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VI - Standard

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It gives me great pride and pleasure in bringing to you **Sura's Mathematics Full year Guide** for **I, II and III** Terms for **6th Standard**. It is prepared as per the Updated New Textbooks.

- This guide encompasses all the requirements of the students to comprehend the text and the evaluation of the textbook.
- Additional questions have been provided exhaustively for clear understanding of the units under study.
- Chapter-wise Unit Tests with Answers.

In order to learn effectively, I advise students to learn the subject section-wise and practice the exercises given. It will be a teaching companion to teachers and a learning companion to students.

Though these salient features are available in this Guide, I cannot negate the indispensable role of the teachers in assisting the student to understand the subject thoroughly.

I sincerely believe this guide satisfies the needs of the students and bolsters the teaching methodologies of the teachers.

I pray the almighty to bless the students for consummate success in their examinations.

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TERM - I

CHAPTER 01

NUMBERS

NUMBERS HELP US TO COUNT CONCRETE OBJECTS.

Formation of Smallest and Greatest Numbers:

Ascending Order:

1. It means arrangement from the smallest to the greatest numbers.
2. For the smallest number, we arrange the given digits in ascending order.
   (e.g.) The smallest four digit number using the digits 5, 7, 8, 3 is 3578.
3. Suppose the digits given may be 5, 7, 8, 0 then arranging the digits in ascending order we get the smallest number as 0578. But leftmost zero has no value and it becomes the three digit number.
4. In this case we have to interchange the leftmost two digits to get the number
   ∴ The smallest four digit number is 5078.

Descending Order:

1. It means arrangement from the greatest to the smallest number.
2. For the greatest number, we arrange the digits in descending order.
   (E.g.) The greatest four digit number using the digits 2, 0, 9, 7 is 9720.

Place Value:

When a number consists of more than one digit each digit has a value depending upon its position.

(E.g.) The place value of each digit in 5432 is 5 thousands, 4 hundreds, 3 tens and 2 ones

The expanded form of 5432 is $5 \times 1000 + 4 \times 100 + 3 \times 10 + 2 \times 1$.

Place Value Chart

Indian Number System

Periods	Arab		Crores		Lakhs		Thousands		Ones		
	TA	A	TC	C	TL	L	T TH	TH	H	T	O
Indian Number System	Ten Arab	Arab	Ten Crores	Crores	Ten Lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones

1. The Place value increases from right to left.
2. Every digit of a number has a place value which gives the value of the digit.
3. From the right, first comma comes after 3 digits, and subsequent commas comes after every 2 digits

International Number System

Periods	Billions			Millions			Thousands			Ones		
International Number System	Hundred Billion	Ten Billion	Billion	Hundred Million	Ten Million	Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One

In International System, commas comes after every 3 digits from the right.

TRY THESE

(Text book Page No.2)

- 999 + 1 = _____. **[Ans: 1000]**
- 10000 – 1 = _____. **[Ans: 9999]**
- The Successor of 4576 is _____. **[Ans: 4577]**
- The Predecessor of 8970 is _____. **[Ans: 8969]**
- The Predecessor of the smallest 5 digit number is_____.

[Ans: Greatest 4 digit number (9999)]

TRY THESE

(Text book Page No.3)

1. **Give 3 examples where the number of things counted by you would be a 5 digit number or more.**

Sol: 1. Number of stars in the sky.
2. Number of people living in Tamilnadu.
3. Number of accidents in India in the year 2017.

2. **There are ten lakh people in a district. What would be the population of 10 such districts?**

Sol. Number of people in the district = 10,00,000
∴ Population of 10 such districts = 10,00,000 × 10 = 1,00,00,000
∴ Total population of 10 districts would be one crore.
∴ 10 lakh = 10,000 Hundreds

3. **The Government spends rupees 2 crores for education in a particular district every month. What would be its expenditure over 10 months?**

Sol. Expenditure for one month = 2 crores.
∴ Expenditure for ten months = 2,00,00,000 × 10 = 20,00,00,000
Expenditure for 10 months = twenty crores.

TRY THESE

(Text book Page No.5)

Complete the table

Place Value / Number	TC	C	TL	L	T TH	TH	H	T	O	Number Name
1670						1	6	7	0	Thousand Six Hundred and Seventy
47684					4	7	6	8	4	Forty Seven Thousand Six Hundred and Eighty Four
120001				1	2	0	0	0	1	One Lakh Twenty thousand one
7800500			7	8	0	0	5	0	0	Seventy Eight Lakhs Five Hundred
53409098		5	3	4	0	9	0	9	8	Five crore Thirty Four Lakhs Nine Thousand Ninety Eight
198765912	1	9	8	7	6	5	9	1	2	Nineteen crore Eighty Seven Lakhs Sixty Five Thousand Nine Hundred and twelve

TRY THESE

(Text book Page No.7)

1. Identify the incorrectly placed comma and rewrite correctly.

Indian System : (i) 56,12,34,0,1,5 (ii) 9,90,03,2245

International System : (i) 7,5613,4534 (ii) 30,30,304,040

Sol: Indian System: (i) 56,12,34,015 (ii) 99,00,32,245

International System: (ii) 756,134,534 (ii) 3,030,304,040

Activity

(Text book Page No.7)

Take a white chart and cut into 9 equal pieces. Write different numbers on each piece. Arrange the pieces, as many times, horizontally which form different numbers. Write any five different numbers and express them in the Indian and the International System.

Sol: Activity to be done by the students themselves

TRY THESE

(Text book Page No.7)

1. Expand the following numbers:

(i) 2304567

Sol: Number : 23,04,567

Expanded form : $2 \times 1000000 + 3 \times 100000 + 0 \times 10000 + 4 \times 1000 + 5 \times 100 + 6 \times 10 + 7 \times 1$

Read as : Twenty Three Lakh Four Thousand Five Hundred and Sixty Seven

(ii) 4509888

Sol: Number : 45,09,888

Expanded form : $4 \times 1000000 + 5 \times 100000 + 0 \times 10000 + 9 \times 1000 + 8 \times 100 + 8 \times 10 + 8 \times 1$

Read as : Forty Five Lakh Nine Thousand Eight Hundred and Eighty Eight

(iii) 9553556

Sol: Number : 95,53,556

Expanded form : $9 \times 1000000 + 5 \times 100000 + 5 \times 10000 + 3 \times 1000 + 5 \times 100 + 5 \times 10 + 6 \times 1$

Read as : Ninety Five Lakh Fifty Three Thousand Five Hundred and Fifty Six

2. Find the place value of underlined digits.

(i) 3841567

Sol: Place value of 8 is $8 \times 1,00,000 = 8,00,000$ (Eight Lakh)

(ii) 9443810

Sol: Place value of 4 is $4 \times 10,000 = 40,000$ (Forty Thousand)

3. Write down the numerals and place value of 5 in the numbers represented by the following number names.

(i) Forty Seven Lakh Thirty Eight Thousand Five Hundred Sixty One.

(ii) Nine Crores Eighty Two lakhs Fifty Thousand Two Hundred Forty One.

(iii) Nineteen Crores Fifty Seven Lakhs Sixty Thousand Three Hundred Seventy.

Sol: (i) 47,38,561

Place value of 5 is $5 \times 100 = 500$ (Five Hundred)

(ii) 9,82,50,241

Place value of 5 is $5 \times 10000 = 50,000$ (Fifty Thousand)

(iii) 19,57,60,370

Place value of 5 is $5 \times 10,00,000 = 50,00,000$ (Fifty Lakhs)

TRY THESE

(Text book Page No.8)

1. How many hundreds are there in 10 lakh?

Sol:

1	0	0	0	0	0	0
TL	L	TTH	TH	H	T	O
				1	0	0

There are four places to the left of Hundred.

2. How many lakhs are there in a million?

Sol:

1	0	0	0	0	0	0
M	HTH	TTH	TH	H	T	O
	1	0	0	0	0	0
	L	TTH	TH	H	T	O

There is one place to the left of lakh.

3. 10 lakh candidates write the Public Exam this year. If each exam centre is allotted with 1000 candidates. How many exam centres would be needed?

Sol. Candidates for one centre = 1000

$\therefore$ For 10 lakh candidates = $\frac{10,00,000}{1000}$ = 1000 centres

Exercise 1.1

1. Fill in the blanks.

(i) The smallest 7 digit number is _____ **[Ans: 10,00,000]**

(ii) The largest 8 digit number is _____ **[Ans: 9,99,99,999]**

(iii) The place value of 5 in 7005380 is _____ **[Ans: 5 × 1000 = 5000]**

(iv) The expanded form of the number 76,70,905 is _____

[Ans: 7× 10,00,000 + 6 × 1,00,000 + 7 × 10,000 + 0 + 9 × 100 + 0 + 5 × 1 (or) 70,00,000 + 6,00,000 + 70,000 + 900+5]

2. Say True or False.

(i) Successor of a one digit number is always a one digit number

Hint : 9 + 1 = 10 **[Ans: False]**

(ii) Predecessor of a 3-digit number is always a 3 or 4 digit number

Hint : 100 – 1 = 99 **[Ans: False]**

(iii) In the Indian System of Numeration the number 67999037 is written as 6,79,99,037. **[Ans: True]**

(iv) 88,888 = 8 × 10000 + 8 × 100 + 8 × 10 + 8 × 1 **[Ans: False]**

3. How many ten thousands are there in the smallest 6 digit number?

Sol: Smallest six digit number is 1,00,000

1 lakh	1	0	0	0	0	0
	L	TTH	TH	H	T	O
Ten Thousand		1	0	0	0	0

$\frac{\text{One lakh}}{\text{Ten Thousand}} = \frac{1,00,000}{10,000} = 10$

1 lakh = **10** Ten Thousands

Another Method

Lakh is only one place to the left of Ten thousand

$\therefore$ 1 lakh is 10 times ten thousand

1 lakh = **10** Ten Thousands

4. Observe the commas and write down the place value of 7.

(i) 56,74,56,345 (ii) 567,456,345

Sol: (i) 56,74,56,345

Place value of 7 is 7 × 10,00,000 = 70,00,000 = Seventy Lakhs.

(ii) 567,456,345

Place value of 7 is 7 × 1,000,000 = 7,000,000 = Seven Million.

5. **Write the following numbers in the International system by using commas.**
(i) 347056 (ii) 7345671 (iii) 634567105 (iv) 1234567890

Sol.

		Billion	Hundred Million	Ten Million	Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One	The Number in International System
(i)	347056					3	4	7	0	5	6	347,056
(ii)	7345671				7	3	4	5	6	7	1	7,345,671
(iii)	634567105		6	3	4	5	6	7	1	0	5	634,567,105
(iv)	1234567890	1	2	3	4	5	6	7	8	9	0	1,234,567,890

6. **Write the largest six digit number and put commas in the Indian and the International Systems.**

Sol. The largest six digit number is 999999

Indian System

Lakh	Ten Thousand	Thousand	Hundred	Ten	One	The Number
9	9	9	9	9	9	9,99,999

International System

Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One	The Number
9	9	9	9	9	9	999,999

7. **Write the number names of the following numerals in the Indian System.**
(i) 75,32,105 (ii) 9,75,63,453

Sol: (i) 75,32,105

TL	L	TTH	TH	H	T	O
7	5	3	2	1	0	5

Seventy Five Lakhs Thirty Two Thousand One Hundred and Five

(ii) 9,75,63,453

C	TL	L	TTH	TH	H	T	O
9	7	5	6	3	4	5	3

Nine crores Seventy Five Lakhs Sixty Three Thousand Four Hundred and Fifty Three.

8. **Write the number names in words using the International System**
(i) 345,678 (ii) 8,343,710 (iii) 103,456,789

Sol: (i) 345,678

Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One
3	4	5	6	7	8

Three Hundred and Forty Five Thousand Six Hundred and Seventy Eight

(ii) 8,343,710

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One
8	3	4	3	7	1	0

Eight Million Three Hundred and Forty Three Thousand Seven Hundred and Ten.

(iii) 103,456,789

Hundred Million	Ten Million	Million	Hundred Thousand	Ten Thou-sand	Thousand	Hundred	Ten	One
1	0	3	4	5	6	7	8	9

One Hundred Three Million Four Hundred Fifty Six Thousand Seven Hundred and Eighty Nine.

9. Write the number name in numerals.

(i) Two crores thirty lakhs fifty one thousand nine hundred eighty.

Sol: 2,30,51,980

(ii) Sixty six millions three hundred forty five thousand twenty seven.

Sol: 66,345,027

(iii) Seven hundred eighty nine million, two hundred thirteen thousand four hundred fifty six.

Sol: 789,213,456

10. Tamil Nadu has about twenty six thousand three hundred forty five square kilometre of Forest land. Write the number mentioned in the statement in the Indian System and International system.

Sol: 26,345 Sq km.

11. The number of employee in the Indian Railways is about ten lakhs. Write this in the International System of numeration.

Sol: 1,000,000 (One Million)

Objective Type Questions

12. The successor of 10 million is

(a) 1000001 (b) 10000001 (c) 9999999 (d) 100001

[Ans: (b) 10000001]

13. The difference between the successor and predecessor of 99999 is

(a) 90000 (b) 1 (c) 2 (d) 99001

[Ans: (c) 2]

14. 1 billion is equal to

(a) 100 crore (b) 100 million (c) 100 lakh (d) 10000 lakh

[Ans: (a) 100 crore]

15. **The expanded form of the number 6,70,905 is**

(a) $6 \times 10000 + 7 \times 1000 + 9 \times 100 + 5 \times 1$

(b) $6 \times 10000 + 7 \times 1000 + 0 \times 100 + 9 \times 100 + 0 \times 10 + 5 \times 1$

(c) $6 \times 1000000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$

(d) $6 \times 100000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$

[Ans: (d) $6 \times 100000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$]

ADDITIONAL QUESTIONS - PROBLEMS

Answer the following questions.

1. **How many thousand are there in 1 lakhs?**

Sol: $\frac{1,00,000}{1000}$ = 100 Thousands

2. **The difference between successor and predecessor of any number is 2. Is it true? Justify your Answer.**

Sol: It is true that the difference between successor and predecessor of any number is 2.
Because the difference between any number and its predecessor is 1.
Also the difference between the number and its successor is 1.
∴ The total difference is 2.

3. **The expanded form of the number 6,00,001 is given as $6 \times 100000 + 1 \times 1$. Can you write like this Comment.**

Sol: Yes. We can write the expansion of the number 600001 as $6 \times 100000 + 1 \times 1$.
Because $6 \times 100000 + 1 \times 1 = 600000 + 1 = 600001$

4. **Write the greatest five digit number using the digits 2, 3, 4, 0 and 7.**

Sol: Greatest five digit number = 74320

5. **Can you write the least five digit number using the digits 2, 3, 4, 0 and 7 as 02347. Why? What will be the correct number?**

Sol: No, we cannot write the least five digit number using the digits 2, 3, 4, 0 and 7 as 02347.
If it is 02347, the left most zero has no value. It becomes 4 digit number 2347.
The correct number will be 20347.

6. **Write the relation between Largest two digit number and Smallest three digit number.**

Sol: Largest two digit number + 1 = Smallest three digit number.
$99 + 1 = 100$

7. **Name the property being illustrated in each of the cases.**

i) $(30 + 20) + 10 = 30 + (20 + 10)$ **ii)** $10 \times 35 = (10 \times 30) + (10 \times 5)$

Sol: (i) Associativity (ii) Distribution of multiplication over addition.

1.4. COMPARISON OF NUMBERS

- Let two or more numbers be given, then a number having greater number of digits will be greatest and a number having smaller number of digits will be smallest
- If the number of digits in two or more numbers are the same, then that number will be larger which has a greater left most digit.
- If this digit also happens to be the same, we look at the next digit and so on.

TRY THESE

(Text book Page No.10)

1. Write the numbers in ascending order : 688, 9, 23005, 50, 7500.

Sol: Ascending order : 9, 50, 688,7500, 23005

$9 < 50 < 688 < 7500 < 23005$

2. Find the least and greatest among the numbers : 478, 98, 6348, 3, 6007, 50935

Sol: The least number is 3.

The greatest number is 50935

TRY THESE

(Text book Page No.11)

Compare the two numbers and put <, > and = using place value chart.

15475		**3214**
73204		**973561**
8975430		**8975430**
1899799		**1899799**

Sol: (i) 15475, 3214

Comparing the place value using place value chart.

Place Value	TTH	TH	H	T	O
First Number	–	3	2	1	4
Second Number	1	5	4	7	5

Comparing the place values from left we have **15475 > 3214**

(ii) 73204, 973561

Place value chart

Place Value	L	TTH	TH	H	T	O
First Number	–	7	3	2	0	4
Second Number	9	7	3	5	6	1

Comparing the digits of two numbers **73204 < 973561**

(iii) 8975430, 8975430

Place Value	TL	L	TTH	TH	H	T	O
First Number	8	9	7	5	4	3	0
Second Number	8	9	7	5	4	3	0

From the place value chart comparing the digits from left 8 = 8, 9 = 9, 7 = 7, 5 = 5 4 = 4, 3 = 3, 0 = 0 ∴ **8975430 = 8975430**

(iv) 1899799, 1899799.

Place Value	TL	L	TTH	TH	H	T	O
First Number	1	8	9	9	7	9	9
Second Number	1	8	9	9	7	9	9

From the place value chart comparing the digits of the two numbers from the highest place value we have 1 = 1, 8 = 8, 9 = 9, 9 = 9, 7 = 7, 9 = 9, 9 = 9

∴ **1899799 = 1899799**

Note :

The number 10^{100} is called googol.

The number $10^{\text{googol}} = 10^{(10^{100})}$ is called googolplex.

TRY THESE

(Text book Page No.12)

The area in sq. k.m. of four Indian states are given below

States	Area (Sq.Km)
TamilNadu	1,30,058
Kerala	38,863
Karnataka	1,91,791
Andhra Pradesh	1,62,968

List the areas of the above four Indian States in the ascending and the descending order.

Sol: We can prepare place value chart

States / Place value		L	TTH	TH	H	T	O
Tamilnadu		1	3	0	0	5	8
Kerala		–	3	8	8	6	3
Karnataka		1	9	1	7	9	1
Andhra Pradesh		1	6	2	9	6	8

5 digit number 38,863 is the least value.
Comparing digits of other 6 digit numbers from left.
$1 = 1 = 1, \quad 3 < 6 < 9$
Ascending order = 38,863 < 1,30,058 < 1,62,968 < 1,91,791
Kerala < Tamilnadu < Andhra Pradesh < Karnataka
Descending order = 1,91,791 > 1,62,968 > 1,30,058 > 38,863
Karnataka > Andhra Pradesh > Tamilnadu > Kerala

TRY THESE

(Text book Page No12)

1. In the same way, try placing the digit 4 in thousands place and get six different 4-digit numbers. Also make different 4-digit numbers by fixing 8 and 5 in the thousands place.

Sol: (i)

TH	H	T	O
4	8	5	9
4	5	8	9
4	8	9	5
4	5	9	8
4	9	5	8
4	9	8	5

(ii)

TH	H	T	O
8	9	4	5
8	4	9	5
8	0	5	4
8	9	5	4
8	5	4	9
8	4	5	9

(iii)

TH	H	T	O
5	4	9	8
5	4	8	9
5	9	8	4
5	8	9	4
5	9	4	8
5	8	4	9

Activity

(Text book Page No.12)

Divide a chart paper into eight equal parts. Write different 1-digit numbers on it. List out the possible 8 digit numbers and also find the largest and the smallest numbers among them.

Sol: Activity to be done by the students themselves

TRY THESE

(Text book Page No.13)

1. In the same way, make different 4-digit numbers by exchanging the digits and check every time whether the number made is small or big.

Sol:

TH	H	T	O
1	4	3	2
4	3	2	1
3	2	1	4
2	1	4	3

1432 < 4321

4321 > 3214

3214 > 2143

2. Pedometer used in walking practice contains 5 digit number. What could be the largest measure?

Sol: 99,999

EXERCISE 1.2

1. Fill in the blanks with > or < or =

Ans: (i) 48792 < 48972

Hint : 7 < 9 [Hint: Open side can hold large number]

(ii) 1248654 > 1246854

Hint : 8 > 6

(iii) 658794 = 658794

2. Say True or False.

(i) The difference between the smallest number of seven digits and the largest number of six digits is 10.

Hint : 1000000 – 999999 = 1 **[Ans: False]**

(ii) The largest 4-digit number formed by the digits 8, 6, 0, 9 using each digit only once is 9086

Hint : The largest 4-digit number formed by the digits 8, 6, 0, 9 is 9860 **[Ans: False]**

(iii) The total number of 4 digit number is 9000.

Hint : The highest 4 and 3 digit number is 9999 and 999 respectively.

∴ 9999 – 999 = 9000 **[Ans: True]**

3. Of the numbers 1386787215, 137698890, 86720560, which one is the largest? Which one is the smallest?

Sol: We know that the number with more digits is greater.

∴ Greatest number is 1386787215

Smallest number is 86720560

4. Arrange the following numbers in the descending order:
128435, 10835, 21354, 6348, 25840

Sol: Place value chart is given by

Qn. No.	Given Number	L	T TH	TH	H	T	O
(i)	128435	1	2	8	4	3	5
(ii)	10835		1	0	8	3	5
(iii)	21354		2	1	3	5	4
(iv)	6348			6	3	4	8
(v)	25840		2	5	8	4	0

⇒ The number with more digits is the greater number

Step 1: ∴ 128435 is the larger number and 6348 is the least number

Step 2: For the remaining 5 digit numbers we can compare the left most digits and find 25840 > 21354 > 10835

∴ The descending order:

128435 > 25840 > 21354 > 10835 > 6348

5. Write any eight digit number with 6 in ten lakhs place and 9 in ten thousandth place.

Sol: **Step (i):** Preparing place value chart with 8 digits 6 in ten lakh place and 9 in Ten thousand place

Step (ii): Fill the other places with any of the numbers

C	TL	L	T TH	TH	H	T	O
5	6	8	9	7	4	3	2

∴ The number may be 56897432. Similarly we can write many numbers.

6. Rajan writes a 3-digit number, using the digits 4, 7 and 9. What are the possible numbers he can write?

Sol: The given digits are 4, 7 and 9.

H	T	O
9	7	4
9	4	7
7	9	4
7	4	9
4	7	9
4	9	7

Rajan can write 974, 947, 794, 749, 479, 497

7. The password to access my ATM card includes the digits 9, 4, 6 and 8. It is the smallest 4 digit even number. Find the password of my ATM card.

Sol: Given digits are 9, 4, 6 and 8.

Smallest number with these digits is 4689

Given that it is an even number.

∴ It may be 4698.

So password of ATM card is 4698.

8. Postal Index Number consists of six digits. The first three digits are 6, 3 and 1. Make the largest and the smallest Postal Index Number by using the digits 0, 3 and 6 each only once.

Sol: Given PIN consists of six digits. First three digits are 6, 3, and 1.

The digits 0, 3 and 6 to be used only once, in the remaining places.

	L	T TH	TH	H	T	O
Largest No.	6	3	1	6	3	0
Smallest No.	6	3	1	0	3	6

Largest Postal Index Number: 631630

Smallest Postal Index Number: 631036

9. **The height (in metres) of the mountains in Tamil Nadu are as follows:**

Sl. No	Mountains	Height (in metres)
1	Doddabetta	2637
2	Mahendragiri	1647
3	Anaimudi	2695
4	Velliangiri	1778

(i) **Which is the highest mountain listed above?**
(ii) **Order the mountains from the highest to the lowest.**
(iii) **What is the difference between the heights of the mountains Aanaimudi and Mahendragiri?**

Sol: Arranging the numbers in place value chart.

Mountains	TH	H	T	O
Doddabetta	2	6	3	7
Mahendragiri	1	6	4	7
Anaimudi	2	6	9	5
Velliangiri	1	7	7	8

(i) Highest mountain is Anaimudi [Comparing left most digits]
(ii) From the above chart
In thousands place, Doddabetta and Anaimudi have greater value 2.
Comparing digits of 2637 and 2695
$2 = 2, 6 = 6, 3 < 9$.
$\therefore$ $2637 < 2695$
Again comparing the digits of 1647 and 1778
$1 = 1, 6 < 7$
$\therefore 1647 < 1778$.
$\therefore$ The required order is $2695 > 2637 > 1778 > 1647$.
$\therefore$ Anaimudi > Doddabetta > Veliangiri > Mahendragiri
(iii) The height of Anaimudi mountain = 2695 m
The height of Mahendragiri mountain = 1647 m
$\therefore$ The Difference = 1048 m

Objective Type Questions

10. **Which list of numbers is in order from the smallest to the largest?**
(a) 1468, 1486, 1484 (b) 2345, 2435, 2235
(c) 134205, 134208, 154203 (d) 383553, 383548, 383642
[Ans: (c) 134205, 134208, 154203]

11. **The Arabian sea has an area of 1491000 square miles. This area lies between which two numbers?**
(a) 1489000 and 1492540 (b) 1489000 and 1490540
(c) 1490000 and 1490100 (c) 1480000 and 1490000
Hint : 1489000 < 1491000 < 1492540 **[Ans: (a) 1489000 and 1492540]**

12. The chart below shows the number of newspapers sold as per Indian Readership Survey in 2018. Which could be the missing number in the table?

Name of the News Paper	Ranking	Sold (in Lakh)
A	1	70
B	2	50
C	3	?
D	4	10

(a) 8 (b) 52 (c) 77 (d) 26

Hint : 50 > 26 > 10 **[Ans: (d) 26]**

ADDITIONAL QUESTIONS - PROBLEMS

Fill in the blanks.

1. 10 crore _____ **[Ans: 100 million]**

Answer the following question.

1. The heights of five boys in class VI are 135, 141, 129, 132, 145 (in centimeters) in height. Arrange their heights as how they stand in the assembly?

Sol: 129 cm < 132 cm < 135 cm < 141 cm < 145 cm

2. The number lock has the password number with 3 digits. The number is least even number and less than 200. Middle digit has no value separately. Find the password. The digits are used only once.

Sol: 102

3. Arrange in ascending order. 123456, 123546, 123623, 123511

Sol: 123456 < 123511 < 123546 < 123623

4. Arrange in descending order. 8461, 7535, 2943, 6214

Sol: 8461 > 7535 > 6214 > 2943

5. Find the numbers between 572634 and 562634 which is approximated to ten thousands place.

Sol: 562634, < 570000, < 572634

1.7 ORDER OF OPERATION

If more than one operations are given in the problem, the rule of order of operations called BIDMAS is used to avoid common arithmetic mistakes.

Expansion of BIDMAS

B	Bracket ( )
I	Indices
D	Division ÷ or /
M	Multiplication ×
A	Addition +
S	Subtraction –

If more than one brackets are given, the innermost bracket should be completed first.

Exercise 1.3

1. Fill in the blanks

(i) If Arulmozhi saves ₹12 per day, then she saves ₹ _____ in 30 days.

Hint : $12 \times 30 = ₹360$ **[Ans: ₹ 360]**

(ii) If a person 'A' earns ₹ 1800 in 12 days, then he earns ₹ _____ in a day.

Hint : $\frac{1800}{12} = 150$ **[Ans: ₹ 150]**

(iii) $45 \div (7 + 8) - 2 =$ _____.

Hint : $45 \div 15 - 2 = 3 - 2 = 1$ **[Ans: 1]**

2. Say True or False

(i) $3 + 9 \times 8 = 96$

Hint : $3 + 72 = 75$ **[Ans: False]**

(ii) $7 \times 20 - 4 = 136$

Hint : $140 - 4 = 136$ **[Ans: True]**

(iii) $40 + (56 - 6) \div 2 = 45$

Hint : $40 + 50 \div 2 = 40 + 25 = 65$ **[Ans: False]**

3. The number of people who visited the Public Library for the past 5 months were 1200, 2000, 2450, 3060 and 3200 respectively. How many people visited the library in the last 5 months.

Sol: People visited the library for past 5 months = 1200 + 2000 + 2450 + 3060 + 3200

$\therefore$ Total people visited = 11910

4. Cheran had a bank savings of ₹ 7,50,250. He withdrew ₹ 5,34,500 for educational purpose. Find the balance amount in his account.

Sol:

Bank Savings of Cheran = ₹ 7,50,250

Withdrew Amount = ₹ 5,34,500

$\therefore$ Balance Amount = ₹ 2,15,750

5. In a cycle factory, 1560 bicycles were manufactured every day. Find the number of bicycles manufactured in 25 days.

Sol:

Number of bicycles manufactured in one day = 1560

$\therefore$ Number of bicycles manufactured in 25 days = 1560×25

$= 39{,}000$

Number of bicycles manufactured in 25 days = 39,000

```
  1560
×   25
 7800
3120
39,000
```

6. ₹ 62,500 was equally distributed as a New Year bonus for 25 employees of a company. How much did each receive?

Sol:

Total amount distributed = ₹ 62500

Number of employees received bonus = 25

$\therefore$ Amount received by one employee = $62500 \div 25 = 2{,}500$.

Each employee received ₹ 2,500

7. Simplify the following numerical expression:

(i) $(10 + 17) \div 3$

(ii) $12 - [3 - \{6 - (5 - 1)\}]$

(iii) $100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\}$

Sol: (i) $(10 + 17) \div 3$ (Given)

$= 27 \div 3$ (Bracket completed first)

$= 9$ (÷ completed)

$\therefore$ $(10 + 17) \div 3 = 9$

(ii) $12 - [3 - \{6 - (5 - 1)\}]$ (Given)

$= 12 - [3 - \{6 - 4\}]$ (Innermost bracket completed first)

$= 12 - [3 - 2]$ [Again Inner bracket completed second]

$= 12 - 1$ (Bracket completed third)

$= 11$ (– completed)

$12 - [3 - \{6 - (5 - 1)\}] = 11$

(iii) $100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\}$ (Given)

$= 100 + 8 \div 2 + \{6 - 6 \div 2\}$ (Innermost bracket completed first)

$= 100 + 8 \div 2 + \{6 - 3\}$ (To remove the next bracket ÷ within the bracket completed second)

$= 100 + 8 \div 2 + 3$ (bracket completed third)

$= 100 + 4 + 3$ (÷ completed fourth)

$= 107$ (+ completed)

$100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\} = 107$

Objective Type Questions

8. The value of $3 + 5 - 7 \times 1$ is _____.

(a) 5 (b) 7 (c) 8 (d) 1

Hint : $3 + 5 - 7 \times 1 = 3 + 5 - 7 = 8 - 7 = 1$ **[Ans: (d) 1]**

9. The value of $24 \div \{8 - (3 \times 2)\}$ is

(a) 0 (b) 12 (c) 3 (d) 4

Hint : $24 \div \{8 - 3 \times 2\} = 24 \div \{8 - 6\} = 24 \div 2 = 12$ **[Ans: (b) 12]**

10. Use BIDMAS and put the correct operator in the box.

$2 \square 6 - 12 \div (4 + 2) = 10$

(a) + (b) – (c) × (d) ÷ **[Ans: (c) ×]**

Hint : $2 \square 6 - 12 \div 6 = 10$

$\Rightarrow$ $2 \square 6 - 2 = 10$

$\Rightarrow$ $2 \times 6 - 2 = 10$

ADDITIONAL QUESTIONS - PROBLEMS

1. Evaluate the following :

(a) $44 \div 2 + (7 + 80 \div 10) - 14 + 23$

(b) $17 \times 6 - 4 - 2 + 20 - (22 + 18)$

(c) $16 \times 144 \div 16 \div 9 + 16 + 15 - 20$

(d) $12 \times 36 \div 12 \div 3 + 5 + 6 - 2$

(e) $15 - [17 + 30 \div 6 - (6 + 6) + 7]$

Sol: (a) $44 \div 2 + (7 + 80 \div 10) - 14 + 23$ (Given)
$= 44 \div 2 + (7 + 8) - 14 + 23$ (To complete the bracket ÷ done first)
$= 44 \div 2 + 15 - 14 + 23$ (Bracket completed second)
$= 22 + 15 - 14 + 23$ (÷ completed third)
$= 60 - 14$ (+ completed fourth)
$= 46$ (– completed last)
$\therefore\ 44 \div 2 + (7 + 80 \div 10) - 14 + 23 = 46.$

(b) $17 \times 6 - 4 - 2 + 20 - (22 + 18)$ (Given)
$= 17 \times 6 - 4 - 2 + 20 - 40$ (Bracket completed first)
$= 102 - 4 - 2 + 20 - 40$ (× completed second)
$= 122 - 4 - 22 - 40$ (+ completed third)
$= 122 - 46$ (– completed one by one)
$= 76$
$\therefore\ 17 \times 6 - 4 - 2 + 20 - (22 + 18) = 76$

(c) $16 \times 144 \div 16 \div 9 + 16 + 15 - 20$ (Given)
$= 16 \times 9 \div 9 + 16 + 15 - 20$ (÷ completed first)
$= 16 \times 1 + 16 + 15 - 20$ (÷ completed second)
$= 16 + 16 + 15 - 20$ (× completed third)
$= 32 + 15 - 20$ (+ completed fourth)
$= 47 - 20$ (+ completed fifth)
$= 27$ (– completed last)
$\therefore 16 \times 144 \div 16 \div 9 + 16 + 15 - 20 = 27$

(d) $12 \times 36 \div 12 \div 3 + 5 + 6 - 2$ (Given)
$= 12 \times 3 \div 3 + 5 + 6 - 2$ (÷ completed first)
$= 12 \times 1 + 5 + 6 - 2$ (÷ completed second)
$= 12 + 5 + 6 - 2$ (× completed third)
$= 17 + 6 - 2$ (+ completed forth)
$= 23 - 2$ (+ completed fifth)
$= 21$ (– completed last)
$\therefore\ 12 \times 36 \div 12 \div 3 + 5 + 6 - 2 = 21$

(e) $15 - [17 + 30 \div 6 - (6 + 6) + 7]$ (Given)
$= 15 - [17 + 30 \div 6 - 12 + 7]$ (Inner bracket completed first)
$= 15 - [17 + 5 - 12 + 7]$ (÷ completed second)
$= 15 - [22 - 5]$ (+ completed third)
$= 15 - 17$ (bracket completed forth)
$= -2$ (– completed last)
$\therefore\ 15 - [17 + 30 \div 6 - (6 + 6) + 7] = -2.$

2. An export company produced 235219 shirts, 158342 trousers and 11704 jackets in a year. What is the total production of all the three items in that year?

Sol: Number of shirts produced = 235219
Number of trousers produced = 158342
Number of jackets produced = 11704
Total production of all items = 405265
Total production of all items in that year = 4,05,265

3. India's population has been steadily increasing from 439 millions in 1961 to 1028 millions in 2001. Find the total increase in population from 1961 to 2001. Write the increase in population in Indian system of Numeration using commas suitably.

Sol: Population of India in 1961 = 439 millions
= 439,000,000
Population of India in 2001 = 1028 millions
= 1,028,000,000
Increase in population from 1961 to 2001 = Population in 2001 – Population in 1961
= 1028000000 – 439000000
= 589000000 = 589 million.
Increase in population in Indian System = 58,90,00,000

4. A person had ₹ 10,00,000 with him. He purchased a flat for ₹ 8,70,000. With the remaining money he has to buy a T.V. for 1 lakh. How much money was left with him to buy a T.V?

Sol:

	₹
Total money the person had	= 10,00,000
Cost of flat	= 8,70,000
Remaining money	= 1,30,000

Now he has ₹ 1,30,000. So it is enough to buy a TV for ₹1,00,000.

5. A box contains 50 packets of biscuits, each weighing 120g. How many such boxes can be loaded in a van, which cannot carry more than 900 kg?

Sol: **Given :** Total number of packets = 50.
Weight of each packet = 120 g
Weight of a box = 50 × 120 g = 6000 g = 6 kg [∵1000 g = 1 kg]
Required number of boxes $= \frac{900}{6} = 150.$

150 boxes are required.

6. How much money was collected from 5342 students for a charity show, if each student contributed ₹ 670.

Sol: Total number of students = 5342
Contribution of each student = ₹ 670
∴ Total money collected = 5342 × 670 = 35,79,140
Total money collected = ₹ 35,79,140

1.8 ESTIMATION OF NUMBERS

Rounding off is one way to find a number for estimation that is quite convenient. It gives us the closest suitable number according to a given place value.

Rounding off a Number to the Nearest Tens:

(i) For rounding off a number to the nearest tens, we examine the digit at ones place. If the digit at ones place is less than 5, then replace the ones digit by 0 and keep the other digits as they are (E.g.) we rounding off 64 as 60.

(ii) If the digit at ones place is 5 or more, then replace the ones digit by 0 and increase tens digit by 1.

(eg) We rounding off 67 as 70.

Example 1: **Round off these numbers to the nearest thousands. (a) 5647 (b) 6575**

Sol: **(a)** **Given number is 5647**

Place value to be round off is thousand.

Digit in thousands place is 5

The digit in Hundred place is $6 > 5$

Adding 1 to 5 $\Rightarrow 1 + 5 = 6$

Changing the digits to the right of 6 to zeroes $\Rightarrow$ 6000

$\therefore$ The required rounded number 5647 = 6000

(b) **6575**

Here the place value to round off is Thousand,

$\therefore$ The digit in the Hundreds place is $5 \geq 5$

$\therefore$ Adding 1 to 6 $\Rightarrow 1 + 6 = 7$

Changing the digits to the right of 7 to zeroes $\Rightarrow$ 7000

$\therefore$ The required rounded number 6575 = 7000

Estimation of Sum and Difference: Generally to estimate the sum or difference, we round off each number to its greatest place and then calculate the sum or difference of the rounded off numbers. For multiplication and division also we follow the same way.

Activity

(Text book Page No.19)

1. **Fill up the jar with some items like Tamarind seeds. Let each student give an estimate of the number of items. Make a table of the result by finding the difference of the estimate and the actual amount.**

Sol: Activity to be done by the students themselves

2. **Get a large jar and a bag of Tamarind seeds and put 30 seeds in the jar. Observing the contents, estimate how many seeds roughly will fill the whole jar. Continue to fill the jar to check your estimate.**

Sol: Activity to be done by the students themselves

TRY THESE

(Text book Page No.20)

1. **Round off the following numbers to the nearest ten.**

(i) 57 (ii) 189 (iii) 3,956 (iv) 57,312

Sol: **(i)** **57**

Given number 57

Place value to be rounded off is ten.

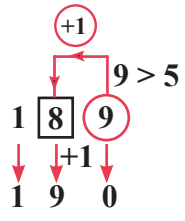
Digit in tens place is 5.

Digit to the right of 5 is $7 > 5$

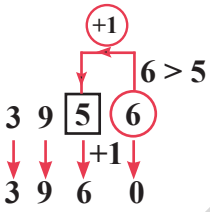
$\therefore$ Adding 1 to 5 $\Rightarrow 1 + 5 = 6$

Changing the digits to the right of 6 to zero $\Rightarrow$ 60

$\therefore$ Rounded off number is 60.

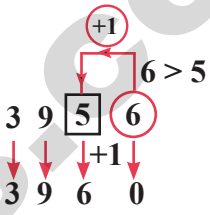


(ii) 189



Place value to be rounded off is ten
Digit in ten place is 8
Digit to the right of 8 is 9 > 5
∴ Adding 1 to 8 ⇒ 1 + 8 = 9.
Changing the digits to the right of 19 to zero ⇒ 190
Required rounded off number is 190

(iii) 3956



Place value to be rounded off is ten.
Digit in tens place is 5
Digit to the right of 5 is 6 > 5
∴ Adding 1 to 5 ⇒ 1 + 5 = 6
Changing the right digits of 396 to zero ⇒ 3960
Required rounded off number is 3960.

(iv) 57312

Place value to be rounded off is ten.
Digit in tens place is 1
Digit to the right of 1 is 2 < 5
∴ Leaving the number 2 as it is changing the digits to the right of 5731 to zero ⇒ 57310.
The rounded of number is 57310

2. Round off the following numbers to the nearest ten, hundred and thousand.
(i) 9,34,678 (ii) 73,43,489 (iii) 17,98,45,673

Sol: (i) 9,34,678

Nearest Tens: 9,34,680
Nearest Hundreds: 9,34,700
Nearest Thousands: 9,35,000

(ii) 73,43,489

Nearest Tens: 73,43,490
Nearest Hundreds: 73,43,500
Nearest Thousands: 73,43,000

(iii) 17,98,45,673

Nearest Tens: 17,98,45,670
Nearest Hundreds: 17,98,45,700
Nearest Thousands: 17,98,46,000

3. Mount Everest, the highest peak in the world located in Nepal is 8,848 m high. Its height can be rounded off to the nearest thousand as _____. [Ans: 9000 m.]

TRY THESE

(Text book Page No.21)

1. Estimate the sum and the difference rounding off to nearest thousands: 8457 and 4573

Sol: (a) Sum 8457 ⇒ 8000
4573 ⇒ 5000
Sum = 13,000

(b) Difference

$8457 \Rightarrow 8000$

$4573 \Rightarrow 5000$

Difference = 3,000

2. Estimate the product 39 × 53

Sol: $39 \Rightarrow 40$

$53 \Rightarrow 50$

Product $40 \times 50 = 2000$

3. Estimate the quotient : 6845 ÷ 395

Sol: $6845 \Rightarrow 6800$

$395 \Rightarrow 400$

Quotient = 17.

Exercise 1.4

1. Fill in the blanks.

(i) The nearest 100 of 843 is _____.

Hint : The digit in tens place is $4 < 5$. **[Ans: 800]**

(ii) The nearest 1000 of 756 is _____.

Hint : The digit in hundred place is $7 \geq 5$ **[Ans: 1000]**

(iii) The nearest 10,000 of 85654 is _____.

Hint : The digit in thousand place is $5 \geq 5$. **[Ans: 90,000]**

2. Say True or False

(i) 8567 is rounded off as 8600 to the nearest 10.

Hint : In ones place the digit is $7 \geq 5$. So 8570 **[Ans: False]**

(ii) 139 is rounded off as 100 to the nearest 100.

Hint : In tens place we have $3 < 5$. So 100 **[Ans: True]**

(iii) 1,70,51,972 is rounded off as 1,70,00,000 to the nearest lakh.

Hint : In ten thousand place the digit is $5 \geq 5$. So 1,71,000,000 **[Ans: False]**

3. Round off the following to the given nearest place.

(i) 4,065; hundred

Sol: We have to round off 4065 to hundreds

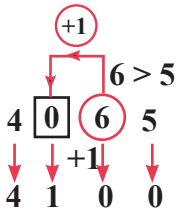
The digit in hundreds place is 0

The digit to the right of 0 is $6 > 5$

Adding 1 to $0 \Rightarrow 0 + 1 = 1$

Changing the digits to the right of 41 to zeros

$4065 \simeq 4100 \Rightarrow 4100$



(ii) 44,555; thousand

To round off 44555 to thousands

The digit in the thousands place is 4

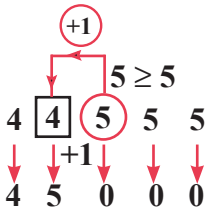
The digit to the right of 4 is $5 = 5$.

$\therefore$ Adding 1 to the thousand place value digit 4

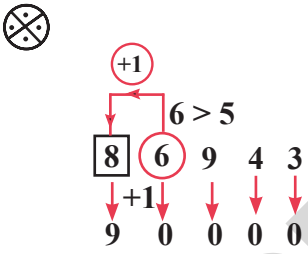
$4 + 1 = 5$

Changing the digits to the right of 45 to zeros we get 45000

$44555 \simeq 45000$

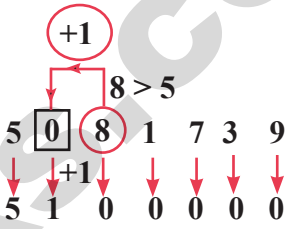


(iii) 86,943; ten thousand



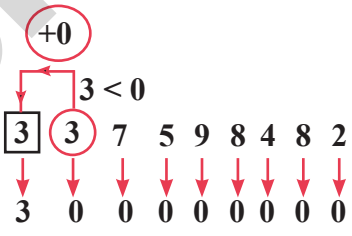
To round off 86,943 to ten thousand
The digit in ten thousands place is 8
The digit to the right of 8 is 6 > 5
Adding 1 to 8 ⇒ 8 + 1 = 9.
Changing the digits to the right of 9 to zeroes we get 90,000
∴ 86943 ≃ 90,000

(iv) 50,81,739; lakh



To round off 5081739 to lakhs
The digit in the lakhs place is 0
The digit to the right of 0 is 8 > 5
∴ Adding 1 to 0 ⇒ 1 + 0 = 1
Changing the digits right off 51 to zeros
We get 51,00,000
∴ 5081739 ≃ 51,00,000

(v) 33,75,98,482; ten crore



To round off 337598482 to ten crore
The digit in the ten crores place is 3
The digit to the right of 3 is 3 < 0
∴ The digit in ten crore place remains the same 3.
Changing the digit to the right of 3 zeros we get 30,00,00,000
∴ 33,75,98,482 ≃ 30,00,00,000

4. Estimate the sum of 157826 and 32469 rounded off to the nearest ten thousand.

Sol:

1,57,826	⇒	1,60,000
32,469	⇒	30,000
1,90,295	⇒	1,90,000

5. Estimate by rounding off each number to the nearest hundred.

(i) 8074 + 4178

Sol:

8074	⇒	8100
4178	⇒	4200
		12,300

(ii) 1768977 + 130589

17,68,977	⇒	1769000
1,30,589	⇒	130600
		18,99,600

6. The population of a city was 43,43,645 in the year 2001 and 46,81,087 in the year 2011. Estimate the increase in population by rounding off to the nearest thousands.

Sol:

Population in the year 2011 is 46,81,087 ⇒ 46,81,000
Population in the year 2001 is 43,43,645 ⇒ 43,44,000
∴ Increase in Population = 3,37,000

Objective Type Questions

7. **The number which on rounding off to the nearest thousands given 11000 is**

(a) 10345 (b) 10855 (c) 11799 (d) 10056

Hint : In 10855, the digit in hundred place is 8 ≥ 5. So 11000 **[Ans: (b)] 10855**

8. **The estimation to the nearest hundred of 76812 is**

(a) 77000 (b) 76000 (c) 76800 (d) 76900

Hint : In tens place the digit is 1 < 5, So 76800 **[Ans: (c) 76800]**

9. **The number 9785764 is rounded off to nearest lakh as**

(a) 9800000 (b) 9786000 (c) 9795600 (d) 9795000

Hint : In ten thousand place, the digit is 8 >5. So 9800000 **[Ans: (a) 9800000]**

10. **The estimated difference of 167826 and 2765 rounded off to the nearest thousand is**

(a) 180000 (b) 165000 (c) 140000 (d) 155000

Hint : 167826 = 168000, 2765 = 3000
∴ 168000 – 3000 = 165000 **[Ans: (b) 165000]**

ADDITIONAL QUESTIONS - PROBLEMS

1. **Estimate the following to the nearest hundreds**

(a) **439 + 334 + 4317** **(b)** **1,08,734 – 47,599**
(c) **8325 – 491** **(d)** **4,89,348 – 48,365**

Sol: **(a)** **439 + 334 + 4317**

439 ⇒ 400
334 ⇒ 300
4317 ⇒ 4300
Sum 5,000

(b) **1,08,734 – 47,599**

1,08,734 ⇒ 1,08,700
47,599 ⇒ 47,600
Difference = 61,100

(c) **8325 – 491**

8325 ⇒ 8300
491 ⇒ 500
Difference ⇒ 7,800

(d) **4,89,348 – 48,365**

4,89,348 ⇒ 4,89,300
48,365 ⇒ 48,400
Difference = 4,40,900

2. **Estimate the following products**

(a) **578 × 161** **(b)** **5281 × 3491**
(c) **1291 × 592** **(d)** **9250 × 29**

Sol: **(a)** **578 × 161**

578 ⇒ 600

161 ⇒ 200

∴ Estimated product = 600 × 200 = 1,20,000

(b) **5281 × 3491**

5281 ⇒ 5000

3491 ⇒ 3500

∴ Estimated Product = 5000 × 3500 = 1,75,00,000

(c) **1291 × 592**

1291 ⇒ 1300

592 ⇒ 600

∴ Estimated Product = 1300 × 600 = 7,80,000

(d) **9250 × 29**

9250 ⇒ 9000

29 ⇒ 30

∴ Estimated Product = 9000 × 30 = 2,70,000

1.9 WHOLE NUMBERS

1. The collection of counting numbers {1, 2, 3, ...} is called the **Set of Natural Numbers** and it is denoted by $\mathbb{N}$.
2. When the collection include zero as well, {0, 1, 2, 3, ...}, it is called the **Set of Whole Numbers** that is denoted by $\mathbb{W}$.
3. Every whole number has a predecessor, except zero.
4. In $\mathbb{N}$, the smallest number is 1.
5. In $\mathbb{W}$, the smallest number is 0.
6. The number 1 has a predecessor in $\mathbb{W}$, namely 0, but it has no predecessor in $\mathbb{N}$.

TRY THESE

(Text book Page No.23)

✦ **Find the value of 6 + 3 + 8 and 3 + 6 + 8**

(i) Are they same?

(ii) Is there any other way of arranging these three numbers?

Sol: 6 + 3 + 8 = 3 + 6 + 8 = 17

(i) Yes, 6 + 3 + 8 = 3 + 6 + 8 = 17, Both are same

(ii) Yes, we can arrange these numbers as

3 + 8 + 6 = 8 + 6 + 3 = 8 + 3 + 6 = 6 + 8 + 3

✦ **Find the value of 5 × 2 × 6 and 2 × 5 × 6**

(i) Are they same?

(ii) Is there any other way of arranging these three numbers?

Sol: 5 × 2 × 6 = 2 × 5 × 6 = 60

(i) Yes, they are the same

(ii) They can be arranged as 2 × 6 × 5 = 6 × 5 × 2 = 5 × 6 × 2 = 6 × 2 × 5.

✦ **Is 7 – 5 the same as 5 – 7? Why**

Sol: 7 – 5 ≠ 5 – 7.

Because subtraction is not commutative [∵ 7 – 5 = 2; 5 – 7 = – 2]

✦ **What is the value of (15 – 8) – 6? Is it the same as 15 – (8 – 6)? Why?**

Sol: $(15 - 8) - 6 = 7 - 6 = 1$

$\therefore (15 - 8) - 6 = 1$

It is not same as $15 - (8 - 6)$.

$\because 15 - (8 - 6) = 15 - 2 = 13$.

$\therefore (15 - 8) - 6 \neq 15 - (8 - 6)$

✦ **What is 15 ÷ 5? Is it the same as 5 ÷ 15? Why?**

Sol: $15 \div 5 = 3$; $5 \div 15 = \frac{1}{3}$

$\therefore 15 \div 5 \neq 5 \div 15$

$\Rightarrow$ Division is not commutative for whole numbers.

✦ **What is the value of (100 ÷ 10) ÷ 5? Is it the same as 100 ÷ (10 ÷ 5)? Why?**

Sol: $(100 \div 10) \div 5 = 10 \div 5 = 2$;

$100 \div (10 \div 5) = 100 \div 2 = 50$

$\therefore 100 \div (10 \div 5) \neq (100 \div 10) \div 5$

$\Rightarrow$ Division of whole numbers are not associative.

1.10 PROPERTIES OF WHOLE NUMBERS

1. Whole numbers can be added or multiplied in any order and hence commutative.
2. Subtraction and division are **not commutative**
3. When we need to add or multiply several numbers, the order in which we do the addition or multiplication does not matter. This is called **associativity** of addition and multiplication.
4. Subtraction and division are **not associative**
5. When we multiplying a sum, we can rewrite it as a sum of two products. This is called **distributivity** of multiplication over addition.
6. Whole numbers also distributive of multiplication over subtraction.
7. Addition does not distribute over multiplication.
8. Any number multiplied by zero gives zero
9. Division by zero is **not defined.**
10. When zero is added to any number, we get the same number. Therefore zero is called the **additive identity**
11. When we multiply any number by 1, we get the same number. Therefore 1 is the **Multiplicative identity**.
12. When we add any two natural numbers, we get a **natural number**.
13. When we multiply any two natural numbers, we get a **natural number**.
14. When we add any two whole numbers, we get a **whole number**.
15. When we multiply any two whole numbers, we get a **whole number**.
16. When we add a natural number to a whole number, we get a **natural number**.
17. When we multiply a natural number by a whole number, we get a **whole number**.

TRY THESE

(Text book Page No.24)

✦ **Use at least three different pairs of whole numbers to verify that subtraction is not commutative**

Sol: **(a) 7 and 20**

$20 - 7 \neq 7 - 20$

(b) 300 and 100

$300 - 100 \neq 100 - 300$

(c) 60 and 5

$60 - 5 \neq 5 - 60$

✦ **Is $10 \div 5$ the same as $5 \div 10$? Justify it by taking two more combinations of numbers**

Sol: $10 \div 5 \neq 5 \div 10$ (i.e) $2 \neq \frac{1}{2}$

Example: (a) $20 \div 10 \neq 10 \div 20$ ie. $2 \neq \frac{1}{2}$; (b) $100 \div 50 \neq 50 \div 100$ ie. $2 \neq \frac{1}{2}$

TRY THESE

(Text book Page No.26)

Complete the following tables.

(i)

9	+	0	=	9
7	+	0	=	**7**
0	+	17	=	17
0	+	**37**	=	37
0	+	**Any Number**	=	**The same Number**

(ii)

11	×	1	=	11
1	×	55	=	55
1	×	12	=	**12**
1	×	**100**	=	100
1	×	**Any Number**	=	**The same Number**

Complete the Table.

6	+	8	=	14, a Natural Number
4	+	5	=	9, a Natural Number
4	×	5	=	20, a Natural Number
6	×	8	=	48, a Natural Number
100	+	10	=	110, a Natural Number
20	+	30	=	50, a Natural Number
20	×	30	=	600, a Natural Number
100	×	10	=	1000, a Natural Number
6	+	8	=	14, a Whole Number
4	+	5	=	9, a Whole Number
15	×	0	=	0, a Whole Number
11	×	2	=	22, a Whole Number
100	+	10	=	110, a Whole Number
20	+	30	=	50, a Whole Number
75	×	0	=	0, a Whole Number
80	×	1	=	80, a Whole Number

EXERCISE 1.5

1. Fill in the blanks.

(i) The difference between the smallest natural number and the smallest whole number is _____

Hint : $1 - 0 = 1$ **[Ans: 1]**

(ii) $17 \times$ _____ $= 34 \times 17$ [Ans: 34]
(iii) When _____ is added to a number, it remains the same. [Ans: 0]
(iv) Division by _____ is not defined. [Ans: 0]
(v) Multiplication by _____ leaves a number unchanged. [Ans: 1]

2. Say True or False
(i) 0 is the identity for multiplication of whole numbers.
Hint : 1 is the identity for multiplication [Ans: False]
(ii) Sum of two whole numbers is always less than their product.
Hint : $1 + 1 = 2 > 1 \times 1 = 1$ [Ans: False]
(iii) Both addition and multiplication are associative for whole numbers. [Ans: True]
(iv) Both addition and multiplication are commutative for whole numbers. [Ans: True]
(v) Multiplication is distributive over addition for whole numbers. [Ans: True]

3. Name the property being illustrated in each of the cases given below.
(i) $75 + 34 = 34 + 75$
Ans: Addition is commutative
(ii) $(12 \times 4) \times 8 = 12 \times (4 \times 8)$
Ans: Multiplication is associative
(iii) $50 + 0 = 50$
Ans: 0 is the additive identity
(iv) $50 \times 1 = 50$
Ans: 1 is the multiplicative identity.
(v) $50 \times 42 = 50 \times 40 + 50 \times 2$
Ans: Distributivity of multiplication over addition

4. Use the properties of whole numbers and simplify.
(i) 50×102
Sol: Using distributive property of multiplication over addition.
$50 \times 102 = 50 \times 100 + 50 \times 2 = 5000 + 100 = 5100$
$50 \times 102 = 5100$
(ii) $500 \times 689 - 500 \times 89$
Sol: Using distributivity of multiplication over subtraction $500 \times 689 - 500 \times 89$
$= 500 \times (689 - 89) = 500 \times 600 = 300000$
$500 \times 689 - 500 \times 89 = 3,00,000$
(iii) $4 \times 132 \times 25$
Sol: We know that multiplication is associative
$\therefore \quad 4 \times 132 \times 25 = 4 \times 25 \times 132 = 100 \times 132 = 13200$
$4 \times 132 \times 25 = 13200$
(iv) $196 + 34 + 104$
Sol: $196 + 34 + 104 = 196 + 104 + 34 = 300 + 34 = 334$ [$\because$ Addition is associative]
$196 + 34 + 104 = 334$

Objective Type Questions

5. $(53 + 49) \times 0$ is
(a) 102 (b) 0 (c) 1 (d) $53 + 49 + 0$
Hint : $53 \times 0 + 49 \times 0 = 0 + 0 = 0$ [Ans: (b) 0]

6. $\frac{59}{1}$ is
(a) 1 (b) 0 (c) $\frac{1}{59}$ (d) 59 [Ans: (d) 59]

7. **The product of a non-zero whole number and its successor is always**
(a) an even number (b) an odd number (c) zero (d) none of these
[Ans: (a) an even number]

8. **The whole number that does not have a predecessor is**
(a) 10 (b) 0 (c) 1 (d) none of these
Hint : 0 is the smallest whole number **[Ans: (b) 0]**

9. **Which of the following expressions is not zero?**
(a) 2×0 (b) $0 + 0$ (c) $2 + 0$ (d) $0 - 0$
Hint : Dividing by 0 is not defined. **[Ans: (c) 2 + 0]**

10. **Which of the following is not true?**
(a) $(4237 + 5498) + 3439 = 4237 + (5498 + 3439)$
(b) $(4237 \times 5498) \times 3439 = 4237 \times (5498 \times 3439)$
(c) $4237 + 5498 \times 3439 = (4237 + 5498) \times 3439$
(d) $4237 \times (5498 + 3439) = (4237 \times 5498) + (4237 \times 3439)$
Hint : $4237 + 5498 \times 3439 = 4237 + (5498 \times 3439)$
[Ans: (c) $4237 + 5498 \times 3439 = (4237 + 5498) \times 3439$]

ADDITIONAL QUESTIONS - PROBLEMS

1. **Are all whole numbers are natural numbers? Justify your answer?**
Sol: No, all whole numbers are not natural numbers.
Because '0' belongs to whole number system. But it is not in natural number system.
$\therefore$ All whole numbers except '0' are natural numbers.

2. **Use associative property of addition to add 847 + 306 + 453**
Sol: $847 + 306 + 453 = (847 + 453) + 306 = 1300 + 306 = 1606$
$847 + 306 + 453 = 1606$

3. **Find the value of $(1063 \times 127) - (1063 \times 27)$**
Sol: $(1063 \times 127) - (1063 \times 27) = 1063\,(127 - 27)$ [Taking 1063 as common]
$= 1063 \times 100 = 106300.$
i.e $(1063 \times 127) - (1063 \times 27) = 106300$

4. **Find the product using suitable properties**
(a) 738×103 (b) 1005×168
Sol: (a) We have $738 \times 103 = 738 \times (100 + 3)$
$= 738 \times 100 + 738 \times 3$ [By distributive property of multiplication over addition)
$= 73800 + 2214 = 76014$
(b) $1005 \times 168 = (1000 + 5) \times 168$
$= (168 \times (1000 + 5)$ (By commutative property)
$= (168 \times 1000) + (168 \times 5)$
$= 1,68,000 + 840 = 1,68,840$

5. **Write the largest six digit number and write the number names in words using the Indian and International system.**
Sol: The largest six digit number is 999999
Number names is nine lakh ninety nine thousand nine hundred and ninety nine

Indian System

Lakh	Ten Thousand	Thousand	Hundred	Ten	One	The Number
9	9	9	9	9	9	9,99,999

International System

Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One	The Number
9	9	9	9	9	9	999,999

6. In a mobile store, the number of mobiles sold during a month is 1250, Assuming that the same number of mobiles are sold every month, find the number of mobiles sold in 2 years.

Sol:
Number of mobiles sold in 1 month = 1250
1 year = 12 months
2 years = $2 \times 12 = 24$ months
Number of mobiles sold in 24 months = $1250 \times 24 = 30,000$
Number of mobiles sold in 2 years = 30,000

7. Simplify $24 + 2 \times 8 \div 2 - 1$

Sol: $24 + 2 \times 8 \div 2 - 1$

$= 24 + 2 \times 4 - 1$ [÷ Completed first]

$= 24 + 8 - 1$ [× Completed second]

$= 32 - 1$ [+ Completed third]

$= 31$ [– Completed]

Exercise 1.6

Miscellaneous Practice Problems

1. Try to open my locked suitcase which has the biggest 5 digit odd number as the password comprising the digits 7, 5, 4, 3 and 8. Find the password.

Sol: Using place value chart

The number should be the biggest odd 5 digit number

TTH	TH	H	T	O
8	7	5	4	3

The password is 87543

2. As per the census of 2001, population of four states are given below. Arrange the states in ascending and descending order of their population.

State	Population
Tamil Nadu	72147030
Rajasthan	68548437
Madhya Pradesh	72626809
West Bengal	91276115

Sol: All the four values have 8 digits

∴ Comparing the left most digits we have 91276115, 72626809, 72147030, 68548437

Descending order: 91276115 > 72626809 > 72147030 > 68548437

Ascending order: 68548437 < 72147030 < 72626809 < 91276115

Ascending order: Rajasthan < Tamil Nadu < Madhy Pradesh < West Bengal

Descending order: West Bengal > Madhya Pradesh > TamilNadu > Rajasthan

3. Study the following table and answer the questions.

Year	No. of Tigers
1990	3500
2008	1400
2011	1706
2014	2226

(i) How many tigers were there in 2011?
(ii) How many tigers were less in 2008 than in 1990?
(iii) Did the number of tigers increase or decrease between 2011 and 2014? If yes, by how much?

Sol: (i) There are 1706 tigers in 2011

(ii) No. of tigers in 2008 = 1400

No. of tigers in 1990 = 3500

∴ 3500 – 1400 = 2100

There were 2100 lesser tigers

(iii) No. of tigers in 2014 = 2226

No. of tigers in 2011 = 1706

= 520 ∴ 2226 > 1706

∴ The number of tigers increased from 2011 to 2014.

Yes, the number of tigers increased, 520 more tigers are there in 2014.

4. Mullaikodi has 25 bags of apples. In each bag there are 9 apples. She shares them equally amongst her 6 friends. How many apples do each get? Are there any apples left over?

Sol:

Number of bags of apples = 25

Number of apples in each bag = 9

∴ Total apples = 25 × 9 = 225

Number of friends = 6

Number of apples each friend get = 225 ÷ 6 = 37

Number of apples each get = 37

Remaining apples = 3 [∴ 37 × 6 = 222, 225 – 222 = 3]

5. A poultry has produced 15472 eggs and fits 30 eggs in a tray. How many trays do they need?

Sol:

Total eggs = 15472

No. of eggs in 1 tray = 30

∴ No. of trays needed = 15472 ÷ 30 = 516

No. of trays needed = 516

[515 + 1 for remaining 22 eggs]

```
      515
30 | 15472
     150
     ---
      47
      30
     ---
      172
      150
     ---
       22
```

Challenging Problem

(Text book Page No.29 & 30)

6. Read the table and answer the following questions.

Name of the Star	Diameter (in miles)
Sun	864730
Sirius	1556500
Canopus	25941900
Alpha Centauri	1037700
Arcturus	19888800
Vega	2594200

Sol: **(i) Write the Canopus star's diameter in words, in the Indian and the International System.**

Canopus star's diameter is 25941900 miles

Indian System: Two crore Fifty Nine Lakh Forty one thousand Nine Hundred

International System: Twenty Five Million Nine Hundred Forty One Thousand Nine Hundred.

(ii) Write the sum of the place values of 5 in Sirius star's diameter in Indian System.

Sirus star's diameter = 1556500 miles

Sum of place values of 5 is $5 \times 100000 + 5 \times 10000 + 5 \times 100$

$= 500000 + 50000 + 500 = 5,50,500$

(iii) Eight hundred sixty four million seven hundred thirty. Write in Indian System.

Given value is 864,000,730

In Indian System 86,40,00,730

Eighty six crore forty lakhs seven hundred and thirty.

(iv) Write the diameter in words of Arcturus star in International System.

Diameter of Arcturus Star is 19,888,800 miles (i.e) Nineteen Million Eight Hundred and Eighty Eight Thousand Eight Hundred.

(v) Write the difference of the diameters of Canopus and Arcturus star in the Indian and the International Systems.

Diameter of Canopus = 25941900

Diameter of Arcturus = 19888800

Difference = 6053100

In Indian System 60,53,100

Sixty lakh fifty three thousand one hundred.

In International System 6,053,100

Six Million fifty three thousand one hundred.

7. Anbu asks Arivu Selvi to guess a five digit odd number. He gives the following hints.

- **The digit in the 1000s place is less than 5**
- **The digit in the 100s place is greater than 6**
- **The digit in the 10s place is 8.**

What is Arivu Selvi answer? Does she give more than one answer?

Sol: There are more than one answers.

One of them is **54781**

Some of the other numbers may be 64783, 74785, 84787 and so on.

8. A Music concert is taking place in a stadium. A total of 7,689 chairs are to be put in rows of 90.

(i) How many rows will there be?

(ii) Will there be any chairs left over?

$$\begin{array}{r} 85 \\ 90\overline{)7689} \\ 720 \\ \hline 489 \\ 450 \\ \hline 39 \end{array}$$

Sol: (i) There will be 85 rows

(ii) Yes, there are 39 chairs left over.

9. Round off the seven digit number 29,75,842 to the nearest lakhs and ten lakhs. Are they the same?

Sol:

TL	L	TTH	TH	H	T	O
2	9	7	5	8	4	2

To the nearest lakhs ⇒ 30,00,000

To the nearest ten lakhs ⇒ 30,00,000

Yes, they are the same.

10. Find the 5 or 6 or 7 digit numbers from a newspaper or a magazine to get a rounded number to the nearest ten thousand.

(i) A rounded number.

(ii) A rounded amount of money.

(iii) An exact number.

Sol: (i) Nearly 3,00,000 appeared for the Public Examination.

(ii) A discount of ₹ 1,00,00,000 will be allowed to the farmers

(iii) 46,00,000 students have benefited by scholarships.