In view of the reform of the PreVocational Education at Secondary level, we are pleased to provide to Educators and PreVocational students teaching and learning materials in line with the new Curriculum Framework-Secondary (PreVocational) which will now comprise of four years of schooling.

The objective of the PreVocational education is to provide opportunities to learners to obtain a formal qualification after four years of schooling. It will also provide learners with opportunities to branch out in either, further training in a number of vocational areas or to join the world of work or even to reintegrate the academic stream.

This project necessitates a well-planned teaching based on a set of carefully designed materials. The MIE is providing the pedagogical support and appropriate materials for both teachers and pupils. We believe that all children are educable and we have incorporated in the text materials that would provide learning experiences appealing to a diversity of learners. We wish that teaching is based on a collaborative and consensual approach with the students as well as with the support of the home.

We also hope that these materials will help everyone to obtain a clear idea of the PreVocational project. You will surely notice that the materials can benefit any learner and a much wider group of students than just the PreVocational stream. It will be followed by other more exciting ones to cover the whole of the four years.

I wish to thank all the staff of MIE under whose guidance these materials have been produced and the team of MIE graphic designers who have produced a wonderful piece of work. My thanks also go to the staff of the MITD who have been associated with the writing of the materials, the Educators from secondary schools who have contributed in various panels and the PreVocational Inspectors for their constructive comments.

Sheela Thancanamootoo  
Director, MIE
The current Mathematics series has been specifically designed to meet the needs of the Prevocational stream. Putting learners at the forefront, the different tailor-made textbooks attempt to give a different mathematical experience to students who are seeking a new start. Further, to offer a success-oriented experience, learners are led to construct mathematical ideas on a concept-by-concept basis, without much requirement of prior mathematical knowledge. Concepts are introduced and developed from the known experiences of learners, using their real-life mathematical knowledge. Much emphasis is laid on sense making.

Each chapter is progressively developed according to the following sequence: introduction box, example box, graded exercises, continuous assessment and profiling. Key mathematical terms have been highlighted as it is known that language is often a barrier to problem solving. Each chapter ends with a profiling table, where teachers are expected to show how much progress has specifically been made in a given area. We have equally attempted to encourage the involvement of parents in monitoring their ward’s progress by requiring them to sign the end-of-unit report from the teacher.

The textbooks have been written in such a way that they prompt independent learning. Much care has been taken in presenting the tasks according to their level of complexity so that students can easily move from one level to the other. We have used simple sentences so that learners can read the materials on their own. We hope that the graphical layout of the textbook stimulates students’ interest in the learning materials.

The book is also meant to be a guide to teachers in terms of pedagogical strategies. The real-life examples used to introduce concepts and the pedagogical development of mathematical ideas are expected to be beneficial to teachers. We have adopted a unit-by-unit approach so that the textbooks can be used flexibly at any point in time. Such an approach will facilitate the differentiation of instruction in the classroom. We have primarily included basic problems in the different content areas. Teachers are required to supplement other problems as the mastery of mathematical skills requires much practice.

We hope that this series of textbooks will give students a new opportunity to re-enter the world of mathematics as they dedicatedly work through the different units with the support of their committed teachers. We equally hope that students will have an enjoyable mathematical experience, developing both skills and confidence, appreciating and valuing the mathematics in their daily life and work experience.

**Mathematics Panel**
Mauritius Institute of Education

Mr K. Mathoor – Coordinator
Dr A. Ramful – Coordinator

Ministry of Education, Culture & Human Resources

Mr Mamodebaccus Sheik Belal – Educator
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Mr Geerwar Hans - Educator

Acknowledgements

The Mathematics Panel would like to thank all those who have directly or indirectly helped in the writing of the Mathematics textbooks.
# TABLE OF CONTENT

## Unit 1
- Counting .................................................. 8
- Addition .................................................... 12
- Subtraction ............................................... 15
- Even and Odd numbers ................................. 18
- Square numbers ......................................... 21
- Continuous Assessment ................................. 24
- Profiling .................................................... 26

## Unit 2
- Patterns and Sequences ................................. 28
- Factors and Multiples .................................... 32
- Multiplication ............................................ 39
- Division .................................................... 47
- Mental Mathematics .................................... 51
- Divisibility tests ......................................... 57
- Continuous Assessment ................................. 59
- Profiling .................................................... 60

## Unit 3
- Review of fractions ....................................... 62
- Multiplication involving fractions .................... 65
- Division involving fractions ............................ 70
- Decimal fractions ........................................ 75
- Rounding decimals ....................................... 76
- Multiplication involving decimals .................... 80
- Division involving decimals ............................ 88
- Continuous Assessment ................................. 93
- Profiling .................................................... 95
UNIT 1

By the end of the unit, you should be able to:

• count, read and write numbers up to 10 000.
• compose and decompose numbers up to 10 000.
• perform operations on numbers involving addition and subtraction.
• solve simple word problems.
• work out number patterns and sequences involving even, odd and square numbers.
In this unit we study numbers up to 10,000. In year 1, you learned how to represent numbers in terms of units, tens and hundreds using notes. Using the same idea, we can represent Rs 7682 as follows:

Rs 7682 = Rs 7000 + Rs 600 + Rs 80 + Rs 2
7682 = (7\times1000) + (6\times100) + (8\times10) + (2\times1)
1. Count and complete.

(a) 1000, 1001, 1002, _____, _____, _____, _____, _____, _____, 1010
(b) 1010, 1020, 1030, _____, _____, _____, _____, _____, 1100

2. Complete the Grid.

<table>
<thead>
<tr>
<th></th>
<th>1000</th>
<th>1100</th>
<th>1200</th>
<th>1300</th>
<th></th>
<th></th>
<th></th>
<th>1900</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td>2500</td>
<td></td>
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<td></td>
</tr>
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<td>3000</td>
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<td></td>
<td></td>
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<td>4000</td>
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<td>4300</td>
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<td></td>
</tr>
<tr>
<td>5000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td></td>
<td>6200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7000</td>
<td></td>
<td></td>
<td>7400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8000</td>
<td></td>
<td></td>
<td></td>
<td>8600</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9000</td>
<td></td>
<td></td>
<td></td>
<td>9500</td>
<td></td>
<td></td>
<td></td>
<td>9900</td>
</tr>
</tbody>
</table>

3. Complete the sequence of numbers.

(a) 9900, 9910, 9920, _____, _____, _____, _____, _____, _____, _____, 10 000
(b) 9990, 9991, 9992, _____, _____, _____, _____, _____, _____, _____, 10 000
(c) 8125, _____, 8175, 8200, 8225, _____
4. Write the numbers in expanded form. One example has been done for you.

(a) 6725 = \(6 \times 1000 + 7 \times 100 + 2 \times 10 + 5 \times 1\)

(b) 9803 =

(c) 8125 =

5. Write the number for each of the following expansions.

(a) \((5 \times 1000) + (6 \times 100) + (2 \times 10) + (8 \times 1)\) = ____________

(b) \((7 \times 1000) + (0 \times 100) + (3 \times 10) + (2 \times 1)\) = ____________

(c) \((4 \times 1000) + (3 \times 100) + (0 \times 10) + (4 \times 1)\) = ____________

(d) \((5 \times 1000) + (0 \times 100) + (0 \times 10) + (5 \times 1)\) = ____________

---

**NUMBER NAME**

Example 1:

5623

- Five thousand
- six hundred
- and twenty three

Example 2:

6074

- Six thousand and seventy-four
6. Write in words.
   (a) 4322 : ________________________________________________________________
   (b) 5555 : ________________________________________________________________
   (c) 7023 : ________________________________________________________________
   (d) 6740 : ________________________________________________________________

7. Write in figures.
   (a) Two thousand three hundred and eighteen :  _________________
   (b) Six thousand and five hundred and ninety-nine :  _________________
   (c) Three thousand and eighty :  _________________
   (d) Nine thousand and fourteen :  _________________

8. Arrange the following numbers in ascending order.
   (a) 6537, 3894, 8349, 5062  _____________________________________________
   (b) 5796, 4898, 7904, 6543  _____________________________________________
   (c) 4233, 4034, 4323, 4321  _____________________________________________

9. Arrange the following numbers in descending order.
   (a) 3940, 4098, 3094, 4307, 3049  _____________________________________________
   (b) 3894, 2583, 7940, 5750, 6432  _____________________________________________
   (c) 5624, 5529, 5429, 5623, 5650  _____________________________________________

10. Write down the value of:
    (a) 3 in 3894 :  _________________
    (b) 5 in 4750 :  _________________
    (c) 9 in 2952 :  _________________
    (d) 4 in 9234 :  _________________
Mrs. Kamla buys a microwave oven for Rs. 3645 and a sewing machine for Rs. 5239.

How much does she pay altogether?

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microwave oven</td>
<td>Rs 3645</td>
</tr>
<tr>
<td>Sewing machine</td>
<td>Rs 5239</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Rs 8884</strong></td>
</tr>
</tbody>
</table>

She pays Rs. 8884 altogether.

11. Work out.

(a) \[\begin{array}{c}
4236 \\
+ 2513 \\
\hline
6749
\end{array}\]

(b) \[\begin{array}{c}
8432 \\
+ 2007 \\
\hline
10439
\end{array}\]

(c) \[\begin{array}{c}
3677 \\
+ 1713 \\
\hline
5390
\end{array}\]

(d) \[\begin{array}{c}
2047 \\
+ 3094 \\
\hline
5141
\end{array}\]

(e) \[\begin{array}{c}
2999 \\
+ 3999 \\
\hline
6998
\end{array}\]

(f) \[\begin{array}{c}
3456 \\
+ 2544 \\
\hline
6000
\end{array}\]
12. Mr Montocchio has a farm of length and width as shown in the picture below:

How much fencing is required to enclose the farm?

13. The expenditure of Mrs Sarah in March is shown below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>3700</td>
</tr>
<tr>
<td>Telephone</td>
<td>1225</td>
</tr>
<tr>
<td>Electricity</td>
<td>1375</td>
</tr>
<tr>
<td>Water</td>
<td>225</td>
</tr>
<tr>
<td>Car fuel</td>
<td>2775</td>
</tr>
</tbody>
</table>

(a) How much does Mrs Sarah spend on food, electricity and water?

(b) How much does she spend on telephone and car fuel?

(c) How much does she spend in all in March?
14. Three candidates in an election obtained 706, 724 and 523 votes respectively. Find the total number of votes obtained by the three candidates.

15. A carpenter is planning to build a cupboard. The table below shows the materials needed and their corresponding costs. Complete the table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood sheet</td>
<td>2675</td>
</tr>
<tr>
<td>Wood and varnish</td>
<td>4878</td>
</tr>
<tr>
<td>Nails, screws and glue</td>
<td>649</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>
Niresh uses 3 five hundred rupee notes to buy a pair of shoes for Rs 1475. How much money is left?

<table>
<thead>
<tr>
<th>Sum of money</th>
<th>Rs 1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of shoes</td>
<td>Rs 1425</td>
</tr>
<tr>
<td>Amount left</td>
<td>Rs 25</td>
</tr>
</tbody>
</table>

1. (a) 5784 - 2343 = 
(b) 3428 - 1203 = 
(c) 9425 - 1458 =

(d) 7213 - 2114 = 
(e) 1425 - 977 = 
(f) 5703 - 3909 =

2. Work out.
(a) 4735 - 2524 =
(b) 5623 - 2715 =
(c) 5378 - 658 =
(d) 4008 - 3654 =

3. Find the difference between 3456 and 2243.

4. Subtract 2577 from 4322.
5. The weekly wages of Ajeev and Ravin are Rs 8769 and Rs 9780 respectively. How much more money does Ravin receive in a week?

6. Mrs Sarojini earns a monthly salary of Rs 10 000. A sum of Rs 3577 is deducted from her salary every month for her loan. How much money is left after the deduction?

7. A truck weighs 9750 kg. A car weighs 1175 kg. By how much is the truck heavier than the car?
8. Water tank A has a capacity of 2250 L and water tank B has a capacity of 1375 L. How much more water can tank A hold than tank B?

\[
\begin{array}{c|c}
\text{Tank A} & 2250 \text{ L} \\
\text{Tank B} & 1375 \text{ L} \\
\end{array}
\]

9. A helicopter is flying at a height of 2525 m. An aeroplane is flying at a height of 6243 m. What is the difference in height between the two?

\[
\begin{array}{c}
\text{Helicopter:} & 2525 \text{ m} \\
\text{Aeroplane:} & 6243 \text{ m} \\
\end{array}
\]
The aim of this activity is to identify even and odd numbers.

Materials required: 100 counters and a 100-square chart.

**Procedure**

1. Divide class in groups of four.

2. Provide each group a set of 100 counters (e.g., bottle tops) and a 100-square chart.

3. Select 6 counters. Arrange them in pairs as shown below.

   ![6 counters arranged in pairs](image)

4. Now, select 9 counters. Can they be arranged in pairs?

   ![9 counters with one left unpaired](image)

   We say that 6 is an **even** number as we can pair the counters.

   We say that 9 is an **odd** number as one counter is left unpaired.
### Even and odd numbers

<table>
<thead>
<tr>
<th></th>
<th>√</th>
<th>3</th>
<th>√</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td>20</td>
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<td>61</td>
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<td>70</td>
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<td>74</td>
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<td>80</td>
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<tr>
<td>88</td>
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<td>90</td>
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<tr>
<td>91</td>
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<td></td>
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<tr>
<td>93</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. (a) Complete the table.
   (b) Put a tick on the **even** numbers and a cross on the **odd** numbers as indicated in the first row.

6. Study the pattern on the chart. What do you observe?

7. Use your chart to find out whether the following numbers are even or odd.

<table>
<thead>
<tr>
<th>Even</th>
<th>Odd</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>_______</td>
</tr>
<tr>
<td>50</td>
<td>_______</td>
</tr>
<tr>
<td>73</td>
<td>_______</td>
</tr>
<tr>
<td>42</td>
<td>_______</td>
</tr>
<tr>
<td>45</td>
<td>_______</td>
</tr>
<tr>
<td>26</td>
<td>_______</td>
</tr>
<tr>
<td>27</td>
<td>_______</td>
</tr>
<tr>
<td>98</td>
<td>_______</td>
</tr>
</tbody>
</table>
A number which is exactly divisible by 2 is an even number.

An even number ends in 0, 2, 4, 6 or 8.

1. (a) List out all the even numbers less than 20. 

(b) List out all the even numbers between 20 and 30.

2. Ring the even numbers from the list below:
   (a) 24, 27, 38, 41, 62, 73, 84
   (b) 115, 128, 142, 351, 572, 890

An odd number ends in 1, 3, 5, 7 or 9.

3. Write down the odd numbers between
   (a) 13 and 29,

   (b) 49 and 75.

4. Ring the odd numbers from the list below
   (a) 4, 45, 6, 12, 84, 11, 31, 13, 95
   (b) 125, 148, 249, 315, 500, 737, 805.
Consider the numbers 3, 4, 5, 6, 7, 8, 9, 10.

Let us use dots to represent each of these numbers.

Investigate which of these numbers can be arranged into a square.

3  Not a square
4  Square
5  Not a square
6  Not a square
7  Not a square
8  Not a square
9  Square
10 Not a square

We observe that 4 dots and 9 dots can be arranged in a square.

The numbers 4 and 9 are called square numbers. Observe that:

4 = 2 \times 2
9 = 3 \times 3
A square number is obtained when a (non-zero) whole number is multiplied by itself.

Example:

\[ 4 \times 4 = 16 \]
\[ 5 \times 5 = 25 \]

16 and 25 are square numbers.

Note that 1 is also a square number as \( 1 \times 1 = 1 \).

Construct other square numbers:

(a) \( 6 \times 6 = \)

(b) \( 7 \times 7 = \)

(c) \( 8 \times 8 = \)

(d) \( 9 \times 9 = \)

(e) \( 10 \times 10 = \)

(f) \( 11 \times 11 = \)

(g) \( 12 \times 12 = \)
5. Write down the square numbers which lie between
   (a) 5 and 20
   (b) 20 and 40
   (c) 40 and 70
   (d) 70 and 110

6. Ring the square numbers from the list below:
   48, 64, 77, 121

7. Write the next three terms in the following:
   (a) 9, 16, 25, _____, _____, _____
   (b) 81, 100, 121, _____, _____, _____

8. Write down
   (a) the smallest 3-digit square number that is also odd.
      _______________________
   (b) the largest 2-digit square number that is also even.
      _______________________
Continuous assessment

1. Complete the sequences:
   (a) 125, 150, 175, _____, _____, _____, _____
   (b) 8750, 8850, 8950, _____, _____, _____, _____
   (c) 7635, 7620, 7605, _____, _____, _____, _____

2. Write in words:
   (a) 4512  ___________________________________________________
   (b) 9785  ___________________________________________________
   (c) 3019  ___________________________________________________

3. Write in expanded form:
   (a) 2647 =  ______________________________________________
   (b) 7652 =  ______________________________________________
   (c) 9021 =  ______________________________________________

4. Work out the following:
   (a) 4132 + 3738 =
   (b) 4012 + 5904 =
   (c) 3175 + 290 + 85 =
   (d) 4005 + 1300 + 3210 =
5. Work out the following:

(a) \[
\begin{array}{c}
5237 \\
-3218 \\
\hline
\end{array}
\]

(b) \[
\begin{array}{c}
7689 \\
-4809 \\
\hline
\end{array}
\]

(c) \[5305 - 3530 =\]

(d) \[9378 - 4589 =\]

6. (a) List out the even numbers between 75 and 100.

(b) Write down the odd numbers between 20 and 40.

(c) Ring the odd numbers and put a cross on the square numbers in the list given below.

\[2, 3, 9, 24, 25, 33, 41, 49, 51, 58, 64.\]
# UNIT 1

## Profiling

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read numbers up to 10 000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Write numbers up to 10 000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Write number names up to 10 000</td>
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<td>4. Compose and decompose numbers up to 10 000</td>
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<td>5. Perform addition</td>
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<td>7. Solve simple word problems</td>
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<td>8. Identify even and odd numbers</td>
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<td>9. Identify square numbers</td>
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## Student’s Progress

Teacher’s comments

___________________________________________________________

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Signature of parent: ___________________ Date: ____________
By the end of the unit, you should be able to:

• work out patterns and sequences.

• find factors and multiples of a number.

• perform operations on numbers involving multiplication and division.

• solve word problems.

• perform mental arithmetic operations.
Patterns exist all around us. The pictures below show the patterns in a beehive, a music scale, tiles and a piece of fabric.

In this unit, we shall study number patterns.
Number patterns

Consider the 100-number square.

Start at 4 and count by 4s (i.e., 4, 8, 12, ...).

Circle every number you counted.

Describe a pattern.

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Pattern in multiplication table 9

Describe the pattern in the table.

\[
\begin{align*}
1 \times 9 & = 9 \\
2 \times 9 & = 18 \\
3 \times 9 & = 27 \\
4 \times 9 & = 36 \\
5 \times 9 & = 45 \\
6 \times 9 & = 54 \\
7 \times 9 & = 63 \\
8 \times 9 & = 72 \\
9 \times 9 & = 81 \\
10\times 9 & = 90
\end{align*}
\]
1. Continue the pattern of dots.

(a)  

1 4 9 _________               _________

(b)  

1 3 6 _________             _________

1 1+2 1+2+3 _________             _________

(c)  

1x2 2x3 3x4 _________              _________

(d)  

3 5 7 _________              _________
Complete the number patterns in exercises 1 to 4.

2. Number of bicycles: \(\begin{array}{c}1 & 2 & 3 & 4 & 5 \\ \end{array}\)
   Number of wheels: \(\begin{array}{c}2 & 4 & \quad & \quad & \quad \\ \end{array}\)

3. Number of cars: \(\begin{array}{c}1 & 2 & 3 & 4 & 5 \\ \end{array}\)
   Number of wheels: \(\begin{array}{c}4 & 8 & \quad & \quad & \quad \\ \end{array}\)

4. Find the next three terms in each of the following sequences.
   (a) \(5, 7, 9, 11, \quad, \quad, \quad\)
   (b) \(3, 9, 27, 81, \quad, \quad, \quad\)
   (c) \(160, 80, 40, 20, \quad, \quad, \quad\)
   (d) \(\frac{1}{11}, \quad \frac{3}{11}, \quad \frac{5}{11}, \quad \frac{7}{11}, \quad, \quad, \quad\)
   (e) \(2, 3, 5, 8, 13, \quad, \quad, \quad\)
   (f) \(0.4, 1.2, 3.6, 10.8, \quad, \quad, \quad\)
   (g) \((0.6, 1.3), (0.5, 1.1), (0.4, 0.9), (\quad, \quad), (\quad, \quad), (\quad, \quad)\)
Factors

We know that 6 = 2 X 3.
We say that:
2 is a factor of 6
3 is a factor of 6
Also, 6 = 1 X 6.
1 is a factor of 6
6 is a factor of 6
So the factors of 6 are 1, 2, 3, 6.

We can also obtain the factors of 6 by arranging 6 beads in rectangular form.

Arrangement 1: 2 rows and 3 columns
2 X 3 = 6

Arrangement 2: 1 row and 6 columns
1 X 6 = 6

The factors of 6 are 1, 2, 3, and 6. Note that 6 can be divided by 1, 2, 3, and 6.

Similarly, we can find the factors of 12 by arranging 12 beads in rectangular form.

1 X 12

2 X 6

3 X 4

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

Observe that 12 can be divided exactly by its factors.
12 ÷ 1 = 12, 12 ÷ 2 = 6, 12 ÷ 3 = 4, 12 ÷ 4 = 3, 12 ÷ 6 = 2, 12 ÷ 12 = 1.

A factor of a number divides that number exactly.
1. Find the factors of the following numbers by arranging beads in rectangular form

(a) 10

(b) 18
2. Find the factors of the following numbers using the multiplication table.

(a) 15

(b) 20

(c) 24

(d) 30

(e) 36

(f) 50

(g) 17
Consider the factors of 2, 6, 7, 8, 9, 10, 11, 12, 13

Factors of 2: 1, 2
Factors of 6: 1, 2, 3, 6
Factors of 7: 1, 7
Factors of 8: 1, 2, 4, 8
Factors of 9: 1, 3, 9
Factors of 10: 1, 2, 5, 10
Factors of 11: 1, 11
Factors of 12: 1, 2, 3, 4, 6, 12
Factors of 13: 1, 13

We observe that the numbers 2, 7, 11 and 13 have only 2 factors: 1 and the number itself.

Numbers such as 2, 7, 11 and 13 are called prime numbers.

The numbers 6, 8, 9, 10 and 12 have more than 2 factors.

Such numbers are called composite numbers.
3. Write all the prime numbers between
   (a) 1 to 20
   (b) 21 to 50

4. Circle the prime numbers in the list below.
   39, 49, 59, 69, 79, 89, 99

5. Ring the numbers which are **not** prime.
   11, 21, 31, 41, 51, 61, 71, 81, 91

6. Write down all the prime numbers between 50 and 70.

7. Ring each composite number in the list below.
   6, 9, 13, 15, 19, 38, 31, 57, 79, 91

8. Write down
   (a) the smallest 2-digit composite number.
   (b) the largest 3-digit composite number.

9. Which of the following numbers are composite?
   301, 421, 517, 849
**Multiples**

Consider sets of 5 objects.

1 set of 5

\[ 1 \times 5 = 5 \]

2 sets of 5

\[ 2 \times 5 = 10 \]

3 sets of 5

\[ 3 \times 5 = 15 \]

4 sets of 5

\[ 4 \times 5 = 20 \]

We say that 5, 10, 15, 20 are multiples of 5.

To find the multiples of 5, we multiply 1, 2, 3, 4, 5, … by 5.

A multiple of a number is obtained by multiplying the number by a (non-zero) whole number.

For example, the multiples of 4 are obtained as follows:

\[ 4 \times 1 = 4 \]
\[ 4 \times 2 = 8 \]
\[ 4 \times 3 = 12 \]
\[ \ldots \]

\[ \ldots \]
10. Complete
   (a) The first five multiples of 3 are _____ , _____ , _____ , _____ , _____

   (b) The first five multiples of 6 are _____ , _____ , _____ , _____ , _____

   (c) The first five multiples of 10 are _____ , _____ , _____ , _____ , _____

11. Ring the multiples of 7 from the given numbers
    8 , 14 , 17 , 19 , 21 , 28 , 112 , 45 , 56

12. Find the sum of all the multiples of 6 between 42 and 84.

13. Which of the following numbers is a multiple of 9?
    129 , 303 , 729

14. Find the sum of all the multiples of 10 between 150 and 200.
### Multiplication

In Year 1 (unit 2) you were introduced to multiplication involving 1-digit number. We shall now work with multiplications involving 2-digit numbers.

**Example:**

A school bus can carry 55 students. How many students can 7 school buses carry?

One bus: 55 students

7 buses: $55 \times 7$ students

```
3 5 5
X 7
3 8 5
```

Number of students: 385

---

1. **Work out:**

   |   |   |   |
---|---|---|---|
   | a | b | c | d | e |
---|---|---|---|---|---|
   | 83 | 93 | 89 | 67 | 63 |
   | X 4 | X 5 | X 6 | X 8 | X 9 |

2. **Work out:**

   |   |   |   |
---|---|---|---|
   | a | b | c | d |
---|---|---|---|---|
   | 175 | 234 | 803 | 917 |
   | X 3 | X 5 | X 6 | X 7 |

---

39
Multiplication by multiples of 10

Recall:

\[ 5 \times 20 = 5 \times 2 \times 10 \]
\[ = 10 \times 10 \]
\[ = 100 \]

\[ 7 \times 40 = 7 \times 4 \times 10 \]
\[ = 28 \times 10 \]
\[ = 280 \]

Key terms:
- Multiply
- Product
- Times
- Of

Multiplication by a 2-digit number

Example: \( 45 \times 13 \)

\[
\begin{array}{c|c|c}
40 & 5 \\
\hline
10 & 10 \times 40 = 400 & 10 \times 5 = 50 \\
3 & 3 \times 40 = 120 & 3 \times 5 = 15 \\
\end{array}
\]

\( 45 \times 13 = 400 + 120 + 50 + 15 \)

\[ \text{or} \quad 145 \]
\[ \times 13 \]
\[ \underline{135} \]
\[ 450 \]
\[ \underline{585} \]

\( 45 \times 13 = 45 \times (3 + 10) \)

\[ = (45 \times 3) + (45 \times 10) \]
\[ = 135 + 450 \]
\[ = 585 \]
3. Work out
   (a) \(3 \times 20 = \)
   (b) \(4 \times 70 = \)
   (c) \(6 \times 80 = \)
   (d) \(2 \times 70 = \)

4. Work out the following multiplications using the method shown in the explanation box.

   (a) \[
   \begin{array}{c}
   27 \\
   \times 13
   \end{array}
   \]

   (b) \[
   \begin{array}{c}
   74 \\
   \times 35
   \end{array}
   \]

5. Work out
   (a) \[
   \begin{array}{c}
   75 \\
   \times 25
   \end{array}
   \]
   (b) \[
   \begin{array}{c}
   48 \\
   \times 23
   \end{array}
   \]
   (c) \[
   \begin{array}{c}
   57 \\
   \times 29
   \end{array}
   \]
   (d) \[
   \begin{array}{c}
   93 \\
   \times 27
   \end{array}
   \]
A shortcut method for multiplication

Consider the multiplication: 135 \times 12.
A 3-digit number is multiplied by a 2-digit number.

**Step 1:**
Draw a rectangle and divide it into 3 columns and 2 rows. Divide each small rectangle obtained by a diagonal to store the result.

![Diagram of a 3x2 grid divided into 9 smaller rectangles by diagonals.]

**Step 2:**
Place the digits of 135 on top of each column and the digits of 12 besides the rows as shown in the diagram.

![Diagram with 1, 3, and 5 in the first row and 1 and 2 in the second row.]

**Step 3:**
Multiply 1 by 1; 3 by 1 and 5 by 1.
Multiply 1 by 2; 3 by 2 and 5 by 2.
Write the answers in the grid as shown on the next page.
**MULTIPLICATION**

![Multiplication Diagram]

**Step 4:** (Refer to the diagram below)

Add the numbers along the diagonals starting from the right. The first diagonal contains zero. Thus, write zero below the grid. In the second diagonal, 6+1+5 = 12. Write 2 below the rectangle and carry '1' to the next diagonal.

Thus the sum of the third diagonal is 2+1+3 = 6.

The fourth diagonal contains only the number 1. Write '1' below the grid as shown in the following diagram.

Thus, $135 \times 12 = 1620$

Check your answer:

```
1 3 5
X 1 2
1 2 7 0
+ 1 3 5 0
------
1 6 2 0
```
Example: $898 \times 73$

Check:

$\begin{array}{c}
6 & 5 \\
2 & 2 \\
8 & 9 & 8 \\
\end{array}$

$X 73$

$898$

$126'94$

$62860$

$65554$

6. **Work out**

(a) $245 \times 32$

(b) $629 \times 45$
(c) $898 \times 73$

(d) $142 \times 18$

(e) $325 \times 48$

(f) $923 \times 14$
7. A factory uses 645 kilowatt of electricity daily. How much electricity does the factory use in 24 days?

8. A car manufacturer uses 234 screws to make a car. If he manufactures 65 cars, how many screws are needed?

9. In a school of 396 pupils, each contributes Rs 85 for an outing. How much money is collected in all?

10. Hans grows 124 rows of cabbages. There are 30 cabbages in each row. How many cabbages are there altogether?

11. The rectangular school compound has dimensions 315 m by 85 m. Find the area of the school compound.
In this section, we work out problems involving division by a 2-digit number.

**Example 1:**

336 cans of soft drink are to be packed in boxes of 24. How many such boxes are obtained?

We divide 336 by 24, i.e., $336 \div 24$.

Alternatively, we can proceed as follows.

We know that $24 \times 10 = 240$.

Thus 240 cans will fill 10 boxes.

Number of cans left = $336 - 240 = 96$.

How many boxes will be required to pack the remaining 96 bottles?

1 box = 24 cans
2 boxes = $24 \times 2 = 48$ cans
3 boxes = $24 \times 3 = 72$ cans
4 boxes = $24 \times 4 = 96$ cans

Thus, we need 4 more boxes.

Therefore, the total number of boxes required = $10 + 4 = 14$. 

\[
\begin{array}{c}
336 \\
- 240 \rightarrow 10 \text{ boxes} \\
\hline
96 \\
- 96 \rightarrow 4 \text{ boxes} \\
\hline
0 \rightarrow 14 \text{ boxes}
\end{array}
\]
Division

Division by repeated subtraction

Example 2: Consider $2232 \div 72$

We know that $72 \times 10 = 720$.

\[
\begin{array}{c}
2232 \\
- 720 \quad \text{10 times} \\
1512 \\
- 720 \quad \text{10 times} \\
792 \\
- 720 \quad \text{10 times} \\
72 \\
- 72 \quad \text{1 times} \\
0 \\
\end{array}
\]

Thus $2232 \div 72 = 31$.

1. Work out

(a) $75 \div 15 = $

(b) $96 \div 16 = $

(c) $169 \div 13 = $
2. Work out

(a) \[ 1161 \div 43 = \]

(b) \[ 1600 \div 25 = \]

(c) \[ 1022 \div 73 = \]

(d) \[ 1614 \div 56 = \]
3. A carpenter drills 216 holes in a rectangular array in a board. There are 12 holes in each row. How many rows are there in all?

4. One dollar ($) can be exchanged for Rs 28. How many dollars can be obtained for Rs 1260?

5. Jodish buys a CD player on hire purchase for Rs 2352. She pays Rs 98 as monthly instalment. How many months does she take to settle the account?

6. A poultry farm sells eggs in packs of 24. Everyday the farm produces 1560 eggs. How many packs are produced daily?
Knowledge of multiplication by multiples of 10 is very useful in performing mental arithmetic.

**Example 1**

(a) \(6 \times 10 = 60\)

(b) \(6 \times 20 = 6 \times 2 \times 10 = 12 \times 10 = 120\)

(c) \(6 \times 80 = 6 \times 8 \times 10 = 48 \times 10 = 480\)

**Example 2**

(a) \(6 \times 100 = 600\)

(b) \(6 \times 200 = 6 \times 2 \times 100 = 12 \times 100 = 1200\)

(c) \(6 \times 800 = 6 \times 8 \times 100 = 48 \times 100 = 4800\)

**Example 3**

(a) \(6 \times 1000 = 6000\)

(b) \(6 \times 2000 = 6 \times 2 \times 1000 = 12000\)

(c) \(6 \times 8000 = 6 \times 8 \times 1000 = 48000\)
Perform the multiplications in exercises 1 - 5 mentally.

1.
(a) \(4 \times 10\)
(b) \(7 \times 10\)
(c) \(9 \times 10\)

2.
(a) \(3 \times 40\)
(b) \(7 \times 30\)
(c) \(9 \times 70\)

3.
(a) \(3 \times 100\)
(b) \(5 \times 100\)
(c) \(9 \times 100\)

4.
(a) \(4 \times 300\)
(b) \(7 \times 500\)
(c) \(8 \times 800\)

5.
(a) \(3 \times 5000\)
(b) \(7 \times 6000\)
(c) \(9 \times 9000\)

**Note**
- \(4 \times 25 = 100\)
- \(8 \times 125 = 1000\)
- \(40 \times 25 = 1000\)
Multiplication by 9 and 99

To multiply a number by 9, we can first multiply it by 10 and then subtract it from the result.

Example 1: \(24 \times 9\)
\[24 \times 10 = 240\]
\[240 - 24 = 216\]

Example 2: \(37 \times 9\)
\[37 \times 10 = 370\]
\[370 - 37 = 333\]

Similarly, to multiply a number by 99, we can first multiply it by 100 and then subtract it from the result.

Example 3: \(5 \times 99\)
\[5 \times 100 = 500\]
\[500 - 5 = 495\]

Example 4: \(24 \times 99\)
\[24 \times 100 = 2400\]
\[2400 - 24 = 2376\]

Example 5: \(36 \times 99\)
\[36 \times 100 = 3600\]
\[3600 - 36 = 3564\]
Work out exercises 1, 2 and 3 using the method given in the explanation box.

1.
   (a) $13 \times 9$
   
   (b) $27 \times 9$
   
   (c) $43 \times 9$

2.
   (a) $5 \times 99$
   
   (b) $6 \times 99$
   
   (c) $8 \times 99$

3.
   (a) $15 \times 99$
   
   (b) $26 \times 99$
   
   (c) $30 \times 99$
Multiplication by splitting

We can multiply numbers by splitting them in terms of units and tens.

Example 1

\[\begin{align*}
14 \times 6 &= (10 \times 6) + (4 \times 6) \\
&= 60 + 24 = 84
\end{align*}\]

Example 2

\[\begin{align*}
76 \times 9 &= (70 \times 9) + (6 \times 9) \\
&= 630 + 54 \\
&= 684
\end{align*}\]

Example 3

\[\begin{align*}
27 \times 50 &= (27 \times 5) \times 10 \\
\text{Now, } 27 \times 5 &= (20 \times 5) + (7 \times 5) \\
&= 100 + 35 = 135 \\
135 \times 10 &= 1350
\end{align*}\]

Example 4

\[\begin{align*}
34 \times 70 &= (34 \times 7) \times 10 \\
\text{Now, } 34 \times 7 &= (30 \times 7) + (4 \times 7) \\
&= 210 + 28 = 238 \\
238 \times 10 &= 2380
\end{align*}\]
UNIT 2

Work out exercises 1 and 2 by splitting.

1.

(a) 14 × 7

(b) 16 × 5

(c) 19 × 8

(d) 23 × 6

(e) 32 × 4

(f) 56 × 6

2.

(a) 16 × 20

(b) 23 × 40

(c) 36 × 50

(d) 44 × 30

(e) 56 × 40

(f) 77 × 60
1. A number is divisible by 2 if it ends in 0, 2, 4, 6, 8.

   Example:
   (a) 248 is divisible by 2.
   (b) 247 is not divisible by 2.

2. A number is divisible by 3 if its sum of digits is divisible by 3.

   Example:
   (a) 471 is divisible by 3 since $4 + 7 + 1 = 12$ and 12 is divisible by 3.
   (b) 143 is not divisible by 3 since $1 + 4 + 3 = 8$ and 8 is not divisible by 3.

3. A number is divisible by 4 if its last two digits is divisible by 4

   Example:
   (a) 512 is divisible by 4 since 12 is divisible by 4.
   (b) 431 is not divisible by 4 since 31 is not divisible by 4.

4. A number is divisible by 5 if it ends in 0 or 5.

   Example:
   (a) 225 is divisible by 5 as it ends in 5.
   (b) 420 is divisible by 5 as it ends in 0.
   (c) 338 is not divisible by 5 as it neither ends in 0 nor 5.
1. Which of the following numbers are divisible by 2?
   635, 776, 999, 540

2. Which of the following numbers are divisible by 3?
   124, 225, 972, 443

3. Which of the following numbers are divisible by 4?
   220, 543, 777, 988

4. Which of the following numbers are divisible by 5?
   255, 673, 600, 567

5. Circle the leap year.

6. Write down a 3-digit number that is divisible by
   (a) 2: ______________
   (b) 3: ______________
   (c) 4: ______________
   (d) 5: ______________
1. Work out
   (a) $30 \times 10 = \quad$ (b) $15 \times 100 =$
   (c) $245 \times 4 = \quad$ (d) $46 \times 32 =$
   (e) $513 \times 15 = \quad$ (f) $725 \times 14 =$

2. Work out
   (a) $66 \div 3 = \quad$ (b) $144 \div 6 =$
   (c) $7000 \div 100 = \quad$ (d) $10000 \div 1000 =$
   (e) $221 \div 13 = \quad$ (f) $552 \div 24 =$

3. Find the factors of
   (a) $35 = \quad$ (b) $76 =$
   (c) $84 = \quad$ (d) $108 =$

4. Find the multiples of 4 between 10 and 50.

5. Find the multiples of 7 between 60 and 100.

6. Write down the missing terms in the following sequences.
   (a) $3, 6, 9, \ldots, \ldots, \ldots$
   (b) $1, 4, 9, \ldots, \ldots, \ldots$
   (c) $59, 57, 55, \ldots, \ldots, \ldots$
   (d) $512, 508, 504, \ldots, \ldots, \ldots$

7. Write down the prime numbers between 20 and 40.
# UNIT 2

## Profiling

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perform Multiplication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Perform Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Solve word problems</td>
<td></td>
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</tr>
<tr>
<td>4. Write factors and multiples</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. Identify Composite &amp; Prime numbers</td>
<td></td>
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<tr>
<td>6. Complete number patterns &amp; sequences</td>
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<tr>
<td>7. Perform mental arithmetic operations</td>
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### Student’s Progress

**Teacher’s comments**

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Signature of parent: ___________________  Date: __________
By the end of the unit, you should be able to:

- perform operations involving fractions.
- perform operations involving decimal fractions.
- solve word problems involving fractions and decimal fractions.
We shall first review the basic concepts of fraction discussed in Year 1.

1. Write down the fraction shaded.
   - (a) Fraction shaded: _____________
   - (b) Fraction shaded: _____________

2. Shade the given fraction in each figure below.
   - (a) Fraction shaded: _____________
   - (b) Fraction shaded: _____________
Equivalent Fractions

3. Write the missing number.

(a) \( \frac{1}{2} = \frac{\square}{12} \)  \( \quad \) (b) \( \frac{1}{8} = \frac{4}{\square} \)  \( \quad \) (c) \( \frac{4}{\square} = \frac{15}{20} \)

(d) \( \frac{14}{16} = \frac{\square}{8} \)  \( \quad \) (e) \( \frac{3}{7} = \frac{\square}{56} \)  \( \quad \) (f) \( \frac{6}{\square} = \frac{42}{77} \)

4. Arrange in ascending order.

(a) \( \frac{4}{13} , \frac{8}{13} , \frac{12}{13} , \frac{7}{13} \)

(b) \( \frac{1}{2} , \frac{1}{8} , \frac{1}{4} , \frac{1}{16} \)

(c) \( \frac{2}{3} , \frac{5}{9} , \frac{1}{2} , \frac{13}{18} \)

5. Arrange in descending order.

(a) \( \frac{3}{11} , \frac{9}{11} , \frac{6}{11} , \frac{10}{11} \)

(b) \( \frac{5}{8} , \frac{1}{2} , \frac{13}{16} , \frac{3}{4} \)

(c) \( \frac{1}{4} , \frac{1}{6} , \frac{1}{3} , \frac{1}{8} \)
6. Work out:

(a) \( \frac{7}{16} + \frac{5}{8} + \frac{3}{8} \)

(b) \( \frac{5}{12} + \frac{2}{9} + \frac{7}{36} \)

(c) \( 3 \frac{2}{5} + 2 \frac{3}{10} \)

(d) \( 6 \frac{2}{3} + 2 \frac{3}{4} \)

7. Work out:

(a) \( \frac{3}{4} - \frac{1}{2} \)

(b) \( \frac{3}{4} - \frac{7}{16} \)

(c) \( 7 \frac{1}{3} - 4 \frac{1}{2} \)

(d) \( 6 \frac{5}{12} - 2 \frac{1}{3} \)
Multiplication involving fractions

**Example 1**

John has four friends. He wants to give \( \frac{1}{2} \) of an apple to each of them. How many apples does he need?

\[
\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2
\]

He needs: \( 4 \times \frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} \)

\[
= \frac{1}{1} + \frac{1}{1} = 2
\]

Using a shorter method:

\[
4 \times \frac{1}{2} = \frac{4}{1} \times \frac{1}{2} = \frac{4 \times 1}{1 \times 2} = \frac{4}{2} = 2.
\]

He needs 2 apples.

**Example 2**

John has five friends. He wants to give \( \frac{3}{4} \) of an apple to each of them. How many apples does he need?

\[
\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4}
\]

\[
= \frac{1\frac{1}{2}}{3} + \frac{1\frac{1}{2}}{3} + \frac{3}{4}
\]

\[
= 3\frac{3}{4}
\]

Using a shorter method:

\[
5 \times \frac{3}{4} = \frac{5}{1} \times \frac{3}{4} = \frac{15}{4} = 3\frac{3}{4}.
\]
8. Work out:

(a) \(8 \times \frac{1}{4}\)

(b) \(10 \times \frac{1}{5}\)

(c) \(14 \times \frac{1}{7}\)

(d) \(25 \times \frac{3}{5}\)

(e) \(\frac{3}{4} \times 8\)

(f) \(\frac{2}{3} \times 12\)

(g) \(\frac{4}{5} \times 6\)

(h) \(\frac{3}{7} \times 8\)
Multiplication of two fractions

We know how to multiply two whole numbers. Let us now find out how to multiply a fraction by a fraction.

Example 1: Suppose Hugo has \(\frac{1}{3}\) of a candy bar and he gives \(\frac{1}{2}\) of it to Elsa. What fraction of the whole does Elsa’s share represent?

We have to take \(\frac{1}{2}\) of \(\frac{1}{3}\). First consider one whole.

Hugo has \(\frac{1}{3}\) of one whole as shown in the diagram.

We have to take \(\frac{1}{2}\) of the shaded part. So, we divide it into two equal parts and shade one part.

The double shaded part represents \(\frac{1}{2}\) of \(\frac{1}{3}\).

The double shaded part is also \(\frac{1}{6}\) of the whole.

Thus \(\frac{1}{2}\) of \(\frac{1}{3}\) = \(\frac{1}{6}\)

or \(\frac{1}{2} \times \frac{1}{3} = \frac{1 \times 1}{2 \times 3} = \frac{1}{6}\)

Example 2: Similarly, we can interpret \(\frac{2}{3} \times \frac{1}{5}\) as \(\frac{2}{3}\) of \(\frac{1}{5}\)

We have to take \(\frac{2}{3}\) of \(\frac{1}{5}\). First consider one whole.

Consider \(\frac{1}{5}\) of one whole as shown in the diagram.

We have to take \(\frac{2}{3}\) of the shaded part. We divide it into three equal parts and shade two parts.

The double shaded part represents \(\frac{2}{3}\) of \(\frac{1}{5}\).

The double shaded part is also \(\frac{2}{15}\) of the whole.

Thus \(\frac{2}{3}\) of \(\frac{1}{5}\) = \(\frac{2}{15}\)

or \(\frac{2}{3} \times \frac{1}{5} = \frac{2 \times 1}{3 \times 5} = \frac{2}{15}\)

Therefore to multiply two fractions:
(i) we multiply the numerators
(ii) we multiply the denominators
9. Work out the fraction multiplication using rectangular representation as in the explanation box.

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

(b) \( \frac{2}{3} \times \frac{1}{7} \)

10. Work out the fraction multiplication.

(a) \( \frac{7}{15} \times \frac{1}{3} \)

(b) \( \frac{4}{9} \times \frac{2}{7} \)

(c) \( \frac{5}{12} \times \frac{3}{10} \)

(d) \( \frac{5}{6} \times \frac{2}{5} \)
11. Nishal has 15 marbles. He loses $\frac{2}{5}$ of them. How many marbles are left?

12. James has Rs 200. He spends $\frac{3}{5}$ of it on books. How much money is left?

13. Jane lives 2100 metres away from school. She walks $\frac{2}{7}$ of the distance and travels the rest by bus. What distance does she travel by bus?

14. Rajeev has Rs 240. He spends $\frac{3}{8}$ of it on books and $\frac{1}{3}$ of it on a pen. How much money is left?
Division involving fractions

Let us find out how to perform division involving fractions.

**Example 1:** Consider $6 \div 2$

How many sets of 2 are there in 6 wholes?

Number of sets of 2 = 3.

\[
6 \div 2 = 3.
\]

We also know that \[6 \times \frac{1}{2} = 3.\]

Thus, $6 \div 2$ is equivalent to $6 \times \frac{1}{2}$
or
\[
6 \div \frac{2}{1} = 6 \times \frac{1}{2}.
\]

**Example 2:** Consider $6 \div \frac{1}{2}$

How many halves (\(\frac{1}{2}\)) are there in 6 wholes?

Number of halves = 12

\[
6 \div \frac{1}{2} = 12.
\]

We also know that \[6 \times 2 = 12.\]

Thus, $6 \div \frac{1}{2}$ is equivalent to $6 \times 2$
or
\[
6 \div \frac{1}{2} = 6 \times 2.
\]
**Example 3:** Consider $6 \div \frac{3}{4}$

How many three quarters ($\frac{3}{4}$) are there in 6 wholes?

We divide the 6 wholes into quarters and make groups of three as shown in the diagram.

Number of three quarters ($\frac{3}{4}$) in 6 wholes = 8

$$6 \div \frac{3}{4} = 8$$

Number of quarters in 6 wholes = $6 \times 4 = 24$ (see above diagram)
Number of groups of 3 in 24 quarters = $24 \div 3$

= 8

Thus, $6 \div \frac{3}{4} = \frac{6 \times 4}{3} = \frac{24}{3} = 8$

or

$$6 \div \frac{3}{4} = 6 \times \frac{4}{3}$$

From examples 1, 2 and 3, we observe that to divide a number by a **fraction**, we flip the numerator and denominator of the fraction and change the division sign to the multiplication sign.
Examples

1. \[8 \div \frac{4}{5} = 8 \times \frac{5}{4} = \frac{8}{1} \times \frac{5}{4} = \frac{40}{4} = 10\]

2. \[1\frac{3}{4} \div \frac{1}{2} = \frac{7}{4} \div \frac{1}{2} = \frac{7}{4} \times \frac{2}{1} = \frac{7}{2}\]

3. \[\frac{5}{12} \div \frac{10}{6} = \frac{5}{12} \times \frac{6}{10}\]

We may simplify the numerators and denominators before multiplying as shown below.

\[\frac{1}{12} \times \frac{1}{2} = \frac{1}{4}\]

15. Work out:

(a) \[\frac{1}{4} \div 2\]

(b) \[\frac{3}{8} \div 5\]

(c) \[\frac{4}{7} \div 6\]

(d) \[1\frac{4}{7} \div 6\]

(e) \[2\frac{1}{5} \div 3\]
16. Work out:

(a) \( \frac{5}{12} \div \frac{10}{4} \)

(b) \( \frac{3}{4} \div \frac{9}{8} \)

(c) \( \frac{5}{24} \div \frac{20}{28} \)

(d) \( 1 \frac{3}{4} \div \frac{7}{4} \)

(e) \( 2 \frac{16}{25} \div \frac{33}{50} \)

(f) \( \frac{1}{10} \div \frac{9}{10} \)
17. A shopkeeper packs 60 kg of milk powder into \(\frac{3}{4}\) kg bags. How many bags does he obtain?

18. Asha buys 3 metres of ribbon. She needs \(\frac{3}{10}\) of a metre to decorate one dress. How many dresses can she decorate with the 3 metres of ribbon?

19. \(5 \frac{2}{5}\) kg of elaiti are to be packed in small plastic bags of \(\frac{1}{20}\) kg. How many small plastic bags will be needed?

20. 10 \(\frac{4}{5}\) kg of spices are packed in small bags of \(\frac{3}{10}\) kg. How many small bags can be made?
1. Give the place value of 5 in each of the following:

   (a) 5.01 _____________________________
   (b) 0.5 _____________________________
   (c) 0.85 _____________________________
   (d) 0.045 _____________________________

2. Complete the sequence

   (a) 2.38, 2.39, 2.40, _____, _____, _____, 2.44.
   (b) 3.58, 3.59, _____, _____, _____, 3.63.
   (c) 0.8, 0.9, _____, _____, _____, 1.3, 1.4.

3. Arrange the following decimals in ascending order:

   (a) 0.8, 0.9, 0.2, 0.5, 0.7 _____________________________
   (b) 0.71, 0.82, 0.44, 0.58 _____________________________
Rounding decimals

Often, we have to round decimals to make calculation easier. Consider the decimals between 2.3 and 2.4.

<table>
<thead>
<tr>
<th>2.30</th>
<th>2.31</th>
<th>2.32</th>
<th>2.33</th>
<th>2.34</th>
<th>2.35</th>
<th>2.36</th>
<th>2.37</th>
<th>2.38</th>
<th>2.39</th>
<th>2.40</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>2.3</td>
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<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Observe that 2.35 is exactly in between 2.30 and 2.40.

The decimal numbers 2.31, 2.32, 2.33 and 2.34 are closer to 2.3 than 2.4. We can approximate 2.31, 2.32, 2.33 and 2.34 to 2.3.

The decimal numbers 2.36, 2.37, 2.38 and 2.39 are closer to 2.4 than 2.3. We can approximate 2.36, 2.37, 2.38 and 2.39 to 2.4.

By convention, we approximate the middle number 2.35 to 2.4.

Study the table to observe how numbers with two decimal places are rounded to one decimal place.

<table>
<thead>
<tr>
<th>2 decimal places</th>
<th>1 decimal place</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.30</td>
<td>2.3</td>
</tr>
<tr>
<td>2.31</td>
<td>2.3</td>
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<td>2.32</td>
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<td>2.4</td>
</tr>
<tr>
<td>2.40</td>
<td>2.4</td>
</tr>
</tbody>
</table>
4. Complete the following table:

<table>
<thead>
<tr>
<th>2 decimal places</th>
<th>1 decimal place</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.50</td>
<td></td>
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<tr>
<td>4.51</td>
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<td>4.52</td>
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<td>4.58</td>
<td></td>
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<tr>
<td>4.59</td>
<td></td>
</tr>
<tr>
<td>4.60</td>
<td></td>
</tr>
</tbody>
</table>

5. Write the following numbers to 1 decimal place.

(a) 9.53
(b) 3.47
(c) 1.38
(d) 7.25
(e) 16.79
(f) 100.26
(g) 97.55
(h) 99.96
Rounding to two decimal places

We use a similar procedure to convert numbers with 3 decimal places (3 d.p) to 2 decimal places (2 d.p). Study the table below to observe the conversion.

<table>
<thead>
<tr>
<th>3 d.p</th>
<th>2 d.p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.460</td>
<td>2.46</td>
</tr>
<tr>
<td>2.461</td>
<td>2.46</td>
</tr>
<tr>
<td>2.462</td>
<td>2.46</td>
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<tr>
<td>2.463</td>
<td>2.46</td>
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<td>2.464</td>
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<td>2.465</td>
<td>2.47</td>
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<tr>
<td>2.466</td>
<td>2.47</td>
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<tr>
<td>2.467</td>
<td>2.47</td>
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<tr>
<td>2.468</td>
<td>2.47</td>
</tr>
<tr>
<td>2.469</td>
<td>2.47</td>
</tr>
<tr>
<td>2.470</td>
<td>2.47</td>
</tr>
</tbody>
</table>

Observe that the digit in the 3rd decimal place is less than 5.

Observe that the digit in the 3rd decimal place is equal to 5.

Observe that the digit in the 3rd decimal place is greater than 5.

When the digit in the third decimal place is greater or equal to 5, we increase the number in the second decimal place by one.

The same procedure is used to round a given number to any number of decimal places.

Example:

1.2847 has 4 decimal places.

1.2847 = 1.285 (to 3 d.p)
1.2847 = 1.28 (to 2 d.p)
1.2847 = 1.3 (to 1 d.p)
6. (a) Write the number shown by the balance to 2 d.p.

Answer: _______________

(b) Write the number shown in the calculator to 6 d.p.

Answer: _______________

(c) Write the number shown in the glucometer to 1 d.p.

Answer: _______________

(d) Write the number shown by the balance to 3 d.p.

Answer: _______________
Study the following examples.

**Example 1:**  
0.5 x 3  
= 0.5 + 0.5 + 0.5  
= 1.5  
Or  
0.5 x 3 = ½ x 3  
= \( \frac{3}{2} \)  
= 1 ½ = 1.5

**Example 2:**  
0.25 x 5  
= 0.25 + 0.25 + 0.25 + 0.25 + 0.25  
= 1.25  
Or  
0.25 x 5  
= \( \frac{1}{4} \) x 5  
= \( \frac{5}{4} \)  
= 1 ¼ = 1.25

7. **Evaluate:**

(a) 1.5 x 5 =

(b) 2.25 x 4 =

(c) 3.75 x 4 =
Multiplication of decimal fractions by 10, 100 and 1000

Study the following examples.

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
<th>Example 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.5 \times 10$</td>
<td>$0.36 \times 100$</td>
<td>$0.225 \times 1000$</td>
</tr>
<tr>
<td>$\frac{5}{10} \times 10 = 5$</td>
<td>$\frac{36}{100} \times 100 = 36$</td>
<td>$\frac{225}{1000} \times 1000 = 225$</td>
</tr>
</tbody>
</table>

We observe that when we multiply a decimal fraction by 10, 100 and 1000, we move the decimal point to the right by 1, 2 and 3 places respectively.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.5 \times 10$</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>$0.36 \times 100$</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>$0.225 \times 1000$</td>
<td>225</td>
<td></td>
</tr>
</tbody>
</table>

8. Evaluate:

(a) $0.7 \times 10 =$

(b) $0.51 \times 100 =$

(c) $0.768 \times 1000 =$

(d) $0.26 \times 10 =$

(e) $0.075 \times 100 =$
Multiplication of decimal fractions by multiples of 10, 100 and 1000

Study the following examples.

**Example 1:** \(0.6 \times 20\)

\[
0.6 \times 20 = 0.6 \times 10 \times 2 = \frac{6}{10} \times 10 \times 2 = \frac{6}{10} \times 20 = 6 \times 2 = 12
\]

**Example 2:** \(0.63 \times 200\)

\[
0.63 \times 200 = 0.63 \times 100 \times 2 = \frac{63}{100} \times 100 \times 2 = \frac{63}{100} \times 200 = 63 \times 2 = 126
\]

**Example 3:** \(0.527 \times 3000\)

\[
0.527 \times 3000 = 0.527 \times 1000 \times 3 = \frac{527}{1000} \times 1000 \times 3 = \frac{527}{1000} \times 3000 = 527 \times 3 = 1581
\]

**Example 4:** \(0.47 \times 5000\)

\[
0.47 \times 5000 = 0.47 \times 1000 \times 5 = \frac{47}{100} \times 1000 \times 5 = \frac{47}{100} \times 5000 = 47 \times 50 = 2350
\]
9. Work out:

(a) $0.9 \times 30 = $ 

(b) $0.25 \times 200 = $ 

(c) $0.74 \times 300 = $ 

(d) $0.013 \times 4000 = $ 

(e) $0.87 \times 700 = $ 

(f) $0.04 \times 500 = $ 

(g) $0.03 \times 6000 = $
UNIT 3

Multiplication of a decimal by a decimal

Example 1: \[0.2 \times 0.3\]
\[
\frac{2}{10} \times \frac{3}{10} = \frac{6}{100} = 0.06
\]

Example 2: \[1.2 \times 0.6\]
\[
\frac{12}{10} \times \frac{6}{10} = \frac{72}{100} = 0.72
\]

Example 3: \[0.25 \times 0.5\]
\[
\frac{25}{100} \times \frac{5}{10} = \frac{125}{1000} = 0.125
\]

10. Evaluate:

(a) \[0.9 \times 0.2 = \]

(b) \[2.3 \times 0.4 = \]

(c) \[1.2 \times 0.8 = \]

(d) \[9.3 \times 0.5 = \]

(e) \[2.1 \times 0.3 = \]
Another method for multiplication of decimals

**Example 1:** \(2.4 \times 3.7\)

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>0.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3 \times 2 = 6</td>
<td>3 \times 0.4 = 1.2</td>
</tr>
<tr>
<td>0.7</td>
<td>0.7 \times 2 = 1.4</td>
<td>0.7 \times 0.4 = 0.28</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
6 \\
+ \quad 1.4 \\
\hline
7.4
\end{array} \\
\begin{array}{c}
1.2 \\
+ \quad 0.28 \\
\hline
1.48
\end{array}
\]

\[7.4 + 1.48 = 8.88\]

\[2.4 \times 3.7 = 8.88\]

**Example 2:** \(4.35 \times 6.8\)

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>0.3</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6 \times 4 = 24</td>
<td>6 \times 0.3 = 1.8</td>
<td>6 \times 0.05 = 0.30</td>
</tr>
<tr>
<td>0.8</td>
<td>0.8 \times 4 = 3.2</td>
<td>0.8 \times 0.3 = 0.24</td>
<td>0.8 \times 0.05 = 0.04</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
24 \\
+ \quad 3.2 \\
\hline
27.2
\end{array} \\
\begin{array}{c}
1.8 \\
+ \quad 0.24 \\
\hline
2.04
\end{array} \\
\begin{array}{c}
0.3 \\
+ \quad 0.04 \\
\hline
0.34
\end{array}
\]

\[27.2 + 2.04 + 0.34 = 29.58\]

\[4.35 \times 6.8 = 29.58\]
UNIT 3

11. Work out:

(a) \( 2.3 \times 1.2 = \)

(b) \( 5.27 \times 2.3 = \)

(c) \( 8.47 \times 6.8 = \)
12. A jug can hold 0.75 litre of juice. How much juice can 15 such jugs hold?

13. 48 cardboards each of thickness 0.5 cm are packed together. Find the thickness of the pack.

14. A candy bar costs Rs 2.35. Find the cost of 27 such candy bars.

15. A high speed car covers 4.7 km with 1 litre of petrol. Find the distance covered by the car with 9.85 litres of petrol.
Now, let us consider the division of decimals.

A shopkeeper has 1.5 kg of spices. She wants to divide it into 5 equal packets.

How much spice does one packet hold?

She has to divide 1.5 by 5.

\[
1.5 \div 5 = 1 \frac{1}{2} \div 5 = \frac{3}{2} \div 5 = \frac{3}{2} \times \frac{1}{5} = \frac{3}{10} = 0.3
\]

Each packet holds \(0.3\) kg of spices.

Verify your answer:

\[0.3 \times 5 = 1.5.\]
More examples

**Example 1:** \(0.6 \div 2 = \frac{6}{10} \div 2\) or \(\frac{0.3}{2} = 0.3\) or \(2 \div 0.6 = 0.3\)

\[= \frac{3.6}{10} \times \frac{1}{2} = \frac{3}{10}\]

\[= 0.3\]

**Example 2:** \(2.85 \div 3 = \frac{285}{100} \div 3\) or \(3 \div 2.85 = 0.95\)

\[= \frac{9.5}{100} \times \frac{1}{3} = \frac{95}{100}\]

\[= 0.95\]

**Example 3:** \(3.205 \div 5 = 3.205 \div 5\) or \(0.641\)

\[= \frac{6.41}{1000} \times \frac{1}{5} = \frac{641}{1000}\]

\[= 0.641\]
16. Work out:

(a) \(2.4 \div 4\) = \\
(b) \(0.15 \div 3\) = \\
(c) \(8.56 \div 8\) = \\
(d) \(3.402 \div 9\) = \\
(e) \(6.025 \div 5\) = \\

17. 0.2 m of a PVC pipe is cut into 5 equal pieces. What is the length of each piece in metre?
Division of a decimal by a decimal

To perform division involving decimals, we convert the divisor to a whole number.

Example 1: \[2.8 \div 1.4 = \frac{2.8}{1.4}\]

To convert the denominator (1.4) to a whole number, we multiply it by 10. Similarly, we multiply the numerator by 10.

\[
\frac{2.8}{1.4} = \frac{2.8 \times 10}{1.4 \times 10} = \frac{28}{14} = \frac{4}{2} \quad \text{(after dividing numerator and denominator by 7)}
\]

\[
= 2 \quad \text{(after dividing numerator and denominator by 2)}
\]

Example 2: \[3.36 \div 2.24 = \frac{3.36}{2.24}\]

To convert the denominator (2.24) to a whole number, we multiply it by 100. Similarly, we multiply the numerator by 100.

\[
\frac{3.36}{2.24} = \frac{3.36 \times 100}{2.24 \times 100} = \frac{336}{224}
\]

\[
\frac{336}{224} = \frac{84}{56} \quad \text{(after dividing numerator and denominator by 4)}
\]

\[
= \frac{12}{8} \quad \text{(after dividing numerator and denominator by 7)}
\]

\[
= \frac{3}{2} = 1.5 \quad \text{(after dividing numerator and denominator by 4)}
\]

\[3.36 \div 2.24 = 1.5.\]
18. Work out:

(a) \(0.75 \div 0.15 =\)

(b) \(8.4 \div 0.24 =\)

(c) \(1.25 \div 0.25 =\)

(d) \(3.08 \div 0.11 =\)

(e) \(3.36 \div 0.14 =\)

(f) \(13.5 \div 0.18 =\)
1. Arrange in ascending order.
   
   (a) \( \frac{5}{17}, \frac{7}{17}, \frac{11}{17}, \frac{3}{17} \)
   
   \( \underline{___________} \)
   
   (b) \( \frac{1}{3}, \frac{5}{6}, \frac{7}{12}, \frac{11}{12} \)
   
   \( \underline{___________} \)
   
2. Arrange in descending order.
   
   (a) \( \frac{2}{19}, \frac{3}{19}, \frac{7}{19}, \frac{10}{19} \)
   
   \( \underline{___________} \)
   
   (b) \( \frac{3}{5}, \frac{2}{5}, \frac{4}{5}, \frac{1}{10} \)
   
   \( \underline{___________} \)
   
3. Work out:
   
   (a) \( \frac{2}{9} \times \frac{5}{7} = \) \( \underline{___________} \)
   
   (b) \( 7\frac{2}{9} \times \frac{4}{15} = \)
   
   (c) \( \frac{8}{21} \div \frac{4}{7} = \)
   
   (d) \( 2\frac{3}{8} \div 9\frac{1}{4} = \)
4. Wainda gives \( \frac{1}{5} \) of a cake to Raju and \( \frac{3}{10} \) of it to Jules. What fraction of the whole cake is given to Raju and Jules?

5. The sum of two fractions is \( \frac{7}{20} \). One of the fractions is \( \frac{1}{10} \). Find the other fraction.

6. Work out.
   (a) \( 3.14 \times 0.5 \)
   (b) \( 2.14 \times 1.5 \)
   (c) \( 1.23 \times 2.4 \)

7. Work out:
   (a) \( 4.2 \div 6 \)
   (b) \( 4.48 \div 3.2 \)

8. Round the decimals to the required decimal place.
   (a) \( 4.32 : \) ______________ (1 d.p)
   (b) \( 2.76 : \) ______________ (1 d.p)
   (c) \( 3.465 : \) ______________ (2 d.p)
### Fractions and Decimals

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1. Multiplication of fractions
2. Division of fractions
3. Rounding of decimals
4. Multiplication of decimals
5. Division of decimals
6. Word problems

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**Student’s Progress**

Teacher’s comments
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Signature of parent: ___________________ Date: ____________