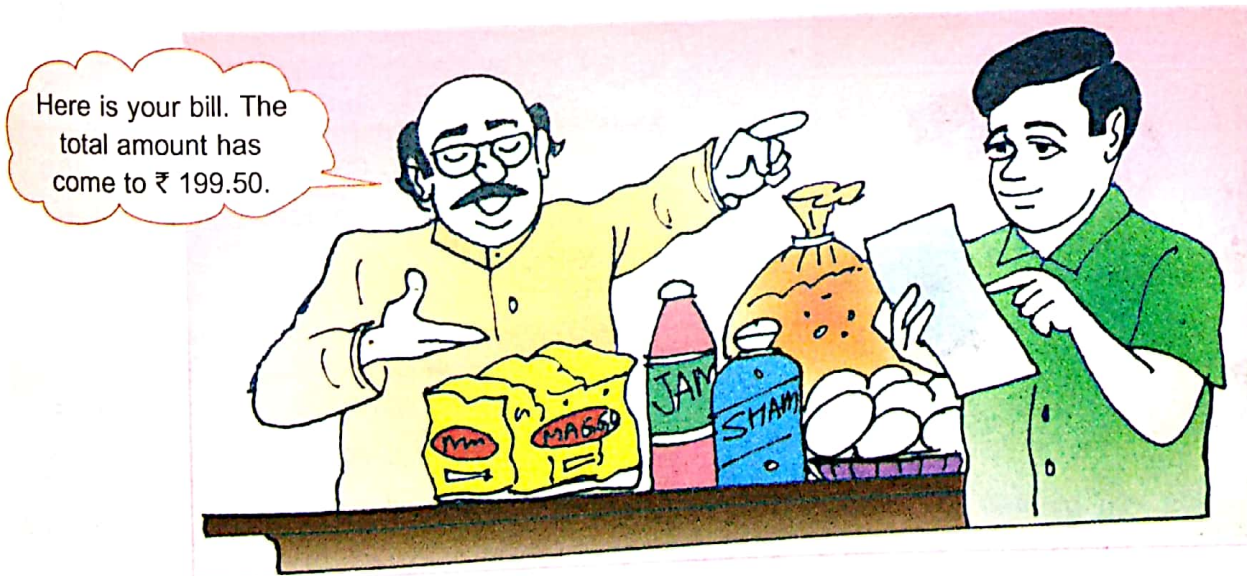
UNIT - 14

BILLS

Read the following carefully and find out what Rohan is doing in these pictures.



The slip of paper on which a shopkeeper notes down the requirements of a customer (buyer) and calculates the total cost of items purchased is called a **BILL**.



See Rohan is reading the bill carefully. He is also checking the total amount

shown in the bill.

Cash Memo				
Tel.: 26152002 Mobile: 9958482560		SUPER STORE Sector-8, R.K. Puram, New Delhi-22		Date: 13-08-2009
S.No.	Items	Quantity	Rate	Amount
1.	Shampoo	1	₹ 61.50	₹ 61.50
2.	Eggs	6	₹ 2.50	₹ 15.00
3.	Jam	2 bottles	₹ 32.00	₹ 64.00
4.	Maggi	3 packs	₹ 8.00	₹ 24.00
5.	Sugar	2 kg	₹ 27.50	₹ 55.00
Total				₹ 219.50

Uses of a Bill

Let us study the uses of a bill now.



- A shopkeeper can keep a track on day to day sales.

- The customer can cross check the prices of items purchased and their total cost.

- In case of any problem, the customer can exchange the item easily by showing the bill.

We obtain gas bill, electric bill, water bill, ration bill, etc. All of them look different as entries made in various bills are not exactly the same.

Preparing a Bill

Let us now learn how to prepare a bill.

Example 1 : Mr Gupta purchased the following items from Chawla General Store, M.G. Road, Jaipur on 5 August, 2009.

- (a) 2 kg rice at ₹ 22 per kg
- (b) 4 soaps at ₹ 11.50 per soap
- (c) 1 biscuit packet at ₹ 5.50 per packet
- (d) 3 tooth brushes at ₹ 12.50 per tooth brush

Solution : Check the Steps.

Step 1 : Write the name of shop, its location, phone number and date of purchase of items.

Step 2 : Make five columns —item number, name of item, quantity, rate and amount of item purchased.

Step 3 : Enter the name of item, rate and quantity in the bill.

Step 4 : We calculate the amount for each item by multiplying the rate by quantity.

Step 5 : We find the total cost of item purchased.

Cash Memo				
Tel.: 2452002 Mobile: 9425082560		CHAWLA GENERAL STORES M.G. Road, Jaipur		Date: 5-8-2009
S.No.	Items	Quantity	Rate	Amount
1.	Rice	2 kg	₹ 22.00	₹ 44.00
2.	Soap	4	₹ 11.50	₹ 46.00
3.	Biscuit	1	₹ 5.50	₹ 5.50
4.	Tooth brush	3	₹ 12.50	₹ 37.50
Signature				Total ₹ 133.00

Worksheet 1

1. Who prepares a bill and for whom?
2. Name any three bills you receive at home. Do all of them look alike? If not, why?
3. Write three uses of a bill.
4. Mr Kumar bought the following items from Toys Corner, Kamla Nagar, Delhi on 13 March, 2009. Prepare a bill for these items.
 - (a) 1 teddy bear at ₹ 75 per piece.
 - (b) 3 toy cars at ₹ 45.50 per car.
 - (c) 2 building blocks at ₹ 36 per block.
 - (d) 1 jig-saw puzzle for ₹ 85.50.
5. Mrs Kiran purchased the following items from New Style Garment Store, Karol Bagh, Delhi on 7 September, 2009.
 - (a) 2 frocks at ₹ 255.75 per frock.
 - (b) 1 salwar kameez for ₹ 325.
 - (c) 3 shirts at ₹ 125.50 per shirt.
 - (d) 4 night gowns at ₹ 105.50 per gown.

If Mrs Kiran gives the shopkeeper ₹ 1,700, how much balance does she get back?

Brain Teasers

1. (a) What is a bill?
(b) How is a bill useful in case of a defective item?

2. You are given a bill below. Fill in the blanks.

Ph: 8461398		RARE TEXTILES Shimla		Date: 5-2-2009
S. No.	Item	Quantity	Rate	Amount
1.	Shawl	5	₹ 175	₹ _____
2.	Cotton cloth	3 metres	₹ 30.50	₹ _____
3.	Shirt piece	2	₹ _____	₹ 360.00
4.	Socks	1 pair	₹ _____	₹ 68.50
Signature			Total	_____

3. Rahul got the following bill from the Raj Sweet shop. Rahul finds some errors in this bill. Find out those errors.

Ph: 4310209		RAJ SWEET SHOP R.T. Nagar, Nagpur		Date: 4-3-2009
S. No.	Item	Quantity	Rate	Amount
1.	Pista Burfi	2 kg	₹ 180.00	₹ 350.00
2.	Kajoo Burfi	1 kg	₹ 300.00	₹ 300.00
3.	Jalebi	2 kg	₹ 120.00	₹ 250.00
4.	Gulab Jamun	3 kg	₹ 140.00	₹ 420.00
5.	Laddoo	2 kg	₹ 100.00	₹ 200.00
Signature			Total	₹ 1,520.00

4. Look carefully at the bill given below and answer the questions that follows.

Ph: 2350168		PAI & COMPANY Calicut (Kerala)		Date: 7-11-2009
S. No.	Item	Quantity	Rate	Amount
1.	Comic	6	₹ 3.50	₹ 21.00
2.	Readers Digest	3	₹ 33.00	₹ 99.00
3.	Greeting Card	5	₹ 25.00	₹ 125.00
4.	Pilot Pen	1	₹ 50.00	₹ 50.00
Signature			Total	₹ 295.00

- From which shop were the above items purchased and when were they purchased?
 - Where is this shop located?
 - How many items were purchased from Pai & Company?
 - What is the cost of one comic?
 - What is the cost of 5 greeting cards?
 - If I want to buy 3 pilot pens, how much should I pay?
 - What is the total cost of the items purchased?
5. Anil purchased the following items from the Aggarwal Namkeen Corner on 6 July, 2009. Prepare a bill for these items. If Anil gave the shopkeeper one hundred rupee note, how much balance will he get back?
- 3 packets potato chips at ₹ 12.50 per packet.
 - 2 packets cream biscuits at ₹ 6.50 per packet.

- (c) 6 pastries at ₹ 5 per pastry.
- (d) One pepsi for ₹ 10.
6. Prepare a bill for the following items purchased from Raj General Store, Paschim Vihar, Delhi on 11 January, 2009. Find the total amount to be paid.
- (a) $1\frac{1}{2}$ kg sugar for ₹ 40.
- (b) 500 grams urad dal for ₹ 35.50.
- (c) 1 bottle of jam for ₹ 16.50.
- (d) 5 packets of biscuits for ₹ 25.

TEMPERATURE



Do you know how much hot the milk is?



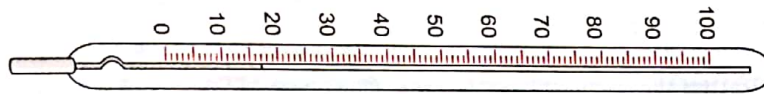
Do you know how much cold the water is?

To find how much hot or cold an object or body is, we need a measurement.

TEMPERATURE is the measure used to check hotness or coldness of a body.

The instrument used to measure temperature of a body is called THERMOMETER.

Look at this thermometer carefully.



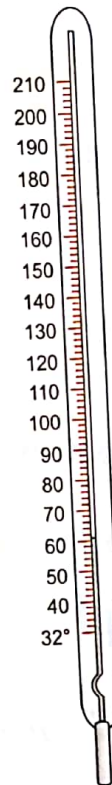
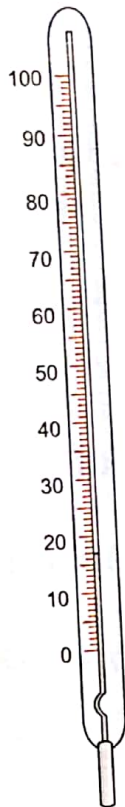
The unit used to measure the temperature is called **degree**.

Look at the thermometers given below and note the scales given on each.

Celsius Scale

Fahrenheit Scale

Freezing point of
water = 0°C
Boiling point of
water = 100°C



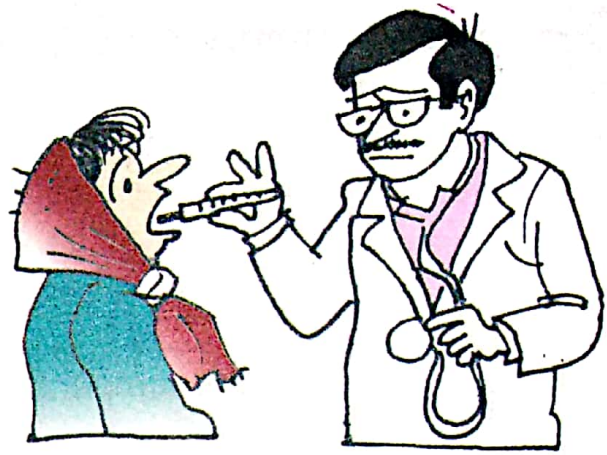
Freezing point of
water = 32°F
Boiling point of
water = 212°F



Do You Know ?

- The Fahrenheit Scale is named after a German scientist, G-Fahrenheit.
- The Celsius Scale is named after a Swedish astronomer, A. Celsius.

See ! The doctor is using a thermometer to measure the temperature of his patient.



A doctor's thermometer is called **clinical thermometer**. We use Fahrenheit Scale in it.

Do You Know ?

The temperature of a healthy adult is $98.6\text{ }^{\circ}\text{F}$ or $37\text{ }^{\circ}\text{C}$.



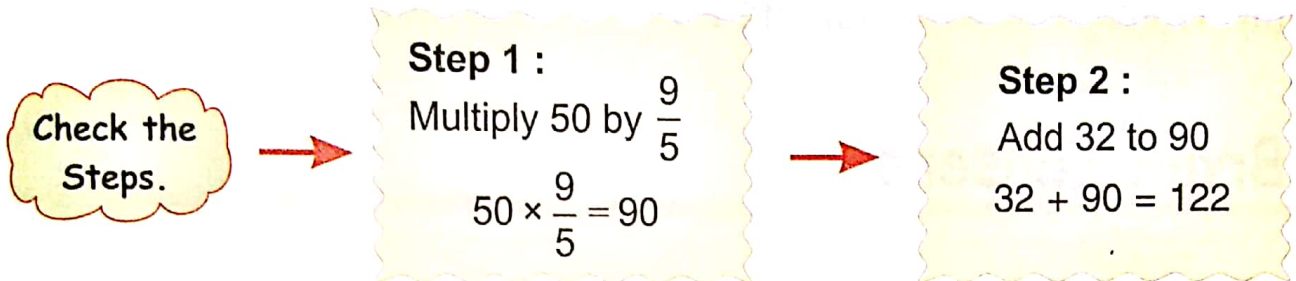
Worksheet 1

1. What is the measure of hotness or coldness of a body called?
2. Name the instrument used for measuring temperature.
3. What is the name of the thermometer used by a doctor?
4. Name the two scales used for measuring temperature.
5. What is the freezing point and the boiling point of water in the Celsius Scale?
6. What is the freezing point and the boiling point of water in the Fahrenheit Scale?

Conversions

Converting Celsius Scale into Fahrenheit Scale

Let us convert 50°C into Fahrenheit Scale.



So, $50^{\circ}\text{C} = 122^{\circ}\text{F}$

Worksheet 2

1. Convert the following temperature in the Fahrenheit Scale.

(a) 20°C

(c) 75°C

(e) 85°C

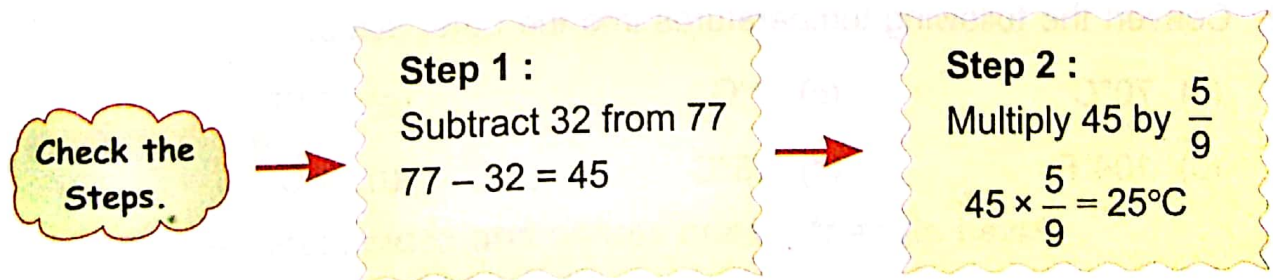
(b) 45°C

(d) 100°C

(f) 10°C

Converting Fahrenheit Scale into Celsius Scale

Let us convert 77°F into Celsius Scale.



So, $77^{\circ}\text{F} = 25^{\circ}\text{C}$

Worksheet 3

1. Convert the following temperature in the Celsius Scale.

(a) 41°F

(c) 95°F

(e) 32°F

(b) 113°F

(d) 212°F

(f) 122°F

Brain Teasers

1. Fill in the blanks.

(a) Temperature is the measure of _____ or _____ of a body.

(b) We use a thermometer to measure the _____ of a body.

(c) A doctor uses a _____ thermometer to measure the temperature of a patient.

(d) Celsius and Fahrenheit are the two _____ used in a thermometer.

(e) 212°F is the _____ point of water in the Fahrenheit Scale.

(f) The _____ scale is used in a clinical thermometer.

(g) $0^{\circ}\text{C} = \text{_____}^{\circ}\text{F}$ and $212^{\circ}\text{F} = \text{_____}^{\circ}\text{C}$.

2. Convert the following temperatures into the other scale.

(a) 70°C

(c) 0°C

(e) 59°F

(b) 104°F

(d) 15°C

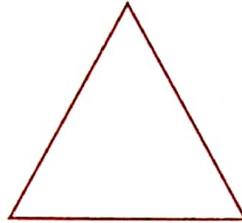
(f) 9°C

UNIT - 16

TRIANGLES



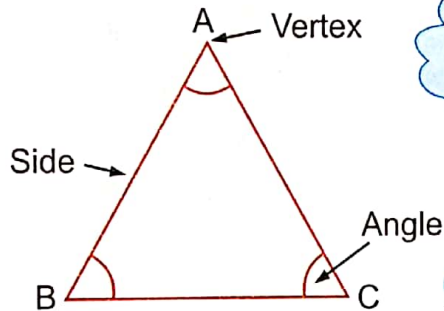
Do you remember this figure?



This is a triangle.



See! A triangle has 3 sides— AB, BC, CA .



A triangle has 3 corners or 3 vertices— A, B and C .

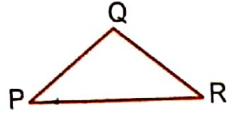
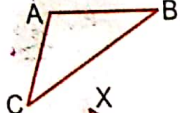
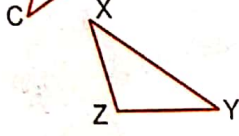
A triangle has 3 angles— $\angle BAC$ or simply $\angle A$
 $\angle CBA$ or simply $\angle B$
 $\angle ACB$ or simply $\angle C$

A triangle has 3 vertices, 3 sides and 3 angles.

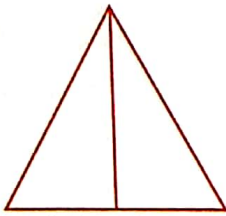
Worksheet 1

1. How many vertices, sides and angles does a triangle have?
2. Draw a triangle. Name its vertices, sides and angles.

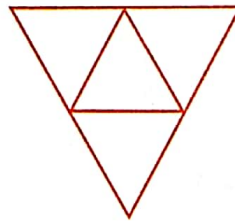
3. You are given some triangles. Name its vertices, sides and angles.

Triangles	Vertices	Sides	Angles
	_____ , _____ , _____	_____ , _____ , _____	_____ , _____ , _____
	_____ , _____ , _____	_____ , _____ , _____	_____ , _____ , _____
	_____ , _____ , _____	_____ , _____ , _____	_____ , _____ , _____

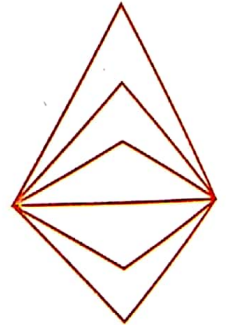
4. Count and write how many triangles are there in each figure.



(a) _____



(b) _____



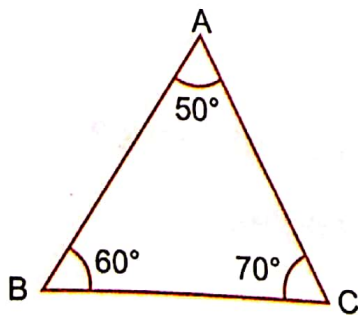
(c) _____

Properties of Triangle

Let us study the properties of a triangle.

Property - I

Let us measure the angles of this triangle.



$$\angle BAC = 50^\circ$$

$$\angle ABC = 60^\circ$$

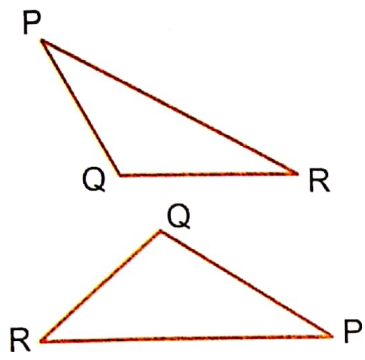
$$\angle ACB = 70^\circ$$

The sum of the 3 angles is

$$60^\circ + 50^\circ + 70^\circ = 180^\circ$$



Now, measure the angles of the triangles given below and complete the table.

	$\angle PQR$	$\angle QRP$	$\angle RPQ$	Sum of 3 angles
				

The sum of the measures of three angles of a triangle is always 180° .

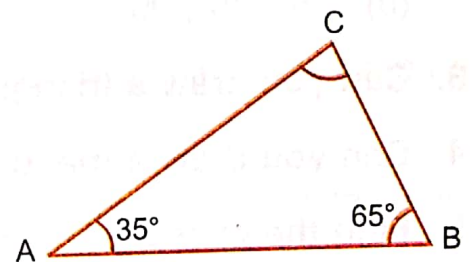
Let us now find out the third angle of a triangle when other two angles are given.

Look at the given triangle.

We are given the measures of 2 angles.

$$\angle A = 35^\circ$$

$$\angle B = 65^\circ$$



We have to find out the measure of $\angle C$.

We know,

$$\text{Sum of 3 angles} = 180^\circ$$

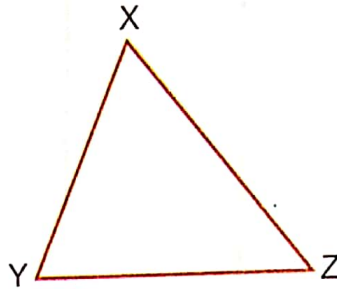
$$\text{Sum of 2 angles, } \angle A + \angle B = 65^\circ + 35^\circ = 100^\circ$$

$$\text{Third angle, } \angle C = 180^\circ - 100^\circ = 80^\circ$$

The third angle is equal to 80° .

Worksheet 2

1. Measure the angles of the triangle given below. What is the sum of the 3 angles?



2. Find which of the following can be the measures of three angles of a triangle.

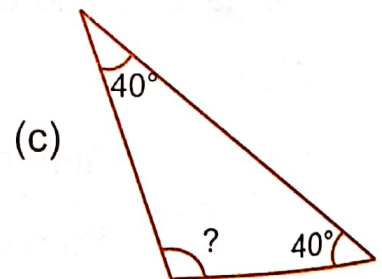
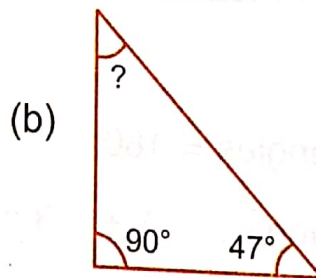
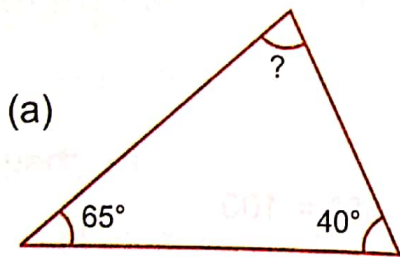
(a) $35^\circ, 80^\circ, 65^\circ$

(c) $70^\circ, 70^\circ, 70^\circ$

(b) $15^\circ, 75^\circ, 90^\circ$

(d) $45^\circ, 59^\circ, 81^\circ$

3. Can you draw a triangle with 2 right angles? Give reasons.
4. Can you draw a triangle with 2 obtuse angles? Give reasons.
5. Find the missing angle in each of the following:



6. The sum of 2 angles of a triangle is 110° . Find the measure of the third angle.
7. Two angles of a triangle are 100° and 55° respectively. Find the third angle.

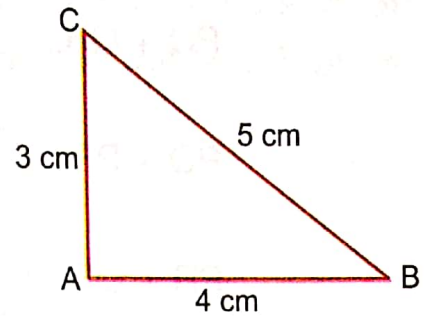
Property - II

Let us measure the sides of the given triangle ABC.

We have, $AB = 4 \text{ cm}$

$BC = 5 \text{ cm}$

$AC = 3 \text{ cm}$



Let us add the sides in pairs

$AB + BC = 9 \text{ cm}$
 $AC = 3 \text{ cm}$
 9 is greater than 3

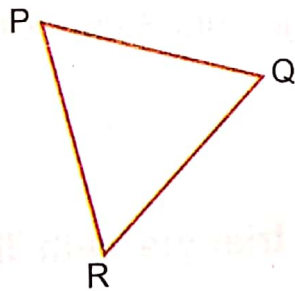
$BC + AC = 8 \text{ cm}$
 $AB = 4 \text{ cm}$
 8 is greater than 4

$AB + AC = 7 \text{ cm}$
 $BC = 5 \text{ cm}$
 7 is greater than 5

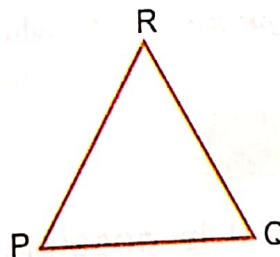
We observe that the sum of any two sides of a triangle is always greater than the third side.

Now, measure the sides of the triangles given below and complete the table.

Triangle 1



Triangle 2



	PQ	QR	PR	PQ + QR	PQ + PR	QR + PR
Triangle 1						
Triangle 2						

Compare the following lengths.

$$PQ + QR \quad \bigcirc \quad PR$$

$$PQ + PR \quad \bigcirc \quad QR$$

$$PR + QR \quad \bigcirc \quad PQ$$

Sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Now, let us see whether we can draw a triangle with the line segments of lengths 3 cm, 2 cm and 6 cm.

Length of first side = 3 cm

Length of second side = 2 cm

Sum of first and second sides = 3 cm + 2 cm = 5 cm

Length of third side = 6 cm

5 cm is smaller than 6 cm.

So, we cannot draw a triangle with the line segments 3 cm, 2 cm and 6 cm.

Worksheet 3

1. Find whether it is possible to draw a triangle with line segments of lengths given below:

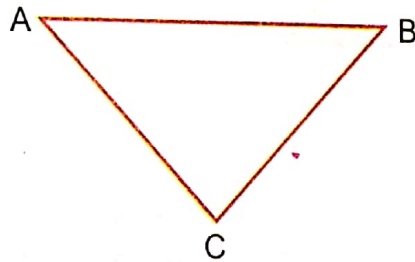
(a) 3 cm, 4 cm, 7 cm

(b) 6 cm, 8 cm, 7 cm

(c) 12 cm, 12 cm, 12 cm

(d) 4 cm, 4 cm, 9 cm

2. Measure the sides of the triangle given below and prove that the sum of the lengths of any two sides of a triangle is greater than the length of its third side.



Classification of Triangles

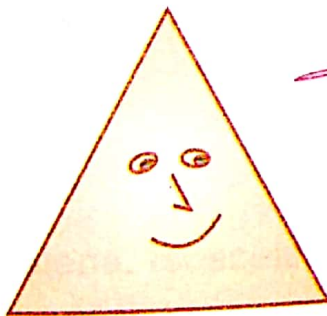
Triangles are classified in two ways.

- according to sides
- according to angles



I. Classification according to sides

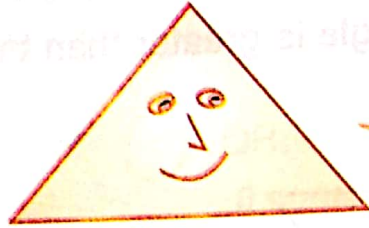
1.



See! all my sides are different in lengths.

If all the three sides of a triangle are of different lengths, the triangle is called a **SCALENE** triangle.

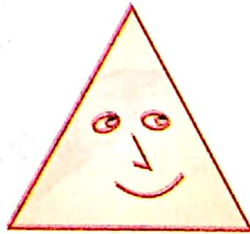
2.



See! I have two of my sides equal in length.

A triangle whose any two sides are of same length, is called an ISOSCELES triangle.

3.

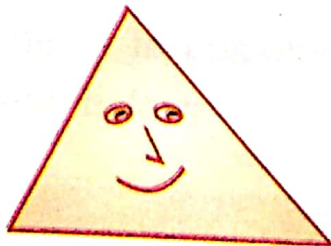


See! all my three sides are equal in length.

A triangle whose all the three sides are of equal length, is called an EQUILATERAL triangle.

II. Classification according to angles

1.

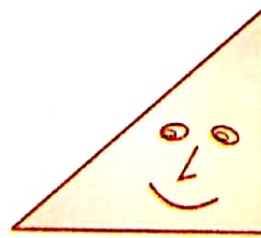


See! each of my angle is acute (less than 90°).

A triangle whose all the angles are acute, is called an ACUTE ANGLED TRIANGLE.

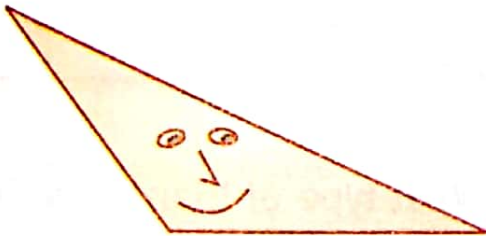
2.

See! One of my angle is a right angle (equal to 90°).



A triangle whose any one angle is a right angle, is called a **RIGHT ANGLED TRIANGLE**.

3.

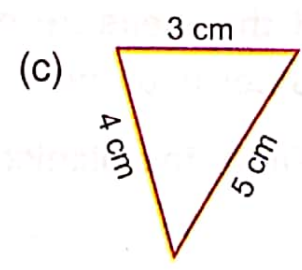
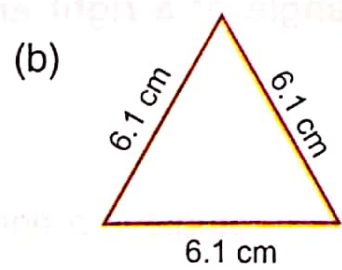
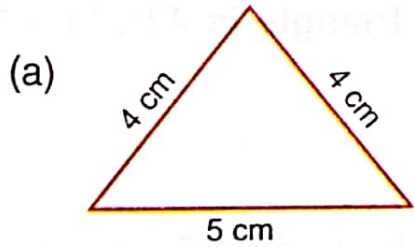


See! One of my angle is an obtuse angle (greater than 90° but less than 180°).

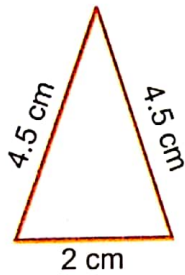
A triangle whose one angle is obtuse, is called an **OBTUSE ANGLED TRIANGLE**.

Worksheet 4

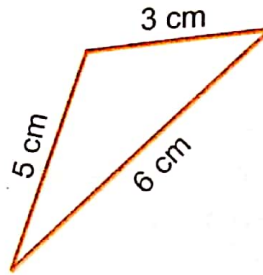
1. Identify the scalene, isosceles and equilateral triangles.



(d)

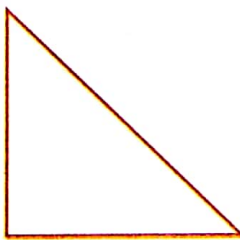


(e)

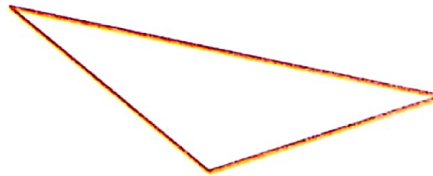


2. Identify the acute, obtuse and right angled triangles.

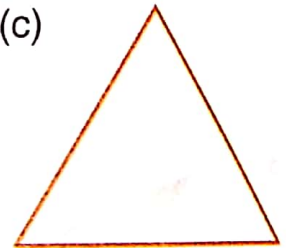
(a)



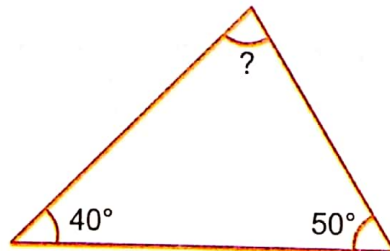
(b)



(c)



3. Find the third angle of this triangle. What type of triangle is this? Why?



4. Sum of 2 angles of a triangle is 90° . Find the third angle. What type of triangle is this?

5. If the measure of one angle of a right angled triangle is 48° , find the other two angles.

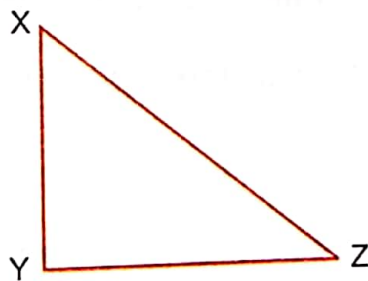
6. Fill in the blanks.

(a) A triangle whose any one angle is a right angle, is called a _____ triangle.

- (b) Each angle of an acute angled triangle is _____.
- (c) Any one angle of an obtuse angled triangle is _____.
- (d) A triangle whose any two sides are equal in length is called _____ triangle.
- (e) Sum of three angles of a triangle is equal to _____.
- (f) Sum of lengths of any two sides of a triangle is _____ than the third side.
- (g) In an isosceles triangle, any _____ sides are equal in length.

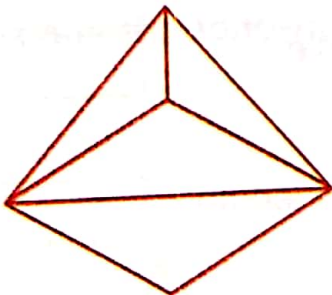
Brain Teasers

1. A closed figure is made of three line segments. What is the figure called?
2. Name the vertices, sides and angles of this triangle.

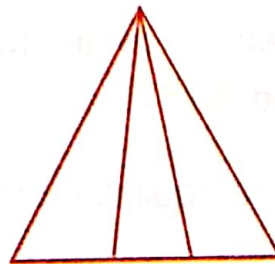


3. How many triangles are there in each?

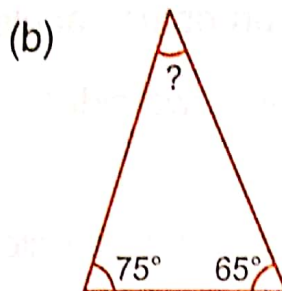
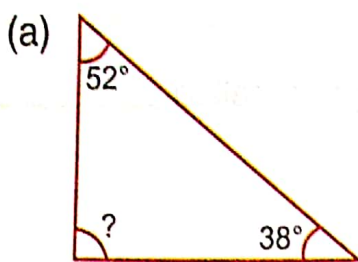
(a)



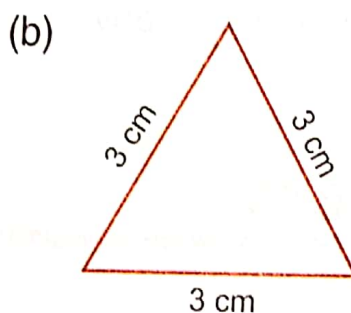
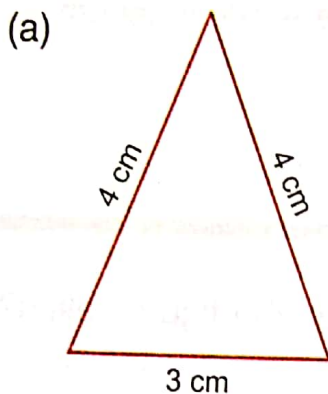
(b)



4. Find the missing angle. State the kind of triangle.



5. State the kind of triangle.



6. Can you construct a triangle with angles 70° , 35° , 85° ? Why?
7. Can you construct a triangle with the line segments of length 11 cm, 7 cm and 8 cm? Give reasons.
8. State True or False.

(a) A triangle can have two right angles.

(b) An obtuse angled triangle has one obtuse angle and two acute angles.

(c) The sum of lengths of any two sides of a triangle is equal to the third side.

(d) The sides of an equilateral triangle are of equal length.

DATA HANDLING

In Class-IV, we have learnt to read the information given in a table. We have also learnt about patterns and magic squares.



Let us now do some recall work.

1. The following table shows the different modes of transport used by 30 students of a class. Study the table carefully and complete the following statements.

Means of Transport	Number of Students
School bus	6
Van	9
Cycle	3
Scooter	5
Rickshaw	7

- (a) The number of students availing school bus is _____.
- (b) _____ students use rickshaw as mode of transport.
- (c) Maximum students use _____ as their mode of transport.
- (d) _____ students come to school by cycle.

2. Continue the following pattern.

(a) ○ △ △ ○ △ △ □ □ □

(b) ^ v ^ v □ □

3. Complete the following number patterns.

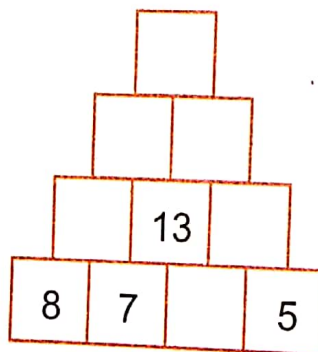
(a) 70, 63, 56, 49, _____, _____, _____, _____

(b) 1, 3, 7, 13, _____, _____, _____

4. Complete the given magic square using numbers 1 to 9.

2	7	
	5	
		8

5. Complete the given tower.








Tally Mark

The following table shows the number of different types of trees in an orchard.

Name of tree	Number of trees
Apple	11
Pear	7
Mango	10
Orange	8
Papaya	4

Now, let us use pictures to organise this information.

Name of tree	Number of trees
Apple	
Pear	
Mango	
Orange	
Papaya	




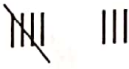

Note: Number of fruits shown is equal to number of fruit trees.

Instead of drawing pictures, we can also draw a line (|) where each line represents a tree.

These lines are called TALLY MARKS.

To make counting simple, the tally marks are made in groups of 5. The fifth mark in each group is made as a cross.

Now, let us use tally marks to organise the information given on the previous page.

Name of tree	Tally Marks	No. of trees
Apple		11
Pear		7
Mango		10
Orange		8
Papaya		4

Worksheet 1

- Given below is the number of different soft drinks served in a Birthday party. Arrange the given information in a table using pictures.

Name of soft drink	Number of soft drink
Pepsi	9
Miranda	4
Coke	8
Sprite	3
Mango	10

2. Quantity of different varieties of sweets sold in a shop on one day is given below. Organise the information using pictures.

Name of sweet	Quantity sold
Pista Burfi	9 kg
Laddoo	3 kg
Jalebi	2 kg
Gulab Jamun	6 kg
Rasgulla	5 kg

3. Organise the information showing favourite colours of 30 children using pictures.

Favourite colour	Number of children
Red	10
Blue	6
Green	5
Yellow	4
Black	5

4. Arrange the given information using tally marks.

(a) Number of books on different subjects in a library.

Subject	Number of books
English	21
Hindi	12
Mathematics	14
General Science	24
Sports	9

(b) Number of different varieties of toffees in a packet.

Toffee	Number of toffees
Mango Bite	12
Eclairs	16
Coffee Bite	13
Lactoplus	18
Melody	11

(c) Number of different vehicles passing through a busy crossing in Delhi from 9 am–10 am.

Vehicle	Number of vehicles
Bus	22
Car	30
Autorickshaw	12
Cycle	6
Scooter	17
Cycle rickshaw	11