REVISED EDITION

BASED ON THE SINGAPORE BAR MODEL METHOD

AS PER LATEST CBSE CURRICULUM

Content developed by

E3 EDUSOLUTIONS
TRANSFORMING LEARNING

Eupheus Learning
Our Advisors

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Yan Kow Cheong, based out of Singapore has been active on the Singapore’s mathematics educational scene for over two decades with teaching appointments at the ACS (Independent), NUS Extension, Institute of Technical Education, and Singapore Science Centre. He regularly conducts workshops and seminars for primary and secondary school students, teachers and parents.

Kow-Cheong is the author of Singapore’s best-selling Mathematical Quickies & Trickies series and the co-author of the MOE-approved Additional Maths 360. Besides editing primary and secondary MOE-approved textbooks, co-writing Teachers’ Guides, and ghost-writing assessment titles, he has also written contests questions and on-line assessment tests, and provided contents for maths apps.

A contributor to mathematics periodicals and journals, such as The Mathematics Educator, Mathematics Medley; he is also the author of The Stack Model Method: An Intuitive and Creative Approach to Solving Word Problems [Primary 3–4 & 5–6] and many other titles. His academic interests involve research in mathematics education, in particular, the psychology of learning and teaching mathematics, and creative problem solving.

Kow-Cheong writes about the good, the bad and the not-so-ugly of Singapore’s maths education and of the local educational publishing industry. Read his two maths blogs at www.singaporemathplus.com and www.singaporemathplus.net.

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Dr. Kevin Mahoney

Dr. Kevin Mahoney, based out of America has been a teacher of mathematics since 1989. A "math war" veteran, he has worked on wide variety of mathematics pedagogy and curricular materials in both public and private schools. In 2012, he became the first American to investigate Singapore's elementary teaching methods at the doctoral level, publishing original academic research on the effects of Singaporean pedagogy on American math students.

Dr. Kevin worked as Math Curriculum Coordinator at an independent school outside Boston, Massachusetts. He consults with large numbers of schools and teacher training institutes in U.S., Canada, Europe and India, training the faculty and helping schools effectively implement mathematics curriculum and instruction.
**Preface**

**WOW MATHS** based on the Singapore model is a series of eight textbooks specially designed to meet the mathematical needs and wants of primary and middle school students in India, by incorporating the proven problem solving strategies and heuristics commonly used in the Singapore maths curriculum.

Besides promoting critical and creative thinking in mathematics, the WOW MATHS series introduces the **Singapre Bar (or Model) Method**—a powerful visualization and problem-solving heuristic used to solve word problems and to help students gain a better insight into mathematical concepts across all the eight grades.

**Approach**

The series infuses the **Concrete-Pictorial-Abstract** (CPA) approach of learning and teaching interwoven with the bar model method. This blend makes the teaching of mathematical concepts much simple and easier. The simpler and effective strategies will not only motivate the students to learn a new topic, concept or skill, but will also make the learning of mathematics more meaningful and relevant to their everyday life.

---

**Concrete**

Venu has 3 cars.

- Red cars: 3

**Pictorial**

- Red cars: 3

**Abstract**

- Table: Venu: 3, Siya: 2

- Calculation: 3 + 2 = 5

They have 5 cars in all.
The WOW series has 15 unique features.

**WOW KIDS**
They are your Maths buddies. They stimulate interest, explain concepts and create involvement in learning.

- **I Have Learnt**
  Quick recap of the concepts learnt in the previous class.

- **Warm Up**
  Encourages active student participation and creates opportunity for interaction and discussion.

- **Everyday Maths**
  Relates the concepts taught to every situation and shows how mathematical concepts are applied to everyday situations.

- **Mental Maths**
  Trains children to perform mental calculations quickly.

- **Mind It**
  Cautions/Alerts children of the common mistakes and errors.

- **Practice Sheets**
  Consists of graded questions that test understanding and application of concepts taught with an integrated approach.

- **Maths Lab Activity**
  Hands on activities to further consolidate the concepts taught.

- **I Can**
  Consolidated check of the concepts learnt in the previous class.

- **Exercise**
  Graded exercises assess understanding of mathematical concepts.

- **Think Smart**
  Helps students enhance their critical and creative thinking skills, and to arouse mathematical curiosity.

- **Fact Zone**
  Mathematical facts about the topics.

- **Teaching Tip**
  Includes suggestions/ideas for teacher and parents to make the learning of the topic comprehensive and complete.

- **Maths Fun**
  Fun-filled activities to promote learning by doing.
Singapore Maths Curriculum is recognized around the world for its innovative and effective teaching and learning practices. Singapore uses heuristics (problem solving strategies) and Bar Model Method (an effective pedagogical strategy recognized in over 30 countries and ranked the highest in TIMSS).

Bar or the Model drawing is a powerful visualization problems solving heuristic that is used to solve both arithmetic and algebraic problems. The Model method enables word problems that we traditionally set at higher grades (using algebra) to be set at lower grades.

**The Bar (or Model) method:**
- helps students to gain a better insight into mathematical concepts such as fraction, ratio and percentage
- helps students to plan for the solution steps for solving a maths problem
- is comparable to, but is less abstract than, the algebraic method
- empowers students to solve challenging problems

Let’s solve some problems by both the traditional and bar model methods.

Venu spent \( \frac{1}{2} \) of his pocket money on a movie and \( \frac{1}{4} \) on a new pen. What fraction of his pocket money was left?

**Traditional Method**

<table>
<thead>
<tr>
<th>Movie</th>
<th>Pen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money spent on movie = ( \frac{1}{2} )</td>
<td>Money spent on pen = ( \frac{1}{4} )</td>
</tr>
<tr>
<td>Total money spent = ( \frac{1}{2} + \frac{1}{4} )</td>
<td></td>
</tr>
<tr>
<td>( = \frac{2}{4} + \frac{1}{4} = \frac{3}{4} )</td>
<td></td>
</tr>
<tr>
<td>Money left = ( 1 - \frac{3}{4} )</td>
<td></td>
</tr>
<tr>
<td>( = \frac{4}{4} - \frac{3}{4} = \frac{1}{4} )</td>
<td></td>
</tr>
</tbody>
</table>

\( \frac{1}{4} \) of his pocket money was left.

**Model Method**

Money left = \( \frac{1}{4} \)

\( \frac{1}{4} \) of his pocket money was left.
Sahil earned a profit of ₹20.00 by selling a pair of shoes for ₹300.00. What was the cost of the pair of shoes?

**Traditional Method**

- Selling price (S.P.) = ₹300.00
- Profit (P) = ₹20.00
- Cost price (C.P.) = ?

C.P. = S.P. – Profit
C.P. = ₹300.00 – ₹20.00
C.P. = ₹280.00

The cost price of the pair of shoes was ₹280.00.

**Model Method**

<table>
<thead>
<tr>
<th>S.P.</th>
<th>C.P. =?</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>₹300.00</td>
<td>₹20.00</td>
<td></td>
</tr>
</tbody>
</table>

The cost price of the pair of shoes was ₹280.00.

Bar modeling is also helpful in solving mathematical problems of higher grades.

Tanya has two brothers. She gave \( \frac{1}{6} \) of her stamp collection to one of them and \( \frac{2}{5} \) of the remainder to the other. In the end, she was left with 12 stamps. How many stamps did Tanya have at first?

**Traditional Method**

- Number of stamps = \( x \)
- Stamps given to one brother = \( \frac{1}{6} x \)
- Remaining stamp collection = \( \frac{5}{6} x \)
- Stamps given to other brother = \( \frac{2}{5} \times \frac{5}{6} x = \frac{1}{3} x \)
- Remaining stamps = 12

According to the question,
\[
\frac{1}{6} x + \frac{1}{3} x + 12 = x
\]
\[
\frac{2x + 2x + 72}{6} = x
\]
\[
\frac{3x + 72}{6} = x
\]
\[
3x + 72 = 6x
\]
\[
3x - 6x = -72
\]
\[
-3x = -72
\]
\[
x = 24
\]

Tanya had 24 stamps at first.

**Model Method**

- Total Stamps
- Remainder
- Given to first brother
- Remaining 12
- Second brother
- First brother

3 units = 12
1 unit = 12 ÷ 3 = 4
6 units = 6 × 4 = 24
Tanya had 24 stamps at first.
Polya’s four-step model, named after the Hungarian mathematician, George Polya (1887-1985), is commonly used in mathematical problem solving.

**Step - 1**
Understanding the problem

- Identify wanted, Given & Needed information
- Restate the problem

**Step - 2**
Devising a Plan

- Draw a model
- Work backwards
- Look for a pattern
- Guess & Check
- Simplify a problem

**Step - 3**
Doing

- Workout the solution
- Tryout different strategies

**Step - 4**
Checking

- Check the solution
- Seek alternatives solutions, if required
- Extend the method to other problems

**Total People**

```
<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Women</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
</tbody>
</table>
```

```
<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
</tbody>
</table>
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I have learnt

4 Thousands + 5 Hundreds + 3 Tens + 9 Ones

Standard Form: 4539

Expanded Form: 4000 + 500 + 30 + 9

4539 can be written in words as: four thousand five hundred thirty-nine.

Reading and writing numbers up to 9999

<table>
<thead>
<tr>
<th>Face Value</th>
<th>Place Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>9 × 1</td>
</tr>
<tr>
<td>3</td>
<td>3 × 10</td>
</tr>
<tr>
<td>5</td>
<td>5 × 100</td>
</tr>
<tr>
<td>4</td>
<td>4 × 1,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

Make the smallest 4-digit number using the digits 4, 3, 5 and 9.

So, the smallest 4-digit number is 3459.

So, the greatest 4-digit number is 9543.

We write the digits in ascending order to form the smallest number.

We write the digits in descending order to form the greatest number.

<table>
<thead>
<tr>
<th>Smallest digit</th>
<th>Greatest digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

Make the greatest 4-digit number using the digits 4, 3, 5 and 9.

Th | H | T | O
---|---|---|---
9  | 5 | 4 | 3

Greatest digit | Smaller digit
---------------|---------------
9              | 3              
5              | 4              
4              | 3              
3              | 9              

Numbers 1
I Have Learnt

Reading and writing numbers up to 9999

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

4 Thousands + 5 Hundreds + 3 Tens + 9 Ones

**Standard Form**: 4539

**Expanded Form**: 4000 + 500 + 30 + 9

4539 can be written in words as: **Four thousand five hundred thirty-nine**.

Forming the Smallest 4-digit Number

Make the smallest 4-digit number using the digits 4, 3, 5 and 9.

- Smallest digit: 3
- Greater digit: 9
- Smaller digit: 4
- Greater digit: 5

So, the smallest 4-digit number is 3459.

Forming the Greatest 4-digit Number

Make the greatest 4-digit number using the digits 4, 3, 5 and 9.

- Greatest digit: 9
- Smallest digit: 3
- Greater digit: 5
- Smaller digit: 4

So, the greatest 4-digit number is 9543.
1. Write the following numbers in words.
   a) 2641
   b) 4079
   c) 6006

2. Write the following number names in figures.
   a) Three thousand seventy-eight
   b) Nine thousand six hundred fifty-four

3. Form the smallest and the greatest 4-digit numbers using 4, 0, 7 and 8, without repetition of digits.
   a) Smallest number =
   b) Greatest number =

4. In the number 7253,
   a) the digit 2 is in the _________ place.
   b) the digit _________ is in the thousands place.
   c) the place value of digit 5 is ________.

5. Write the given numbers in expanded form.
   a) 1357 =
   b) 9084 =
   c) 2165 =

6. Fill in the blanks.
   a) The successor of 6999 is ____________.
   b) The predecessor of 4000 is ____________.
   c) The next even number after 2098 is ____________.

7. Arrange the following numbers in ascending order.
   a) 3423, 3342, 3432, 3324
   b) 6187, 8716, 6117, 6717

8. Arrange the following numbers in descending order.
   a) 9354, 9534, 9334, 9434
   b) 7865, 7765, 8765, 7675
1. Write the following numbers in words.

a) 2641  ______________________________________________

b) 4079   ______________________________________________

c) 6006   ______________________________________________

2. Write the following number names in figures.

a) Three thousand seventy-eight   __________  __________

b) Nine thousand six hundred fifty-four   __________  __________

3. RUPWKHVPDOOHVWDQGWKHJUHDWHVWGLJLWQXPEHUVXVLQJDQG without repetition of digits.

a) Smallest number =

b) Greatest number =

4. In the number 7253,

a) the digit 2 is in the __________

b) the digit __________ is in the thousands place.

c) the place value of digit 5 is __________.

5. Write the given numbers in expanded form.

a) 1357 =

b) 9084 =

c) 2165 =

6. Fill in the blanks.

a) The successor of 6999 is _______________.

b) The predecessor of 4000 is _______________.

c) The next even number after 2098 is _______________.

7. Arrange the following numbers in ascending order.

a) 3423, 3342, 3432, 3324  __________________________________

b) 6187, 8716, 6117, 6717   __________________________________

8. Arrange the following numbers in descending order.

a) 9354, 9534, 9334, 9434  __________________________________

b) 7865, 7765, 8765, 7675  __________________________________

9. Numbers beyond 10,000

Thousands Period

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTh</td>
<td>Th</td>
</tr>
<tr>
<td>H</td>
<td>T</td>
</tr>
<tr>
<td>O</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

5-digit numbers begin with **ten thousands** place (TTh) in the place value chart.

The place value chart for 5-digit numbers is divided into two periods—Ones and Thousands.

The ones period has three places—Hundreds, Tens and Ones.

The thousands period has two places—Ten thousands and Thousands.

**Example 1**

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place Value</th>
<th>Face Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>900</td>
<td>9</td>
</tr>
<tr>
<td>8,000</td>
<td>8</td>
</tr>
<tr>
<td>20,000</td>
<td>2</td>
</tr>
</tbody>
</table>

**Standard form:** 28,915

**Expanded form:** 20,000 + 8,000 + 900 + 10 + 5

28,915 is read as **twenty-eight thousand nine hundred fifteen**.
Commas are put between periods to help us read the number easily.

The place value of a digit depends upon the place occupied by it in the number. The face value of a digit in any number is the digit itself.

**Example 2**

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>1</td>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Place Value  
5  
70  
900  
1,000  
40,000  
3,00,000

Face Value  
5  
7  
9  
1  
4  
3

Standard form: 3,41,975  
Expanded form: 3,00,000 + 40,000 + 1,000 + 900 + 70 + 5

6-digit numbers begin with the **one lakh** place (L) in the place value chart.  
7-digit numbers begin with the **ten lakhs** place (TL) in the place value chart.  
Like the thousands period, the lakhs period also has two places—Ten lakhs and Lakhs.

**Place Value and Face Value**

The **place value** of a digit depends upon the place occupied by it in the number. The **face value** of a digit in any number is the digit itself.

We write the number names according to the place values of the digits.
Commas are put between periods to help us read the number easily.

24,51,215

The place value of a digit depends upon the place occupied by it in the number.

The face value of a digit in any number is the digit itself.

<table>
<thead>
<tr>
<th>Face Value</th>
<th>Place Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3,00,000</td>
<td>3</td>
</tr>
<tr>
<td>80,00,000</td>
<td>8</td>
</tr>
</tbody>
</table>

Expanded form: 20,00,000 + 9,00,000 + 60,000 + 8,000 + 400 + 30 + 5
Number name: Twenty-nine lakh sixty-eight thousand four hundred thirty-five.

Example 3
Write the following numbers in the place value table. Also write their expanded form and number names.

a) 29,68,435

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Place Value: 5 × 1
Face Value: 5

Place Value: 3 × 10
Face Value: 3

Place Value: 4 × 100
Face Value: 4

Place Value: 8 × 1,000
Face Value: 8

Place Value: 6 × 10,000
Face Value: 6

Place Value: 9 × 1,00,000
Face Value: 9

Place Value: 2 × 10,00,000
Face Value: 2

Expanded form: 20,00,000 + 9,00,000 + 60,000 + 8,000 + 400 + 30 + 5
Number name: Twenty-nine lakh sixty-eight thousand four hundred thirty-five.

Example 2

99,999 1,00,000

Greatest 5-digit number
Smallest 6-digit number

9,99,999 10,00,000

Greatest 6-digit number
Smallest 7-digit number

6-digit numbers begin with the one lakh place (L) in the place value chart.

7-digit numbers begin with the ten lakhs place (TL) in the place value chart.

Like the thousands period, the lakhs period also has two places—Ten lakhs and Lakhs.

Expanded form:

Example 3
Write the following numbers in the place value table. Also write their expanded form and number names.

a) 29,68,435

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Place Value: 5 × 1
Face Value: 5

Place Value: 3 × 10
Face Value: 3

Place Value: 4 × 100
Face Value: 4

Place Value: 8 × 1,000
Face Value: 8

Place Value: 6 × 10,000
Face Value: 6

Place Value: 9 × 1,00,000
Face Value: 9

Place Value: 2 × 10,00,000
Face Value: 2

Expanded form: 20,00,000 + 9,00,000 + 60,000 + 8,000 + 400 + 30 + 5
Number name: Twenty-nine lakh sixty-eight thousand four hundred thirty-five.

b) 83,01,243

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Place Value: 3 × 1
Face Value: 3

Place Value: 4 × 10
Face Value: 4

Place Value: 2 × 100
Face Value: 2

Place Value: 1 × 1,000
Face Value: 1

Place Value: 0 × 10,000
Face Value: 0

Place Value: 3 × 1,00,000
Face Value: 3

Place Value: 8 × 10,00,000
Face Value: 8

Expanded form: 80,00,000 + 3,00,000 + 0 + 1,000 + 200 + 40 + 3
Number name: Eighty-three lakh one thousand two hundred forty-three.

Mental Maths
Complete the following blanks.

a) 11,467; _________; 13,467; 14,467; _________; _________.

b) 3,07,478; 3,07,480; _________; _________; 3,07,486; _________.

c) 9,99,997; _________; 9,99,999; _________; _________; _________.
Exercise 1.1

1. **Answer the following questions.**
   a) What are the smallest and the greatest 5-digit numbers?
   b) How many places does the thousands period have?
   c) What are the smallest and the greatest 6-digit numbers?
   d) What are the smallest and the greatest 7-digit numbers?

2. **Write the face value of each digit for the following numbers.**
   a) 16,235   b) 23,572   c) 98,765
   d) 1,23,056  e) 98,76,547  f) 49,75,136

3. **Write the place value of each digit for the following numbers.**
   a) 68,617   b) 81,264   c) 42,416
   d) 21,30,266  e) 87,61,428  f) 53,27,166

4. **Write the face value and place value of 7 in number 7, 77, 777.**

5. **Write the expanded form of the following numbers.**
   a) 21,056   b) 12,416   c) 9,12,861  d) 29,82,983

6. **Write the standard (short) form of the following.**
   a) 50,000 + 1,000 + 400 + 30 + 9  b) 8,00,000 + 2,00,000 + 600 + 70
   c) 40,00,000 + 30 + 4  d) 63,00,000 + 3,000 + 3

7. **Write the number names of the following numbers.**
   a) 12,503  b) 40,625  c) 79,035
   d) 1,02,534  e) 25,00,150  f) 50,40,300

8. **Write the numbers for these number names with the help of the place value table.**
   a) Thirty-five thousand six hundred seventy-two
   b) Seven lakh eighty-nine thousand four hundred fifty-two
   c) Three lakh seventy thousand three hundred
   d) Twenty-three lakh fifty thousand seventy

---

Make students understand that zero is the only digit whose place value remains zero, irrespective of the place it occupies in the number. For example, in 10429, the value of 0 in the thousands place is zero.
Comparing and Ordering Numbers

Predecessor and Successor

**Predecessor**
The predecessor of a number is 1 less than the number.

\[
\text{Number} - 1 = \text{Predecessor}
\]

\[
47,283 - 1 = 47,282
\]

\[
6,47,283 - 1 = 6,47,282
\]

47,282 is the predecessor of 47,283 and 6,47,282 is the predecessor of 6,47,283.

**Successor**
The successor of a number is 1 more than the number.

\[
\text{Number} + 1 = \text{Successor}
\]

\[
47,283 + 1 = 47,284
\]

\[
6,47,283 + 1 = 6,47,284
\]

47,284 is the successor of 47,283 and 6,47,284 is the successor of 6,47,283.

Comparing Numbers

**Example 1**

Compare 7,49,237 and 5,19,267.

Start comparing the digits from extreme left of the number.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>4</td>
<td>9</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>9</td>
<td>2</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

\[
7 \text{ L} > 5 \text{ L}
\]

\[
7,49,237 > 5,19,267 \quad \text{or} \quad 5,19,267 < 7,49,237
\]

**Example 2**

Compare 2,56,945 and 2,12,545.

Start from the left, compare the digits till you find two digits that are different.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

\[
2 \text{ L} = 2 \text{ L}
\]

\[
5 \text{ TTh} > 1 \text{ TTh}
\]

\[
2,56,945 > 2,12,545 \quad \text{or} \quad 2,12,545 < 2,56,945
\]
Ordering Numbers

Example 3

Arrange the following numbers in ascending and descending order.
3,23,567; 31,572; 3,37,482; 5,84,112

1. Write all the digits of the number in the place value table. Then compare the digits of the number.

2. There are three 6-digit numbers and one, 5-digit number. So, the 5-digit number (31,572) is the smallest number of all.

3. 5 is the greatest digit in the highest place of the place value table. Therefore, 5,84,112 is the greatest number.

4. Now 3 L = 3 L, so compare their respective digits in TTh place.
   2 TTh < 3 TTh
   So, 3,23,567 < 3,37,482.

Numbers in ascending order are:
31,572 < 3,23,567 < 3,37,482 < 5,84,112

Numbers in descending order are:
5,84,112 > 3,37,482 > 3,23,567 > 31,572

Everyday Maths

The following table shows the number of people who travelled from Delhi to Mumbai in February. Write the number name of each number, and then arrange the numbers in ascending order.

<table>
<thead>
<tr>
<th>Week</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30,78,981</td>
</tr>
<tr>
<td>2</td>
<td>29,44,004</td>
</tr>
<tr>
<td>3</td>
<td>19,99,908</td>
</tr>
<tr>
<td>4</td>
<td>42,02,725</td>
</tr>
</tbody>
</table>
1. Write the predecessor and the successor of the following numbers.
   a) 21,523   b) 12,570   c) 3,40,025
   d) 1,37,520   e) 74,73,251   f) 79,00,035

2. Write the successor of the greatest 5-digit number.

3. Write the predecessor of the smallest 6-digit number.

4. Fill in the blanks with >, < or =.
   a) 12,876   43,267
   b) 12,928   12,937
   c) 6,17,325   6,17,325
   d) 5,07,152   73,005
   e) 9,62,531   1,35,269
   f) 52,57,032   42,56,032
   g) 5,07,192   50,719
   h) 77,50,192   75,00,253

5. Write the successor or predecessor to fill in the blanks.
   a) 8,53,416;   ;   ;
   b)   ;   ; 2,34,521
   c) 99,999,   ;   ;
   d)   ;   ; 10,00,000

6. Arrange the following numbers in ascending and descending order.
   a) 2,45,621; 1,26,542; 45,169; 34,805
   b) 9,98,999; 8,99,989; 9,98,899; 98,889
   c) 1,21,211; 61,254; 90,153; 90,15,530
   d) 62,17,031; 6,21,703; 64,15,273; 63,93,970
   e) 86,67,685; 86,77,685; 86,67,681; 86,77,648

Think Smart

- Copy the above number line on a sheet of paper.
- Divide the number line into 10 equal parts and write the value of each part.
- Show with arrows where the numbers 1,65,600, 1,65,100, 1,65,800 and 1,65,750 are to be placed on the number line.
Without Repetition

Form the greatest and the smallest 7-digit numbers using the digits 2, 7, 5, 8, 3, 1 and 9, with each digit being used only once.

**Greatest number**

To form the greatest number, write the digits in descending order in the place value table.

```
<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
```

98,75,321 is the greatest number.

**Smallest number**

To form the smallest number, write the digits in ascending order in the place value table.

```
<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>
```

12,35,789 is the smallest number.

---

**Fact Zone**

To obtain the greatest number of any number of digits, write 9 in all the places of the number. Similarly, to obtain the smallest number, write 1 at the highest place of the number and zeros at the other places.

Greatest 7-digit number = 99,99,999
Smallest 7-digit number = 10,00,000

With Repetition

Form the greatest and the smallest 7-digit numbers, using the digits 2, 7, 5 and 8, by repeating the digit(s).

**Greatest number**

We repeat the greatest digit most number of times and the rest of the digits once. So, 8 is repeated 4 times starting from the highest place. We write the other digits in the remaining places, in its descending order.

```
<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>
```

So, the greatest 7-digit number formed is 88,88,752.
We repeat the smallest digit most number of times and the rest of the digits once. So, 2 is repeated 4 times starting from the highest place. We write the other digits in the remaining places, in its ascending order.

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

So, the smallest 7-digit number formed is 22,22,578.

Choose any 2 non-zero digits to form the smallest and the greatest:
- 5-digit number
- 6-digit number
- 7-digit number

**Exercise 1.3**

1. **In each set, form the smallest and the greatest 6-digit numbers, without repeating the following digits.**
   a) 4, 3, 0, 2, 7, 1  b) 6, 7, 1, 2, 5, 8  c) 3, 9, 8, 7, 2, 1
   d) 8, 0, 1, 2, 5, 7  e) 7, 5, 6, 9, 2, 9  f) 9, 6, 0, 5, 1, 3

2. **Form the smallest and the greatest 6-digit numbers by repeating the smallest and the greatest digits, respectively.**
   a) 2, 5, 7, 3, 4  b) 1, 0, 2, 8, 9  c) 7, 6, 5, 2, 0
   d) 2, 6, 7, 1, 3  e) 5, 1, 3, 4, 2  f) 9, 0, 8, 1, 7

3. **Use the five given clues to form the 7-digit number.**
   a) Digit 4 is in the ten lakhs place.
   b) Digit 1 is in the ten thousands place.
   c) Digit 2 is in the tens place.
   d) Digit 6 is in the ones place.
   e) The digits in the remaining places are zero.

4. **Change the position of the digits, if necessary, to form the greatest 7-digit number.**
   a) 41,23,578  b) 98,72,364  c) 56,23,014
Rounding Off Numbers

Rounding Off to the Nearest Tens
When we round off a number to the nearest tens, we look for the digit in the ones place.

If the digit in the ones place is less than 5, keep the tens digit as it is and replace the ones digit by 0.

If the digit in the ones place is 5 or greater than 5, increase the tens digit by 1 and replace the ones digit by 0.

Example 1
Round off 1324 to the nearest tens.

\[
\begin{array}{c|c|c|c}
H & T & O \\
\hline
3 & 2 & 4 \\
\hline
\end{array}
\rightarrow
\begin{array}{c|c|c|c}
H & T & O \\
\hline
3 & 2 & 0 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
4 < 5 \\
324 \rightarrow 320 \\
\end{array}
\]

324 rounded off to the nearest tens is 320.

Example 2
Round off 4765 to the nearest tens.

\[
\begin{array}{c|c|c|c|c}
Th & H & T & O \\
\hline
4 & 7 & 6 & 5 \\
\hline
\end{array}
\rightarrow
\begin{array}{c|c|c|c|c}
Th & H & T & O \\
\hline
4 & 7 & 7 & 0 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
5 = 5 \\
4765 \rightarrow 4770 \\
\end{array}
\]

4765 rounded off to the nearest tens is 4770.

Rounding Off to the Nearest Hundreds
When we round off a number to the nearest hundreds, we look for the digit in the tens place.

If the digit in the tens place is less than 5, keep the hundreds digit as it is and replace the tens and ones digits by 0.

If the digit in the tens place is 5 or greater than 5, increase the hundreds digit by 1 and replace the tens and the ones digits by 0.

Example 3
Round off 7249 to the nearest hundreds.

\[
\begin{array}{c|c|c|c}
Th & H & T & O \\
\hline
7 & 2 & 4 & 9 \\
\hline
\end{array}
\rightarrow
\begin{array}{c|c|c|c}
Th & H & T & O \\
\hline
7 & 2 & 0 & 0 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
\text{A number at the midway point is always rounded off to the next larger number.} \\
7249 \rightarrow 7200 \\
\end{array}
\]

7249 rounded off to the nearest hundreds is 7200.

Example 4
Round off 3962 to the nearest hundreds.

\[
\begin{array}{c|c|c|c}
Th & H & T & O \\
\hline
3 & 9 & 6 & 2 \\
\hline
\end{array}
\rightarrow
\begin{array}{c|c|c|c}
Th & H & T & O \\
\hline
4 & 0 & 0 & 0 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
4000 \\
3962 \rightarrow 4000 \\
\end{array}
\]

3962 rounded off to the nearest hundreds is 4000.

Use real life example to explain why rounding off is useful in practice. For example, instead of saying that the cost of a cycle is ₹25,220, we round it off and say it to be about ₹25,000.
Example 3
Round off 7249 to the nearest hundreds.

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

4 T < 5 T
7249 → 7200

7249 rounded off to the nearest hundreds is 7200.

Example 4
Round off 3962 to the nearest hundreds.

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

6 T > 5 T
3962 → 4000

3962 rounded off to the nearest hundreds is 4000.

Rounding Off to the Nearest Thousands
When we round off a number to the nearest thousands, we look for the digit in the hundreds place.

If the digit in the hundreds place is less than 5, keep the thousands digit as it is and replace the hundreds, tens and ones digits by 0.

If the digit in the hundreds place is 5 or greater than 5, increase the thousands digit by 1 and replace the hundreds, tens and ones digits by 0.

Example 5
Round off 24382 to the nearest thousands.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

3 H < 5 H
24382 → 24000

24382 rounded off to the nearest thousands is 24000.
Example 6
Round off 85704 to the nearest thousands.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

7 H > 5 H
85704 → 86000

85704 rounded off to the nearest thousands is 86000.

Rounding Off to the Nearest Ten Thousands
When we round off a number to the nearest ten thousands, we look for the digit in the thousands place.

If the digit in the thousands place is less than 5, keep the ten thousands digit as it is and replace the thousands, hundreds, tens and ones digits by 0.

If the digit in the thousands place is 5 or greater than 5, increase the ten thousands digit by 1 and replace the thousands, hundreds, tens and ones digits by 0.

Example 7
Round off 74538 to the nearest ten thousands.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

4 Th < 5 Th
74538 → 70000

74538 rounded off to the nearest ten thousands is 70000.

Exercise 1.4
1. Round off the following numbers to the nearest tens.
   a) 2345  
   b) 4126  
   c) 7892  
   d) 1009  
   e) 2058  
   f) 3177  
   g) 9248  
   h) 4299  
   i) 3005

2. Round off the following numbers to the nearest hundreds.
   a) 1026  
   b) 7598  
   c) 1254  
   d) 45,214  
   e) 65,589  
   f) 70,092  
   g) 12,999  
   h) 70,509  
   i) 89,643
3. Round off the following numbers to the nearest thousands.
   a) 34,598  b) 52,337  c) 10,256
   d) 64,230  e) 46,970  f) 23,049
   g) 97,190  h) 14,535  i) 80,170

4. Round off the following numbers to the nearest ten thousands.
   a) 14,785  b) 45,165  c) 95,312
   d) 36,489  e) 15,345  f) 72,364
   g) 64,046  h) 10,523  i) 60,555

Roman Numerals

The Romans used seven letters of the English alphabet to denote numbers.

We often write I, II, III, IV, V, VI, VII, VIII, IX, X, XI and XII to number the pages, grades or digits on a clock.

The letters and their corresponding values are given below.

<table>
<thead>
<tr>
<th>Numeral</th>
<th>I</th>
<th>V</th>
<th>X</th>
<th>L</th>
<th>C</th>
<th>D</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>50</td>
<td>100</td>
<td>500</td>
<td>1000</td>
</tr>
</tbody>
</table>

- We can repeat numbers. Repetition means addition. Only letters I, X, C and M of the English alphabet can be repeated. However, we can only repeat them thrice.
- When we place a smaller letter (I, X and C) on the left of a larger letter, it means subtraction. When we place a larger letter (I, X and C) on the left of the smaller letter, it means addition.

Reading Roman Numerals

III = 1 + 1 + 1 = 3
IX = 10 - 1 = 9
XI = 10 + 1 = 11
XC = 100 - 10 = 90
CX = 100 + 10 = 110
XXX = 10 + 10 + 10 = 30

Mind It

6 = IV  ×
6 = VI  ✓
Writing Roman Numerals

Rules:

Symbol I can only be subtracted from V and X.
Symbol X can only be subtracted from L and C.
Symbols V, L and D are never repeated and subtracted.

Example

19 = X IX \[\frac{10 + 9}{10 + 9}\]
29 = XX IX \[\frac{20 + 9}{20 + 9}\]
43 = XL III \[\frac{40 + 3}{40 + 3}\]

58 = L VIII \[\frac{50 + 8}{50 + 8}\]
66 = LX VI \[\frac{60 + 6}{60 + 6}\]
96 = XC VI \[\frac{90 + 6}{90 + 6}\]

Exercise 1.5

1. State True or False.
   a) The number 42 is written as XXXXII in Roman numerals.
   b) The value of C is 100 in Roman numerals.
   c) The number 85 is written as CXXXV in Roman numerals.
   d) The number 95 is written as LCV in Roman numerals.
   e) XXIX stands for 10 + 11 + 10.
   f) XXVI is less than XXIV.

2. What Roman numerals do these numbers represent?
   a) 109  b) 75  c) 38  d) 92

3. Write the value of the following.
   a) LIV  b) CX  c) LXXX  d) LXV

Find the following and fill in the blanks using Roman numerals.

Your father’s age _______________________
Your mother’s age _______________________
Date of birth of Pt. Jawahar Lal Nehru _______________________
Date on which India gained independence _______________________
Date of birth of your best friend _______________________
Maths Lab Activity

**Aim:** To strengthen the concept of rounding off.

**Requirements:** Paper and pen

**Steps:**
1. Choose the capitals of any five states shown in the map given below.
2. Write the distances (from Delhi) in the given table.
3. Round off each distance (in metres) to the nearest thousands and ten thousands.
4. What difference do you observe in the values when numbers are rounded off to the given places? Share your findings with your partner.

<table>
<thead>
<tr>
<th>State/Capital</th>
<th>Distance in m (km × 1000)</th>
<th>Round off (in m) to the nearest thousands</th>
<th>Round off (in m) to the nearest ten thousands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucknow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I Have Learnt

1. **How many photos are there in all?**

   I have 370 photos.

   We have a total of 2138 photos.

   I have 1768 photos.

   To find the sum, add the numbers.

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>
   +   | 1 | 7 | 6 | 8 |
   | 2  | 1 | 3 | 8 |
   =   | 4 | 6 | 1 | 8 |

   \[370 + 1768 = 2138\]

2. **Who has more photos and by how much?**

   Venu has more photos.

   Look at the above model. Venu has more photos.

   To find by how much does Venu has more photos, we will subtract the smaller number from the larger number.

<table>
<thead>
<tr>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>
   -   | 1 | 6 | 8 |
   | 1  | 3 | 9 | 8 |

   \[1768 - 370 = 1398\]
1. Solve the following.

   a) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   2 & 0 & 0 & 8 \\
   5 & 7 & 3 & 9 \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 6 & 0 & 9 \\
   4 & 9 & 8 & 6 \\
   \hline
   \end{array}
   \]

   c) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 0 & 7 & 9 \\
   1 & 4 & 3 & 8 \\
   \hline
   \end{array}
   \]

   d) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   8 & 1 & 0 & 6 \\
   5 & 4 & 5 & 8 \\
   \hline
   \end{array}
   \]

2. Fill in the missing digits.

   a) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   \text{□} & 9 & \text{□} & 8 \\
   2 & \text{□} & 8 & \text{□} \\
   \hline
   7 & 1 & 0 & 6 \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   \text{□} & 4 & 6 & 5 \\
   3 & \text{□} & \text{□} & \text{□} \\
   \hline
   5 & 3 & 3 & 2 \\
   \hline
   \end{array}
   \]

   c) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   5 & \text{□} & 8 & \text{□} \\
   \text{□} & 3 & \text{□} & 5 \\
   \hline
   9 & 0 & 3 & 4 \\
   \hline
   \end{array}
   \]

   d) \[
   \begin{array}{c|c|c|c|c}
   \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   6 & \text{□} & 9 & 7 \\
   4 & 1 & \text{□} & \text{□} \\
   \hline
   \text{□} & 8 & 9 & 6 \\
   \hline
   \end{array}
   \]

3. In a bakery, 5060 buns were baked in the morning and 4520 buns were baked in the afternoon.

   a) How many buns were baked altogether?

   b) If 3125 buns were sold the next day, how many buns were left?
Addition without Regrouping

Let’s help Irfan’s mother find the total. Look at the table given below.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

```
+  4  6  4  0  0
    4  6  4  0  0
```

- 0 Ones + 0 Ones = 0 Ones
- 0 Tens + 0 Tens = 0 Tens
- 0 Hundreds + 4 Hundreds = 4 Hundreds
- 2 Thousands + 4 Thousands = 6 Thousands
- 3 Ten thousands + 1 Ten thousand = 4 Ten thousands

The total cost of the TV set and the music system is ₹46,400.
**Example 1**

Let’s add 4,71,223 and 21,252 by arranging them in columns.

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>

4,71,223 + 21,252 = 4,92,475

**Example 2**

We can also add more than two numbers, by arranging them in columns as shown below.

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>

4,50,243 + 4,12,130 + 37,524 = 8,99,897

**Exercise 2.1**

1. Add the following.

   a)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

   b)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

   c)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

   d)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

   e)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

   f)  
   
<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

2. Arrange in columns and add.

   a)  
   
   23,241; 2,13,021; 1,62,123

   b)  
   
   66,315; 21,312; 11,252

   c)  
   
   2,11,111; 2222; 3,33,333

   d)  
   
   1,42,312; 1,11,111; 22,320
Addition with Regrouping

Example 1  Add 7,62,547 and 2,25,217.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

We regroup 14 ones as 1 ten 4 ones.

7 Ones + 7 Ones = 14 Ones
= 1 Ten 4 Ones
1 Ten + 4 Tens + 1 Ten = 6 Tens
5 Hundreds + 2 Hundreds = 7 Hundreds
2 Thousands + 5 Thousands = 7 Thousands
6 Ten thousands + 2 Ten thousands = 8 Ten Thousands
7 Lakhs + 2 Lakhs = 9 Lakhs

7,62,547 + 2,25,217 = 9,87,764

Example 2  Add 8,71,999 and 19,999.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>7</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

9 Ones + 9 Ones = 18 Ones
= 1 Ten 8 Ones
1 Ten + 9 Tens + 9 Tens = 19 Tens
= 1 Hundred 9 Tens
1 Hundred + 9 Hundreds + 9 Hundreds = 19 Hundreds
= 1 Thousand 9 Hundreds
1 Thousand + 1 Thousand + 9 Thousands = 11 Thousands
= 1 Ten Thousand 1 Thousand
1 Ten thousand + 7 Ten thousands + 1 Ten thousand = 9 Ten Thousands
8 lakhs + 0 lakhs = 8 Lakhs

8,71,999 + 19,999 = 8,91,998

Ask the students to verify every time if they have copied the digit of the numbers according to their places.
Exercise 2.2

1. Add the following.

a)

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

+ 

b)

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

2. Find the sum.

a) 7,89,261 and 90,123

b) 1,15,206; 2,52,621 and 5,62,131

Properties of Addition

The properties of addition also hold for larger numbers.

1. Order Property of Addition

The two numbers when added in any order does not change the sum.

Let’s add 25,000 and 15,000

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

+ 

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The sum is the same.

So, 25,000 + 15,000 = 15,000 + 25,000 = 40,000

2. Additive Identity Property

When we add zero to a number, it gives the number itself.

- 999 + 0 = 999
- 9,999 + 0 = 9,999
- 99,999 + 0 = 99,999
- 9,99,999 + 0 = 9,99,999

0 is called the additive identity.
3. **Grouping Property of Addition**  
   The sum of three or more numbers does not change even, when their grouping is changed.  
   Let's add 9000; 12,000 and 70,000 in two different ways.

\[
(12,000 + 70,000) + 9,000
\]

\[
\begin{array}{cccccc}
\text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
1 & 2 & 0 & 0 & 0 \\
7 & 0 & 0 & 0 & 0 \\
8 & 2 & 0 & 0 & 0 \\
\end{array}
\]

\[
12,000 + (70,000 + 9,000)
\]

\[
\begin{array}{cccccc}
\text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
7 & 0 & 0 & 0 & 0 \\
9 & 0 & 0 & 0 & 0 \\
7 & 9 & 0 & 0 & 0 \\
\end{array}
\]

---

**Addition Facts**

1. **Adding 1s**
   When we add 1 to a number, it gives the successor of that number.

   \[
   \begin{align*}
   555 + 1 &= 556 \\
   5,555 + 1 &= 5,556 \\
   55,555 + 1 &= 55,556 \\
   5,55,555 + 1 &= 5,55,556
   \end{align*}
   \]

   \[
   \begin{align*}
   1 + 555 &= 556 \\
   1 + 5,555 &= 5,556 \\
   1 + 55,555 &= 55,556 \\
   1 + 5,55,555 &= 5,55,556
   \end{align*}
   \]

2. **Adding 10s, 100s, 1000s and 10,000s**
   When we add 10; 100; 1000 or 10,000 to a number, the digit in the tens, hundreds, thousands or ten thousands place increases by 1, respectively.

   \[
   \begin{align*}
   55,555 + 10 &= 55,565 \\
   55,555 + 100 &= 55,655 \\
   55,555 + 1,000 &= 56,555 \\
   55,555 + 10,000 &= 65,555
   \end{align*}
   \]
Exercise 2.3

1. Fill in the blanks.
   a) $31,250 + \underline{\hspace{2cm}} = 31,250$
   b) $\underline{\hspace{2cm}} + 10 = 63,649$
   c) $93,487 + 0 = \underline{\hspace{2cm}}$
   d) $11,348 + \underline{\hspace{2cm}} = 11,349$
   e) $36,482 + 1 = \underline{\hspace{2cm}}$
   f) $42,989 + \underline{\hspace{2cm}} = 52,989$
   g) $54,810 + 100 = \underline{\hspace{2cm}}$
   h) $\underline{\hspace{2cm}} + 1000 = 51,500$
   i) $\underline{\hspace{2cm}} + 23,451 = 23,451 + 66,849$
   j) $(42,684 + 6,12,321) + 59,282 = \underline{\hspace{2cm}} + (59,282 + 6,12,321)$

2. Add 34,252 to 40,804. Then, add 40,804 to 34,252.
   a) Is the total same in each addition?
   b) Name the property of addition used.

Estimating the Sum

Rounding off numbers and estimating the sum makes calculations easier and quicker.

Look at the digit to the right of the place to which the number is to be rounded off.

<table>
<thead>
<tr>
<th>If the digit is less than 5, keep the digit of the place to which the number is to be rounded off as it is. Put zeros at other places on its right.</th>
<th>If the digit is more than or equal to 5, increase the digit of the place to which the number is to be rounded off by 1. Put zeros at other places on its right.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the digit is less than 5, keep the digit of the place to which the number is to be rounded off as it is. Put zeros at other places on its right.</td>
<td>If the digit is more than or equal to 5, increase the digit of the place to which the number is to be rounded off by 1. Put zeros at other places on its right.</td>
</tr>
</tbody>
</table>

Rounding Off to the Nearest Thousands

Example 1

Estimate the sum of 42,726 and 51,365 to the nearest thousands and compare it with the actual sum.

Rounding off $42,726$ to the nearest 1000s $\rightarrow 43,000$

Rounding off $51,365$ to the nearest 1000s $\rightarrow 51,000$
Rounding Off to the Nearest Ten Thousands

Example 2

Estimate the sum of 1,25,138 and 6,63,848 to the nearest ten thousands. Compare it with the actual sum.

The estimated sum (94,000) is close to the actual sum (94,091). So, the answer is reasonable.

Exercise 2.4

1. Estimate the sum by rounding off the numbers to the nearest thousands and complete the table.

<table>
<thead>
<tr>
<th>Sum</th>
<th>Rounded off numbers</th>
<th>Estimated sum</th>
<th>Actual sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 42,710 + 36,280</td>
<td>43,000 + 36,000</td>
<td>79,000</td>
<td>78,990</td>
</tr>
<tr>
<td>b) 52,425 + 71,892</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 86,262 + 62,666</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) 21,935 + 52,138</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Round off the numbers to the nearest ten thousands and estimate their sum. Draw arrows to join the sum to the estimated number. The first one has been done for you.

<table>
<thead>
<tr>
<th>Sum Rounded off numbers</th>
<th>Estimated sum</th>
<th>Actual sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 43,000 + 36,000</td>
<td>79,000</td>
<td>78,990</td>
</tr>
<tr>
<td>b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rounding off 6,63,848 to the nearest 10,000s

6,60,000

Rounding off 1,25,138 to the nearest 10,000s

1,30,000

The estimated sum (7,90,000) is close to the actual sum (7,88,986).

So, the answer is reasonable.

3. Solve the following word problems.

a) A section of library has 63,427 books and another section has 36,163 books. Estimate the total number of books in the library.

b) Yummy Bakery has completed two years of its operations. The bakery baked 3,18,429 cookies in the first year and 3,20,123 cookies in the second year. Estimate the number of cookies that they baked in two years.

3. Solve the following word problems.

a) A section of library has 63,427 books and another section has 36,163 books. Estimate the total number of books in the library.

b) Yummy Bakery has completed two years of its operations. The bakery baked 3,18,429 cookies in the first year and 3,20,123 cookies in the second year. Estimate the number of cookies that they baked in two years.

3. Solve the following word problems.

Example 1

In the first week, 12,725 people visited a book fair. In the second week, 26,321 people visited the book fair. How many people went to the book fair in 2 weeks?

**Understanding**

We are given the number of people who visited the book fair in two weeks. We have to find the total number of people.

**Planning**

Let’s draw a model to choose the correct operation.

**Doing**

\[
\begin{array}{cccccc}
\text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
1 & 2 & 7 & 2 & 5 \\
2 & 6 & 3 & 2 & 1 \\
3 & 9 & 0 & 4 & 6 \\
\end{array}
\]

39,046 people went to the book fair in two weeks.
Checking

For a quick check, let’s round off the numbers. The rounded off sum should be closer to the actual sum.

\[
\begin{array}{c|c|c|c|c|c}
T&Th&H&T&O \\
1&3&0&0&0 \\
2&6&0&0&0 \\
3&9&0&0&0 \\
\end{array}
\]

The estimated sum 39,000 is close to the actual sum, that is, 39,046. So, the answer is correct.

Exercise 2.5

Solve the following word problems by drawing the models.

1. In a charity show held in two different cities, the collections made were \( \text{Rs}19,854 \) and \( \text{Rs}28,986 \). What was the total money collected?
2. Ravi saved \( \text{Rs}12,621 \) and his brother saved \( \text{Rs}15,625 \). Find the amount they saved altogether.
3. In a shopping mall, 41,382 people visited on day 1; 56,897 on day 2 and 39,242 on day 3. What is the total number of people who visited the mall in 3 days?
4. A total of 2,55,739 patients visited a health camp in the month of April and 2,03,517 patients visited in May.
   a) Estimate the total number of patients who visited the health camp.
   b) Find the actual number of patients who visited the health camp.
5. In a medical camp, 1,36,482 men; 2,21,761 women and 31,411 children were treated. How many people were treated in all?

Subtraction without Regrouping

My mother has spent \( \text{Rs}46,400 \) on a TV set and a music system. She had \( \text{Rs}69,800 \) with her. How much money is left after buying the TV set and the music system?
Let’s calculate the amount of money left with Irfan’s mother.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
<th>Minuend</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>9</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>Subtrahend</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>Difference</td>
</tr>
</tbody>
</table>

- 0 Ones - 0 Ones = 0 Ones
- 0 Tens - 0 Tens = 0 Tens
- 8 Hundreds - 4 Hundreds = 4 Hundreds
- 9 Thousands - 6 Thousands = 3 Thousands
- 6 Ten thousands - 4 Ten thousands = 2 Ten thousands

Irfan’s mother was left with ₹23,400.

**Example**

Find the difference between 4,78,998 and 2,54,382.

Let’s arrange the numbers in columns and subtract.

```
  4,78,998
- 2,54,382
  2,24,616
```

**Exercise 2.6**

1. Subtract the following.

   a) \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c|c|c|}
   & L & TTh & Th & H & T & O \\
   \hline
   & 3 & 8 & 7 & 5 & 4 & 5 \\
   & 2 & 1 & 3 & 2 & 1 & 4 \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c|c|c|}
   & L & TTh & Th & H & T & O \\
   \hline
   & 7 & 6 & 7 & 6 & 7 & 2 \\
   & 4 & 2 & 7 & 6 & 5 & 0 \\
   \hline
   \end{array}
   \]

2. Arrange the numbers in columns, and then subtract.

   a) 78,654 – 46,432
   b) 8,59,638 – 6,23,427
   c) 9,65,790 – 3,24,310
   d) 4,56,794 – 3,35,213

3. Find the difference between.

   a) 8,84,932 and 4,43,521
   b) 8,95,942 and 7,62,432
   c) 7,95,621 and 5,32,411
   d) 9,58,764 and 8,43,254
Subtraction with Regrouping

Example  Subtract 6,41,280 from 9,58,028.

\[
\begin{array}{ccccccc}
\text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
9 & 5 & 7 & 8 & 9 & 0 & 12 & 8 & 8 & \text{Minuend} \\
6 & 4 & 1 & 2 & 8 & 0 & \text{Subtrahend} \\
3 & 1 & 6 & 7 & 4 & 8 & \text{Difference}
\end{array}
\]

8 Ones – 0 Ones = 8 Ones

12 Tens – 8 Tens = 4 Tens

9 Hundreds – 2 Hundreds = 7 Hundreds

7 Thousands – 1 Thousand = 6 Thousands

5 Tens thousands – 4 Ten thousands = 1 Ten thousand

9 Lakhs – 6 Lakhs = 3 Lakhs

\[9,58,028 - 6,41,280 = 3,16,748\]

Check:

The result or the difference when added to the subtrahend must give the minuend.

So, the answer is correct.

Fact Zone

For every addition fact, there are two equivalent subtraction facts.
For example, if 15,000 + 10,000 = 25,000 then:

- \[25,000 - 15,000 = 10,000\]
- \[25,000 - 10,000 = 15,000\]
1. Subtract the following.

   a) \[
   \begin{array}{c|cccc}
   \text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} \\
   \hline
   9 & 2 & 8 & 5 & 6 \\
   - & 5 & 2 & 3 & 4 \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|cccc}
   \text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} \\
   \hline
   6 & 8 & 0 & 2 & 9 \\
   - & 2 & 4 & 2 & 7 \\
   \hline
   \end{array}
   \]

2. Find the difference in each case, and then verify the answer.

   a) \[
   \begin{array}{c|cccc}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   4 & 8 & 0 & 0 & 0 \\
   - & 3 & 7 & 3 & 2 \\
   \hline
   \end{array}
   \]

   + \[
   \begin{array}{c|ccccc}
   \text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 7 & 3 & 2 & 5 \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|cccc}
   \text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} \\
   \hline
   2 & 3 & 9 & 7 & 2 \\
   - & 1 & 1 & 6 & 8 \\
   \hline
   \end{array}
   \]

   + \[
   \begin{array}{c|ccccc}
   \text{L} & \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   1 & 1 & 6 & 8 & 7 \\
   \hline
   \end{array}
   \]

3. Find the difference of following numbers, and then check your answer.

   a) 29,875 and 89,521
   b) 62,093 and 93,742
   c) 2,72,056 and 4,00,289
   d) 3,49,231 and 7,21,099
   e) 2,98,725 and 8,95,219
   f) 5,62,892 and 9,82,521

Subtraction Facts

Just like addition, subtraction has some subtraction facts too.

1. Subtracting 0 from a Number

   If we subtract zero from any number, the answer is the number itself.

   \[
   \begin{align*}
   666 - 0 &= 666 \\
   6,666 - 0 &= 6,666 \\
   66,666 - 0 &= 66,666 \\
   666,666 - 0 &= 666,666 \\
   \end{align*}
   \]

2. Subtracting 1 from a Number

   When we subtract 1 from a number, we get the predecessor of that number.

   \[
   \begin{align*}
   444 - 1 &= 443 \\
   4,444 - 1 &= 4,443 \\
   44,444 - 1 &= 44,443 \\
   444,444 - 1 &= 444,443 \\
   \end{align*}
   \]
3. Subtracting a Number from Itself

When we subtract a number from itself, the answer is zero.

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>444 – 444</td>
<td>0</td>
</tr>
<tr>
<td>4,444 – 4,444</td>
<td>0</td>
</tr>
</tbody>
</table>

4. Subtracting 10s, 100s and 1000s

While subtracting 10, 100 or 1000 from a number, the digit in the tens, hundreds or thousands place decreases by 1, respectively. (If the digit at any place is zero, then we need to regroup.)

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>88,888 – 10</td>
<td>88,878</td>
</tr>
<tr>
<td>88,888 – 100</td>
<td>88,788</td>
</tr>
<tr>
<td>88,888 – 1000</td>
<td>87,888</td>
</tr>
</tbody>
</table>

**Exercise 2.8**

Fill in the blanks.

1. 43,189 – 0 = _________
2. 77,782 – 1 = _________
3. 54,135 – 54,135 = _________
4. 18,862 – 10 = _________
5. 78,921 – 1000 = _________
6. _________ – 0 = 64,871
7. 5,78,521 – ________ = 5,78,421
8. 1,09,845 – ______ = 1,08,845

**Fact Zone**

In subtraction, the order of numbers cannot be changed. We always subtract the smaller number from the greater one.

20,000 – 10,000 = 10,000

10,000 – 20,000 = ?

**Problem Solving Strategies : Simplifying a Problem**

**Example**

What number should be subtracted from 3,20,000 to get the difference 1,16,000?

Oh! These are such larger numbers and it is so confusing. How do we solve such a problem?

I will tell you a way! Why don’t you think of the problem again, by using smaller numbers?

This way of solving the problem is called ‘Simplifying a Problem’. Follow the given steps.
Follow the given steps.

**Read the Problem:** What number should be subtracted from 3,20,000 to get the difference 1,16,000?

**Observe and Understand:** 1,16,000 is the difference. It is smaller than 3,20,000.

**Simplify the Numbers:** Take any number, say 3 instead of 3,20,000 and 1 instead of 1,16,000.

**Rewrite the Problem:** What number should be subtracted from 3, to get the difference 1?

So, 1 should be subtracted from 3.

\[
\begin{array}{c}
3,20,000 \\
-1,16,000 \\
\hline
2,04,000 \\
\end{array}
\]

2,04,000 should be subtracted from 3,20,000 to get the difference 1,16,000.

**Exercise 2.9**

Solve the following problems.

1. Which number is 34,013 less than 36,541?
2. Which number is 81,240 greater than 1,16,231?
3. The sum of two numbers is 80,051. If one number is 38,735, find the other number.
4. What will be the difference if the sum of 61,287 and 12,381 is subtracted from 2,23,538?

**Estimating the Difference**

The difference of two numbers can be estimated.

**Rounding Off to the Nearest Thousands**

*Example 1*

Subtract 29,562 from 56,238.

Rounding off 56,238 to the nearest thousands → 56,000
The estimated difference (26,000) is close to the actual difference (26,676), so the answer is reasonable.

### Rounding Off to the Nearest Ten Thousands

#### Example 2

Subtract 1,18,782 from 2,38,741.

**Rounding off 2,38,741 to the nearest 10,000s**

<table>
<thead>
<tr>
<th>Estimated Difference</th>
<th>Actual Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTh Th H T O</td>
<td>TTh Th H T O</td>
</tr>
<tr>
<td>5 6 0 0 0</td>
<td>4 5 1 6 1 2 1 3 8</td>
</tr>
<tr>
<td>3 0 0 0 0</td>
<td>2 9 5 6 2</td>
</tr>
<tr>
<td>2 6 0 0 0</td>
<td>2 6 6 7 6</td>
</tr>
</tbody>
</table>

The estimated difference (26,000) is close to the actual difference (26,676), so the answer is reasonable.

### Maths Fun

1. Work in pairs.
2. Make two sets of number cards from 1 to 9.
3. Both the players shuffle their set of number cards and draw 6 cards to form a 6-digit number.
4. Subtract the smaller number from the bigger one. Estimate the difference by rounding off and verify your answer.
5. Repeat this process 5 to 6 times.
Exercise 2.10

1. **Estimate the difference by rounding off the numbers to the nearest thousands and complete the table.**

<table>
<thead>
<tr>
<th>Difference</th>
<th>Rounded off numbers</th>
<th>Estimated difference</th>
<th>Actual difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 86,262 – 62,562</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) 21,935 – 14,251</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 59,625 – 11,002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) 95,321 – 12,210</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **Round off the numbers to the nearest ten thousands. Draw arrows to join the difference to the estimated difference.**

- Estimate: More than 1,00,000
  - 3,56,412 – 1,11,329
  - 2,97,412 – 1,14,529
  - 4,55,212 – 2,44,629
  - 4,99,812 – 1,18,529

- Estimate: Less than 1,00,000

3. If 3,45,879 people travel in a metro and 4,69,532 people travel by bus, how many more people travel by the bus than the metro? Verify your answers by rounding off to the nearest ten thousands.

**Problem Solving Through Model Method: Subtraction**

**Example**

Ravi bought a car for ₹4,20,645. He gave ₹4,21,000 to the dealer. How much money did he get back?

**Understanding**

We are given the cost of the car and the amount of money paid. We have to find the money Ravi got back.

**Planning**

Let’s make a model to choose the correct operation and solve the problem.
Think Smart

1. What number should be added to one lakh seventy-six so that the total becomes one lakh seventy thousand six?
2. What should be added to the number obtained above so that the resultant number is one lakh seventy-seven thousand sixty?

Exercise 2.11

1. Tick (✓) the missing part of the whole.

   54,376
   38,965 ?
   a) 15,411       b) 15,114       c) 93,341       d) 93,314

2. Solve the following questions.

   a) The total sale for two months at a jewellery shop is ₹2,90,850. If the sale in the first month was ₹1,29,456, then find the sale for the second month.

   b) On Monday, 1,58,379 bags of wheat were supplied to the grocery shops. On Tuesday, 94,479 bags were supplied. On which day more bags were supplied and by how much?
c) The population of a town in the year 2010 was 29,12,786. If 98,975 people left the town for work, how many people were left?

### Problems involving Addition and Subtraction

**Example 1**

Solve $1,55,423 + 15,067 - 7643$.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>+</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

Add the first two numbers.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>-</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Subtract the third number from the sum.

$1,55,423 + 15,067 - 7643 = 1,62,847$

**Example 2**

The population of a village is 7,20,350. There are 2,63,750 men, 2,20,150 women and the rest are children. How many children are there in the village?

7,20,350

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,63,750</td>
<td>2,20,150</td>
<td>?</td>
</tr>
</tbody>
</table>

The population of men and women in the village is:

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>+</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Subtract 4,83,900 from 7,20,350.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>-</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Check:

- Let's check our answer.
- So, our answer is correct.

Write down the smallest 6-digit number using the digits 4, 2, 0 and 9 (repeat the digit 2 thrice). Also write the greatest 6-digit number with the digit 4 repeating three times. Find the:
  1. sum of the two numbers so formed.
  2. difference also between these two numbers.

**Think Smart**

**Exercise 2.12**

1. Solve the following.
   - a) 2,63,520 + 5,23,152 - 1,62,730
   - b) 5,62,220 + 1,66,220 - 1,80,888
   - c) 5,62,333 + 20,000 + 4,16,215
   - d) 8,62,132 + 1,23,100 + 2,63,210
   - e) 3,12,459 + 101 - 2,24,742
   - f) 5,15,740 + 3,94,000 - 2,99,999

2. Solve the following word problems.
   - a) Sumit had ₹2,63,520 in his bank account. He withdrew ₹15,263 on the first day, and ₹20,000 on the next day. How much money was left in his account?
   - b) The population of a city is 5,63,120. There are 2,43,628 men, 1,26,231 women and the remaining are children. Find the number of children in the city.
   - c) Two years ago, the population of a town was 9,34,025. It increased by 13,405 in the first year. In the second year, it decreased by 20,395. What is the population of the town at the end of three years?

Ask the students to keep these points in mind while solving a word problem:
- Read the sentences of the given problem, one at a time.
- Understand the problem and draw a model, if possible, to show the given information.
- After solving, always check the answers.
Aim: To explore addition and subtraction of large numbers.
Requirements: Paper slips of two different colours (15–20 each), two bowls

Steps:
1. On the paper slips of one colour, write any two random 5-digit or 6-digit numbers.
2. On the paper slips of the second colour, write words such as ‘less than’, ‘total’, ‘altogether’, etc. For example,

   1,35,000
   7695

   Total

3. Put slips of one kind in each bowl.
4. Pair the students sitting next to each other.
5. Distribute one slip of each color to all the pairs.
6. Ask each pair to make word problems on both addition and subtraction using the given information in two minutes.
7. The pair that makes the most word problems, wins the round.
8. Pick a problem from any pair and ask the students to solve it.
9. Continue the activity until the time permits.
10. The pair that gives the most number of correct answers is the winner.
I Have Learnt

Multiply 152 by 23.

1. Multiply by ones.
   - \(152 \times 3 = 456\)
2. Multiply by tens.
   - \(152 \times 20 = 3040\)
3. Add the products of ones and tens.
   - \(456 + 3040 = 3496\)

\[152 \times 23 = 3496\]

I Can

1. Compare using >, < or = .
   a) \(9 \times 8\) \[18 \times 5\]
   b) \(17 + 17 + 17\) \[3 \times 17\]
   c) \(12 \times 4\) \[13 \times 3\]
   d) \(14 \times 7\) \[8 \times 15\]

2. Multiply the following.
   a) \[
   \begin{array}{c}
   \text{Th} \\
   \times \\
   +
   \end{array}
   \]
   b) \[
   \begin{array}{c}
   \text{Th} \\
   \times \\
   +
   \end{array}
   \]
   c) \[
   \begin{array}{c}
   \text{Th} \\
   \times \\
   +
   \end{array}
   \]
**Properties of Multiplication**

1. **Order Property of Multiplication**
   The product of two numbers remains the same even if we change the order of the numbers.

   $\begin{array}{c}
   2 \ 3 \\
   \times \ 1 \ 3 \\
   \hline
   2 \ 9 \ 9 \\
   \end{array}$

   $\begin{array}{c}
   1 \ 3 \\
   \times \ 2 \ 3 \\
   \hline
   2 \ 9 \ 9 \\
   \end{array}$

   The product is the same.

2. **Grouping Property of Multiplication**
   The product of three numbers remains the same even if we change the order in which the numbers are multiplied.

   $$(10 \times 20) \times 30 = 200 \times 30 = 6000$$

   $$10 \times (20 \times 30) = 10 \times 600 = 6000$$

   So, $$(10 \times 20) \times 30 = 10 \times (20 \times 30)$$
Exercise 3.1

1. Fill in the blanks.
   a) $635 \times 12 = \underline{\hspace{1cm}} \times 635$
   b) $45 \times \underline{\hspace{1cm}} = 36 \times 45$
   c) $452 \times 0 = \underline{\hspace{1cm}}$
   d) $1735 \times \underline{\hspace{1cm}} = 0$
   e) $379 \times 1 = \underline{\hspace{1cm}}$
   f) $\underline{\hspace{1cm}} \times 5273 = 5273$
   g) $(\underline{\hspace{1cm}} \times 45) \times 35 = 54 \times (45 \times \underline{\hspace{1cm}})$
   h) $(\underline{\hspace{1cm}} \times \underline{\hspace{1cm}}) \times 12 = 72 \times (15 \times \underline{\hspace{1cm}})$
   i) $(12 + 21) \times 7 = 12 \times 7 + 21 \times \underline{\hspace{1cm}}$

2. Solve.
   a) $(10 \times 50) \times 60$
   b) $(10 \times 60) \times 50$
   What do you observe?

Maths Fun

1. Write down a 2-digit number. The sum of the digits must be less than 10.
2. Multiply the number by 11. What is the product?
3. Repeat steps 1 and 2 with different 2-digit numbers. Record the products.
4. Do you see a pattern? What is the pattern?
5. Use the pattern to state the product of 72 and 11.
Multiplication by 10, 100 and 1000

Multiplying a Number by 10
To get the product of a number and 10, place a zero to the right side of the given number.

Example 1 4 × 10 = 40

Example 2 30 × 10 = 300

Example 3 200 × 10 = 2000

Multiplying a Number by 100
To get the product of a number and 100, place two zeros to the right side of the given number.

Multiplying a Number by 1000
To get the product of a number and 1000, place three zeros to the right side of the given number.
Multiplying a Number Ending with Zero
To get the product of a number and another number which has zeros at the end, we first multiply the two numbers (without the zeros). Then, count the number of zeros and place that number of zeros with the product so obtained.

1. Multiply to find the product.
   a) 35 \times 10   
   b) 1219 \times 10  
   c) 5213 \times 10  
   d) 125 \times 100  
   e) 7293 \times 100  
   f) 319 \times 1000  

2. What are the missing numbers?
   a) 
   b) 
   c) 
   d) 

3. Find the product.
   a) 138 \times 20  
   b) 615 \times 30  
   c) 127 \times 300  
   d) 319 \times 400  
   e) 3 \times 4000  
   f) 5 \times 5000  
   g) 140 \times 80  
   h) 19 \times 7000  

4. Fill in the missing numbers.
   a) 
   b) 

5. Fill in the blanks.
   a) 165 \times 40 = (165 \times \underline{\hspace{1cm}}) \times 10  
   b) 215 \times 800 = (215 \times \underline{\hspace{1cm}}) \times 100  
   c) 61 \times 9000 = (\underline{\hspace{1cm}} \times \underline{\hspace{1cm}}) \times 1000  

142 \times 3000  
= 142 \times (3 \times 1000)  
= (142 \times 3) \times 1000  
= 426 \times 1000  
= 426000  

Exercise 3.2
Multiplication by a 1-digit Number

Example  Multiply 3263 by 4.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

The product of 3263 and 4 is 13,052. So, the answer given by Irfan in the ‘Warm Up’ section is incorrect.

Steps to multiply:

1. Multiply by ones.
   - 3 Ones × 4 = 12 Ones
   - 1 Ten + 2 Ones

2. Multiply by tens.
   - 6 Tens × 4 + 1 Ten = 24 Tens + 1 Ten
   - 2 Hundreds + 5 Tens

3. Multiply by hundreds.
   - 2 Hundreds × 4 + 2 Hundreds = 8 Hundreds + 2 Hundreds
   - 10 Hundreds = 1 Thousand

4. Multiply the thousands.
   - 3 Thousands × 4 + 1 Thousands = 12 Thousands + 1 Thousands
   - 13 Thousands

The number being multiplied is called **multiplicand**.
The number by which the multiplicand is multiplied is called **multiplier**.
The answer is called the **product**.

Give an example to the students to see why the product of a 4-digit number and a 1-digit number can be a 4- or a 5-digit number.
**Exercise 3.3**

1. Find the value of each of the following.

   a) \[
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   8 & 7 & 1 & 5 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & & & & \\
   \hline
   \end{array}
   \]

   b) \[
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   4 & 7 & 9 & 5 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   4 & & & & \\
   \hline
   \end{array}
   \]

   c) \[
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   6 & 8 & 4 & 1 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   6 & & & & \\
   \hline
   \end{array}
   \]

   d) \[
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   4 & 5 & 8 & 1 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   5 & & & & \\
   \hline
   \end{array}
   \]

2. Write the number vertically, then identify the multiplicand, multiplier and product in each.

   a) \(1234 \times 4\)   b) \(6169 \times 3\)   c) \(2341 \times 4\)
   
   d) \(7641 \times 7\)   e) \(9811 \times 9\)   f) \(8765 \times 5\)
   
   g) \(9874 \times 8\)   h) \(6874 \times 6\)   i) \(8987 \times 9\)

**Multiplication by a 2-digit Number**

*Example* Multiply 3231 by 12.

1. Multiply by ones.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 3 & 1 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   1 & & & & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   6 & 4 & 6 & 2 & \\
   \hline
   3231 \times 2 \quad \text{result}
   \end{array}
   \]

2. Multiply by tens.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 3 & 1 & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   1 & & & & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   6 & 4 & 6 & 2 & \\
   \hline
   3231 \times 10 \quad \text{result}
   \end{array}
   \]

3. Add the products of ones and tens.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 3 & 1 & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   6 & 4 & 6 & 2 & \\
   \hline
   3231 \times 10 \quad \text{result}
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 3 & 1 & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   3 & 2 & 3 & 1 & 0 & \\
   \hline
   3231 \times 10 \quad \text{result}
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   3 & 2 & 3 & 1 & 0 & \\
   \hline
   38,772 \quad \text{result}
   \end{array}
   \]

**Instructing students**

1. Multiply by ones. 2. Multiply by tens. 3. Add the products of ones, tens and hundreds.

**Example**

Multiply 328 by 12.

1. Multiply by ones.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 8 & & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   1 & & & & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   6 & 5 & 6 & & \\
   \hline
   328 \times 2 \quad \text{result}
   \end{array}
   \]

2. Multiply by tens.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 8 & & \\
   \hline
   \end{array}
   \times
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   1 & & & & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   6 & 4 & 6 & 2 & \\
   \hline
   328 \times 10 \quad \text{result}
   \end{array}
   \]

3. Add the products of ones, tens and hundreds.
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   \text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
   \hline
   3 & 2 & 8 & & \\
   \hline
   \end{array}
   \]
   
   \[
   \begin{array}{c|c|c|c|c|c|c|c|c|c}
   3 & 2 & 8 & & 0 & \\
   \hline
   328 \times 10 \quad \text{result}
   \end{array}
   \]

Multiplicand Multiplier Product

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c}
\text{TTh} & \text{Th} & \text{H} & \text{T} & \text{O} \\
\hline
3 & 2 & 3 & 1 & 0 & \\
\hline
328 \times 10 \quad \text{result}
\end{array}
\]

\[
328 \times 12 = 38,772
\]
Exercise 3.3

1. Find the value of each of the following.
2. Write the number vertically, then identify the multiplicand, multiplier and product in each.
   
a) 1234 × 4    b) 6169 × 3    c) 2341 × 4   
d) 7641 × 7    e) 9811 × 9    f) 8765 × 5   
g) 9874 × 8    h) 6874 × 6    i) 8987 × 9

Example

Multiply 3231 by 12.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- Multiply by ones.
  - 6462 + 32310 = 38,772
- Multiply by tens.
  - 6462
- Add the products of ones and tens.

Exercise 3.4

Find the product.

1. 512 × 16
2. 212 × 15
3. 976 × 96
4. 763 × 73
5. 593 × 62
6. 478 × 84
7. 1251 × 12
8. 1322 × 11
9. 1324 × 22
10. 3125 × 18
11. 2009 × 41
12. 2775 × 36

Think Smart

Fill in the blanks.

1. 618 × 3 = 1854
   - 6
   - 1
   - 8
   - 0

2. 6258 × 3 = 18774
   - 6
   - 2
   - 5
   - 8

3. 2912 × 8 = 23304
   - 2
   - 9
   - 1
   - 2

Multiplication by a 3-digit Number

Example 1

Multiply 328 by 152.

1. Multiply by ones.
   - 328 × 2 = 656
   - 328 × 50 = 16400
   - 328 × 100 = 32800

2. Multiply by tens.
   - 328 × 15 = 4920
   - 328 × 15 = 4920

3. Multiply by hundreds.
   - 328 × 10 = 3280
   - 328 × 15 = 4920

4. Add the products of ones, tens and hundreds.
   - 656 + 16400 + 32800

328 × 152 = 49856

Teaching Tip

Instruct the students to form a habit of checking the numbers once after copying them. This will ensure that the number are written in correct columns and will reduce the chances of mistakes.
Example 2

1. Multiply by ones.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

2. Multiply by tens.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3. Multiply by hundreds.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4. Add the products of ones, tens and hundreds.

<table>
<thead>
<tr>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4231 × 3</th>
<th>4231 × 0</th>
<th>4231 × 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>12693</td>
<td>0</td>
<td>846200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Product</th>
<th>Actual Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>4231 × 203 = 8,58,893</td>
<td></td>
</tr>
</tbody>
</table>

Exercise 3.5

1. Find the product.
   a) 289 × 145
   b) 154 × 238
   c) 159 × 986
   d) 3030 × 321
   e) 2314 × 122
   f) 6666 × 111
   g) 7853 × 119
   h) 1214 × 786
   i) 1086 × 369

2. How much is 300 times 2432?

   Estimated the Product

   We can estimate the product of two or more numbers by rounding off the multiplier and the multiplicand to the nearest tens, hundreds or thousands and then find their product.

Example 1

Estimate the value of 4025 × 5.

<table>
<thead>
<tr>
<th>4025</th>
</tr>
</thead>
<tbody>
<tr>
<td>4000</td>
</tr>
<tr>
<td>4500</td>
</tr>
<tr>
<td>5000</td>
</tr>
</tbody>
</table>

4025 is rounded down to 4000, as it is nearer to 4000.

Estimated Product

<table>
<thead>
<tr>
<th>4</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>×</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 2   | 0 | 0 | 0 | 0 |

The estimated value 20,000 is close to the actual value 20,125.
So, the answer is reasonable.

Sometimes, the ‘≈’ symbol is used for approximate value.
‘≈’ is used for actual value.
Example 2  Estimate the value of 715 \times 38.

\[
\begin{array}{c}
715 \\
\hline
38
\end{array}
\]

38 is nearer to 40, and 715 is nearer to 700. So, 38 is rounded up to 40 and 715 is rounded down to 700.

<table>
<thead>
<tr>
<th>Estimated Product</th>
<th>Actual Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 0 0 × 4 0</td>
<td>7 1 5 × 3 8</td>
</tr>
<tr>
<td>0 0 0 0</td>
<td>5 7 2 0</td>
</tr>
<tr>
<td>+ 2 8 0 0 0</td>
<td>+ 2 1 4 5 0</td>
</tr>
<tr>
<td>2 8 0 0 0</td>
<td>2 7 1 7 0</td>
</tr>
</tbody>
</table>

The estimated value 28,000 is closer to the actual value 27,170. So, the answer is reasonable.

Think Smart

Which of the above two numbers gives the following products? [Hint: Use estimation.]
1. 540
2. 5640
3. 38925

Exercise 3.6

1. a) Estimate the value of 4192 \times 5.
   
   \[
   \begin{array}{c}
   4192 \\
   \hline
   \times 5
   \end{array}
   \]
   \[
   \begin{array}{c}
   4000 \\
   \hline
   \times 5
   \end{array}
   \]
   
   4192 \times 5 = [Blank]
   
   4000 \times 5 = [Blank]
   
   b) Estimate the value of 313 \times 494.
   
   \[
   \begin{array}{c}
   313 \\
   \hline
   \times 494
   \end{array}
   \]
   
   \[
   \begin{array}{c}
   300 \\
   \hline
   \times 500
   \end{array}
   \]
   
   313 \times 494 = [Blank]
   
   300 \times 500 = [Blank]

2. Estimate the products by rounding off the numbers to the nearest hundreds.
   a) 184 \times 172   b) 298 \times 120   c) 437 \times 159
   d) 980 \times 315   e) 689 \times 144   f) 257 \times 193

3. The product of 348 and 42 was estimated to be 14,000. Check if the estimated answer is correct or not. How far is it from the actual value?
**Example**

Mr Kumar paid a total of ₹3,636 for a bedsheet and 6 cushions. If each cushion costs ₹120, then what is the cost of the bedsheet?

**Understanding**
- What did Mr. Kumar buy?
- How much did he pay altogether?
- What do I have to find?
- What was the cost of each cushion?
- What was the cost of bedsheet?

**Planning**
- Let me draw a model.
- The model will help me to solve the problem.

<table>
<thead>
<tr>
<th>₹3,636</th>
</tr>
</thead>
<tbody>
<tr>
<td>₹120</td>
</tr>
<tr>
<td>1 bedsheet</td>
</tr>
</tbody>
</table>

$\text{₹120 } \times \, 6 = \text{₹720}$

The cost of 6 cushions is ₹720.

$\text{₹3,636 } - \text{₹720 } = \text{₹2,916}$

The cost of bedsheet is ₹2,916.

**Doing**

- The cost of cushions
- The cost of bedsheet
- The amount of money paid by Mr Kumar

$\begin{array}{c}
\text{₹720} \\
+ \text{₹2,916} \\
\hline
\text{₹3,636}
\end{array}$

So, my answer is correct.
Problem Solving Through Model Method

Example

Mr Kumar paid a total of `3,636 for a bedsheet and 6 cushions. If each cushion costs `120, then what is the cost of the bedsheet?

What did Mr. Kumar buy?

How much did he pay altogether?

What do I have to find?

What was the cost of each cushion?

What was the cost of bedsheet?

Let me draw a model.

The model will help me to solve the problem.

Understanding

Planning

1 bedsheet

`3,636

`120

? ?

So, my answer is correct.

Doing

Checking

`120 × 6 = `720

The cost of 6 cushions is `720.

`120

× 6

7 2 0

`3,636 – `720 = `2,916

The cost of bedsheet is `2,916.

Exercise 3.7

Solve the following word problems.

1. The cost of a printer is `4360. How much did Ajay pay if he bought 5 such printers?

2. Hari delivers 389 copies of newspaper every day. How many copies of newspaper does he deliver in the month of June?

3. Rahul’s father has 2000 notes of `20. How much money does he have?

4. Mr Kumar earns `36,520 a month. If he spends `26,380 each month and saves the rest, how much money will he save in a year?

Problem Solving Strategies: Working Backward

Example

Sanjeev bought a shirt for `1520. He, then, bought 6 books and each costs `120. After paying for these things, Sanjeev was left with `10. How much money did he have in the beginning?

In case of bigger numbers, it might not be possible to represent each part through a model to find the whole. In such cases, the bar is generally drawn to show the first two parts and the last part. For example, in the previous example, if the number of cushions bought was 24, the bar would be drawn as:

\[
\begin{array}{c}
\text{₹120} \\
\hline
\text{24 equal parts} \\
\hline
\end{array}
\]

Exercise 3.7

Solve the following word problems.

1. The cost of a printer is `4360. How much did Ajay pay if he bought 5 such printers?

2. Hari delivers 389 copies of newspaper every day. How many copies of newspaper does he deliver in the month of June?

3. Rahul’s father has 2000 notes of `20. How much money does he have?

4. Mr Kumar earns `36,520 a month. If he spends `26,380 each month and saves the rest, how much money will he save in a year?

Example

Sanjeev bought a shirt for `1520. He, then, bought 6 books and each costs `120. After paying for these things, Sanjeev was left with `10. How much money did he have in the beginning?

We are given the money Sanjeev had in the end. We need to find the money he had in the beginning.

Yes Tina! Why don’t you start from the last given fact? This way of solving the problem is called ‘working backward’.
Follow the given steps:
1. How much money did Sanjeev have in the end?
   ₹10.
2. Add the money he spent on buying the books.
   \[6 \times ₹120 = ₹720\]
   \[₹10 + ₹720 = ₹730\]
3. To this, add the money he spent on the shirt.
   \[₹1520 + ₹730 = ₹2250\]
Sanjeev had ₹2250 in the beginning.

Look at the calendar of the current month. Count the number of Saturdays and Sundays. Subtracting the number of Saturdays and Sundays from the total number of days in the month, gives us the number of weekdays (Monday - Friday) in the month.

Answer the following.
1. About how many weekdays are there in a year? ________________
2. About how many Saturdays and Sundays are there in 10 years? ________________
3. About how many weeks are there in 12 years? ________________

Exercise 3.8

Solve the following word problems.
1. Tina had some stamps in her collection. Of this, she gave 1156 stamps to her sister and the remaining stamps were distributed equally among Siya, Venu and Irfan. If each got 1024 stamps, then how many stamps did Tina have in the beginning? [Hint: Start with finding the number of stamps Siya, Venu and Irfan have altogether.]
2. Irfan’s father gave him some money on his birthday, which he had put in his new money bank. He got ₹1100 each from 3 people which he had put in the same money bank. He now has ₹4700. How much money did Irfan get from his father?
Everyday Maths

Look at the calendar of the current month. Count the number of Saturdays and Sundays.
Subtracting the number of Saturdays and Sundays from the total number of days in the
month, gives us the number of weekdays (Monday - Friday) in the month.

Answer the following.
1. About how many weekdays are there in a year?
2. About how many Saturdays and Sundays are there in 10 years?
3. About how many weeks are there in 12 years?

Follow the given steps:
1. How much money did Sanjeev have in the end?

10.

2. Add the money he spent on buying the books.

6 × 120 = 720

10 + 720 = 730

Sanjeev had 730 in the beginning.

Exercise 3.8

Solve the following word problems.
1. Tina had some stamps in her collection. Of this, she gave 1156 stamps
to her sister and the remaining stamps were distributed equally among
Siya, Venu and Irfan. If each got 1024 stamps, then how many stamps did
Tina have in the beginning? [Hint : Start with finding the
number of stamps Siya, Venu and Irfan have altogether.]

2. Irfan's father gave him some money on his birthday,
which he had put in his new money bank. He got 1100 each from 3 people which he had put in the same money
bank. He now has 4700. How much money did Irfan
get from his father?

Aim: To find the smallest product from the given numbers.

Requirements: 1 set of number cards (numbered from 1 to 9), paper, pencil, multiplication grid

Steps:
1. Pair students sitting next to each other. Give each pair a multiplication grid
on a piece of paper, similar to the one shown below.

2. Prepare the number cards as shown above and shuffle them. Place them face
down on the table.
3. Call students randomly and ask them to turn over a card.
4. Each pair writes that number in any box in their multiplication grid.
5. Put back the card, face down. Mix all the cards again.
6. Students take turns to repeat steps 3 to 5 until all the boxes have been filled.
7. Tell the students that arrange the numbers in such a way that the product is a
least possible number.
8. Multiply the numbers on the multiplication grid. The player with the smallest
product wins the round.
9. Repeat this game for few more rounds. Ask the students to look for any
winning strategies. The pair that wins the most rounds is the winner.
**I Have Learnt**

Divide 5437 by 3.

1. Divide the thousands.
   \[ \begin{array}{c}
   \underline{3)
   \\
   5437
   \\
   -3
   \\
   \hline
   2
   \end{array} \]

2. Divide the hundreds.
   \[ \begin{array}{c}
   \underline{3)
   \\
   5437
   \\
   -3
   \\
   \hline
   24
   \\
   \hline
   -24
   \\
   \hline
   0
   \end{array} \]

3. Divide the tens.
   \[ \begin{array}{c}
   \underline{3)
   \\
   5437
   \\
   -3
   \\
   \hline
   24
   \\
   \hline
   -24
   \\
   \hline
   03
   \\
   \hline
   -3
   \\
   \hline
   0
   \end{array} \]

4. Divide the ones.
   \[ \begin{array}{c}
   \underline{3)
   \\
   5437
   \\
   -3
   \\
   \hline
   24
   \\
   \hline
   -24
   \\
   \hline
   03
   \\
   \hline
   -3
   \\
   \hline
   07
   \\
   \hline
   -6
   \end{array} \]

Remainder \rightarrow [1]

The number that is being divided is called the **dividend**.
The number by which we divide is called the **divisor**.
The number that we get after division is called the **quotient**.
The number that remains after division is called the **remainder**.

Here, Dividend = 5437, Divisor = 3, Quotient = 1812, Remainder = 1

We can verify our answer as:

\[
\text{Dividend} = \text{Divisor} \times \text{Quotient} + \text{Remainder}
\]
\[
= 3 \times 1812 + 1
\]
\[
= 5436 + 1
\]
\[
= 5437
\]

So, the answer is correct.
I Have Learnt

Divide 5437 by 3.

1. Divide the thousands.

2. Divide the hundreds.

3. Divide the tens.

4. Divide the ones.

Remainder is always less than the divisor.

Division

3 × 2 Ones = 6 Ones
3 × 1 Th = 3 Th
3 × 8 H = 24 H
3 × 1 Tens = 3 Tens

I Can

1. Divide the following. Find the quotient and the remainder.
   a) \(9 \div 24\)
   b) \(4 \div 448\)
   c) \(3 \div 5562\)

   \[
   \begin{array}{ll}
   Q &= \underline{_______} & Q &= \underline{_______} & Q &= \underline{_______} \\
   R &= \underline{_______} & R &= \underline{_______} & R &= \underline{_______} \\
   \end{array}
   \]

   d) \(11 \div 92\)
   e) \(13 \div 647\)
   f) \(16 \div 984\)

   \[
   \begin{array}{ll}
   Q &= \underline{_______} & Q &= \underline{_______} & Q &= \underline{_______} \\
   R &= \underline{_______} & R &= \underline{_______} & R &= \underline{_______} \\
   \end{array}
   \]

2. A total of 270 toys are packed equally into 15 boxes. How many toys are there in each box?

3. A sum of ₹1080 is shared equally among 4 students. How much does each student get?
Warm Up

Division Facts

Dividing by 1
When a number is divided by 1, the quotient is the number itself.

\[
\begin{align*}
5 &\div 1 = 5 \\
55 &\div 1 = 55 \\
555 &\div 1 = 555 \\
\end{align*}
\]

Dividing by Number Itself
When a non-zero number is divided by itself, the quotient is 1.

\[
\begin{align*}
7 &\div 7 = 1 \\
77 &\div 77 = 1 \\
777 &\div 777 = 1 \\
\end{align*}
\]

Dividing Zero by a Number
When zero is divided by a non-zero number, the quotient is zero.

\[
\begin{align*}
0 &\div 8 = 0 \\
0 &\div 88 = 0 \\
0 &\div 888 = 0 \\
\end{align*}
\]

Dividing by 0
We cannot divide a number by zero.
Exercise 4.1

1. State true (T) or false (F).
   a) We can divide a number by zero.  
   b) Dividing a number by itself gives zero as the quotient.
   c) Dividing a number by 1 gives 1 as the quotient.
   d) Dividing a number by zero gives zero as the quotient.

2. Fill in the blanks.
   a) \(138 ÷ 1 = \) 
   b) \(2657 ÷ \) = 2657
   c) \(15,473 ÷ 1 = \) 
   d) \(\) ÷ 1 = 1820
   e) \(16,400 ÷ \) = 16,400 
   f) \(0 ÷ 135 = \) 
   g) \(38,712 ÷ \) = 1 
   h) \(\) ÷ 18,921 = 1
   i) \(12,345 ÷ 12,345 = \) 
   j) \(\) ÷ 13 = 0

Mental Maths

Complete the following division patterns.

1. \(63 ÷ 9 = \) 
   \(630 ÷ 9 = \) 
   \(6300 ÷ 9 = \) 
   \(63000 ÷ 9 = \)

2. \(72 ÷ 12 = \) 
   \(720 ÷ 12 = \) 
   \(7200 ÷ 12 = \) 
   \(72000 ÷ 12 = \)

Division by 10, 100 and 1000

Division by 10

When we divide a number by 10, we get the quotient by removing the ones digit of the number. The ones digit is the remainder.

\[
32,579 ÷ 10 \rightarrow 3257 \text{ Tens} \ 9 \text{ Ones} ÷ 1 \text{ Ten}
\]

\[
Q = 3257, \ R = 9
\]

Division by 100

When we divide a number by 100, we get the quotient by removing ones and tens digits. The leftover digits in the tens and the ones position is the remainder.

\[
71 ÷ 10 = 7 \ 1
\]

\[
234 ÷ 10 = 23 \ 4
\]

\[
1478 ÷ 10 = 147 \ 8
\]

\[
56034 ÷ 10 = 5603 \ 4
\]

\[
234 ÷ 100 = 2 \ 34
\]

\[
1478 ÷ 100 = 14 \ 78
\]

\[
56034 ÷ 100 = 560 \ 34
\]

\[
32,579 ÷ 100 \rightarrow 325 \text{ H} \ 79 \text{ Ones} ÷ 1 \text{ H}
\]

\[
Q = 325, \ R = 79
\]
**Division by 1000**

When we divide a number by 1000, we get the quotient by removing the ones, tens and hundreds digits. The number formed by the digits removed is the remainder.

<table>
<thead>
<tr>
<th>Number</th>
<th>Q</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1478 ÷ 1000</td>
<td>1</td>
<td>478</td>
</tr>
<tr>
<td>56034 ÷ 1000</td>
<td>56</td>
<td>34</td>
</tr>
<tr>
<td>74000 ÷ 1000</td>
<td>74</td>
<td>0</td>
</tr>
</tbody>
</table>

**Exercise 4.2**

1. **Without actual division, find the quotient and the remainder.**
   
   a) 3000 ÷ 10  
   b) 3000 ÷ 100  
   c) 3000 ÷ 1000  
   d) 15,700 ÷ 10  
   e) 15,700 ÷ 100  
   f) 15,700 ÷ 1000  
   g) 21,546 ÷ 10  
   h) 21,546 ÷ 100  
   i) 21,546 ÷ 1000  

2. **Which of the following will leave no remainder when divided by 100?**
   
   a) 2125  
   b) 12,500  
   c) 62,350  

3. **Which of the following will leave no remainder when divided by 1000?**
   
   a) 10,005  
   b) 21,000  
   c) 12,500  

---

**Example 1** Divide 83,217 by 7. Verify your answer.

1. Divide the ten thousands.
   
   \[ \overline{7 \overline{8} \overline{3} \overline{2} \overline{1} \overline{7}} \]
   
   8 TTh ÷ 7 = 1 TTh R 1

2. Bring down the thousands digit. Divide the thousands.
   
   \[ \overline{1 \overline{8} \overline{3} \overline{2} \overline{1} \overline{7}} \]
   
   13 Th ÷ 7 = 1 Th R 6

   
   \[ \overline{1 \overline{1} \overline{8} \overline{3} \overline{2} \overline{1} \overline{7}} \]
   
   62 H ÷ 7 = 8 H R 6

4. Similarly, divide the tens.
   
   \[ \overline{1 \overline{1} \overline{8} \overline{3} \overline{2} \overline{1} \overline{7}} \]
   
   61 T ÷ 7 = 8 T R 5

5. Similarly, divide the ones.
   
   \[ \overline{1 \overline{1} \overline{8} \overline{3} \overline{2} \overline{1} \overline{7}} \]
   
   57 O ÷ 7 = 8 O R 1

\[ 83,217 ÷ 7 = 11,888 \text{ R } 1 \]

---

**Ask the students to do long division (by 10, 100 and 1000) to see for themselves why the quotient and the remainder can easily be obtained by removing the respective digits in the ones, tens or hundreds place.**
Check:
Dividend = Divisor × Quotient + Remainder

\[
= \ 7 \times 11,888 + 1 \\
= 83,216 + 1 \\
= 83,217
\]

So, the answer is correct.

**Example 2**  Divide 90,092 by 9. Check your answer.

\[
\begin{align*}
1. \text{ Divide the ten thousands.} & \quad 90,009,222 \\
2. \text{ Bring down the thousands digit. Divide the thousands.} & \quad 1009,222 \\
3. \text{ Divide the hundreds.} & \quad 1009,222 \\
4. \text{ Divide the tens.} & \quad 1009,222 \\
5. \text{ Divide the ones.} & \quad 1009,222
\end{align*}
\]

Check:
Dividend = Divisor × Quotient + Remainder

\[
= \ 9 \times 10,010 + 2 \\
= 90,090 + 2 \\
= 90,092
\]

So, the answer is correct.

**Exercise 4.3**

1. Find the quotient and the remainder, then verify your answer.
   
   a) \(36,127 \div 5\)      b) \(23,612 \div 3\)      c) \(89,721 \div 9\)      d) \(10,234 \div 4\)  
   
   e) \(30,842 \div 2\)      f) \(71,296 \div 8\)      g) \(67,636 \div 8\)      h) \(48,062 \div 6\)  
   
   i) \(11,256 \div 5\)      j) \(10,020 \div 3\)      k) \(40,512 \div 7\)      l) \(90,001 \div 8\)
2. Divide and fill in the blanks.

a) \[
\begin{array}{c}
\underline{70845} \\
\underline{606} \\
\underline{668} \\
\underline{688} \\
\underline{698} \\
\underline{708} \\
\end{array}
\]

b) \[
\begin{array}{c}
\underline{80808} \\
\underline{808} \\
\underline{808} \\
\underline{808} \\
\underline{808} \\
\underline{808} \\
\end{array}
\]

3. Find the dividend if:
   a) divisor = 4, quotient = 6313, remainder = 0
   b) divisor = 7, quotient = 12836, remainder = 6
   c) divisor = 9, quotient = 3906, remainder = 1
   d) divisor = 3, quotient = 12345, remainder = 2
   e) divisor = 9, quotient = 4166, remainder = 7

Division by a 2-digit Number

Example 1  Divide 1296 by 12.

1. Divide the thousands.
   \[
   12 \overline{1296} \]
   \[
   12 \times 1 \text{ Th} = 12 \text{ Th} \]
   \[
   1 < 12 \]
   Division is not possible.

2. Divide the hundreds.
   \[
   12 \overline{1296} \]
   \[
   12 \div 12 = 1 \text{ H} \]
   \[
   1296 \div 12 = 108 \]

3. Bring down the tens digit. Divide the tens.
   \[
   12 \overline{1296} \]
   \[
   1296 \div 12 = 108 \]
   \[
   9 < 12 \]
   Bring down the next digit and put a zero in the quotient.

4. Divide the ones.
   \[
   12 \overline{1296} \]
   \[
   108 \div 12 = 9 \text{ Ones} \]
   \[
   96 \text{ Ones} \div 12 = 8 \text{ Ones} \]

\[
1296 \div 12 = 108
\]

Dividend = Divisor × Quotient + Remainder
\[
= 12 \times 108 + 0
\]
\[
= 1296 + 0
\]
\[
= 1296
\]

So, the answer is correct.
Exercise 4.4

Divide the following, and then verify your answer.

1. \(1812 \div 15\)  
2. \(4872 \div 16\)  
3. \(6192 \div 25\)  
4. \(1127 \div 20\)  
5. \(8194 \div 14\)  
6. \(2869 \div 13\)

Estimating the Quotient

To estimate the quotient, first we need to round off the numbers.

**Example 1** Estimate the quotient for \(156 \div 4\).

156 rounded off to the nearest tens is 160.

<table>
<thead>
<tr>
<th>Estimated quotient</th>
<th>Actual quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>(40)</td>
<td>(39)</td>
</tr>
<tr>
<td>(4) \ 160 \ 4)</td>
<td>(156 \ 4)</td>
</tr>
<tr>
<td>- 16 \ - 12</td>
<td>- 12</td>
</tr>
<tr>
<td>00 \ 36</td>
<td>00 \ 36</td>
</tr>
<tr>
<td>- 00 \ 00</td>
<td>- 00 \ 00</td>
</tr>
<tr>
<td>0 \ 0</td>
<td>160 \ 4 = 40 \ 156 \ 4 = 39</td>
</tr>
</tbody>
</table>

The estimated quotient is close to the actual quotient. 
So, the answer is reasonable.

**Example 2** Estimate the quotient for \(1980 \div 18\).

1980 rounded off to the nearest hundreds is 2000.

18 rounded off to the nearest tens is 20.

<table>
<thead>
<tr>
<th>Estimated quotient</th>
<th>Actual quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>(100)</td>
<td>(110)</td>
</tr>
<tr>
<td>(20) \ 2000 \ 18)</td>
<td>(1980 \ 18)</td>
</tr>
<tr>
<td>- 20 \ - 18</td>
<td>- 18</td>
</tr>
<tr>
<td>00 \ 18</td>
<td>00 \ 18</td>
</tr>
<tr>
<td>- 00 \ 00</td>
<td>- 00 \ 00</td>
</tr>
<tr>
<td>00 \ 2000 \ 20 = 100</td>
<td>00 \ 1980 \ 4 = 110</td>
</tr>
</tbody>
</table>

The estimated quotient is close to the actual quotient. 
So, the answer is reasonable.

Ensure that the children verify their answers after each division. This will strengthen their multiplication as well as division concepts.
Exercise 4.5

1. a) Divide 7014 by 7.

   Estimated quotient =   Actual quotient =

   b) Compare the estimated quotient with the actual quotient.

   Which is greater?

2. Estimate the quotient of the following.
   a) 2951 ÷ 12   b) 1686 ÷ 14   c) 3341 ÷ 11
   d) 1892 ÷ 13   e) 6479 ÷ 25   f) 7842 ÷ 21

3. Round off 4869 to the nearest hundreds and divide the rounded off number by 12. Find the quotient.

Problem Solving Through Model Method

Example  3128 students are to be arranged in 16 rows. How many students will stand in each row and how many students will be left?

Understanding

How many students are there? How many rows are there? How do I arrange them? Which operation should I use?

Planning

3128

Doing

195
16) 3128
-16
152
-144
88
-80
8

There will be 195 students in each row and 8 students will be left.
Let's make a model first.

Exercise 4.5

1. a) Divide 7014 by 7.
   
   Actual quotient = 1001...
   
   Which is greater?
   
   Estimated quotient = 1000...
   
   b) Compare the estimated quotient with the actual quotient.

2. Estimate the quotient of the following.
   
   a) 2951 ÷ 12   b) 1686 ÷ 14   c) 3341 ÷ 11
   
   d) 1892 ÷ 13   e) 6479 ÷ 25   f) 7842 ÷ 21

3. Round off 4869 to the nearest hundreds and divide the rounded off number by 12. Find the quotient.

Problem Solving Through Model Method

3128 students are to be arranged in 16 rows. How many students will stand in each row and how many students will be left?

How many students are there?
How many rows are there?
How do I arrange them?
Which operation should I use?

Example

Understanding

There will be 195 students in each row and 8 students will be left.

\[
\begin{array}{c}
16 \\
195 \\
3128 \\
- 16 \\
152 \\
- 144 \\
8 \\
- 80 \\
8 \\
\end{array}
\]

Dividend = Divisor × Quotient + Remainder

\[= 16 \times 195 + 8 = 3120 + 8 = 3128\]

So, the answer is correct.

So, my answer is correct.

Exercise 4.6

Solve the following word problems.

1. The cost of the air tickets for a team of 12 players is ₹62,208. What is the cost of each ticket?

2. A book distributor orders 2363 books. He plans to evenly distribute the books to 17 bookshops. How many books will each bookshop receive?

3. A total of 37,541 children visited a zoo in the month of January. If equal number of children visited the zoo on each day, how many children visited the zoo in a day?

4. Which number should be divided by 6831 to give a quotient of 21 and a remainder of 6?

Everyday Maths

The library has 4008 books to be placed in 24 shelves equally. How many books will each shelf have?
**Aim:** To strengthen the understanding of division of a 4-digit number by a 1-digit number.

**Requirements:** Dice, coloured sketch pens, A4-size sheet, pattern drawn on a chart paper.

**Steps:**
1. Divide the class into groups of 4 and distribute a sketch pen of different colours to each member of the group.
2. Every group gets one A4-size sheet with a game board made on it. The game board has some 1-digit numbers written on it, as shown below. A few 4-digit numbers will be written on the top.

![Game board image](image)

**Game numbers:**
3479, 2521, 6719, 1167, 9165, 7125

3. Player 1 of the group rolls a dice on the game board. The digit on which the dice lands forms the divisor.
4. The player selects a game number and divides this number by the divisor.
5. The player, then, colours the remainder, if any, on the board.
6. Repeat steps 3 to 5 for each player. A turn is missed if there is no remainder or if the remainder is already coloured.
7. The player who colours three numbers diagonally or vertically is the winner.