New Countdown
Second Edition

3
Teaching Guide

OXFORD UNIVERSITY PRESS
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A Note to the Teacher from the Author

New Countdown 3 is stage four of a nine-book journey into maths designed for the young mathematician of today’s fast-changing world. It carries concepts introduced in earlier books (place value, the four operations, measurement, basic geometry, and fractions) to a more advanced level and introduces a range of new ideas: graphs, line segments, the perimeter, Roman number systems, the use of the point in denoting money, bills and their preparation, and telling the time with increasing precision.

New Countdown 3 covers all the concepts recommended for Class Three learners by the revised NCERT syllabus. It also goes beyond them in a systematic and carefully graded way. As in the preceding books of the series, worked examples are provided for every concept introduced, and a range of activities (including puzzles, crosswords and coded messages) seek to guarantee the interest and involvement of every child.

New Countdown 3 comprises three parts, each containing work which can be covered comfortably in the space of a term. We recommend that you follow the three parts in sequence, while the workbook format of Books 0, 1 and 2 continues in the opening portion of New Countdown 3, children are increasingly asked to copy sums in their notebooks as the book progresses. New Countdown 3, has in fact, been designed to help your students make the transition from workbook to textbook; it is therefore essential that every child in your class has a notebook ready as you work together through the book. As before, review pages appear regularly in the text, and a longer review section is included at the end of each part.

Here are my suggestions for practical activity and teaching ideas designed to reinforce learning and add interest, variety and a practical dimension to your classes.

PART ONE

New Countdown 3 begins with a detailed review of Class Two work, and it is important to check that each child has mastered the concepts and is confident about handling them before you proceed to new work. Emphasis is first given to the concept of fractions, which was introduced in Book 2 as a whole number or set divided into a certain number of equal parts. It is essential that children remember and internalize this basic idea as they progress with fractions. They also need to understand the notation used to express fractions and be very clear about the meaning of equivalence. Before starting the review of fractions on page 5, make sure your children have strips of sheets of paper to fold and cut, as they did when learning about ‘halves’ and ‘quarters’ in Book 2. Ask each child to fold his/her strip into quarters and then cut. He/she holds up first one quarter, then two quarters, then three quarters and, finally, four quarters. The notation for each fraction $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$ is shown on the board. Four quarters should again be held up to emphasize the fact that the four quarters make a whole. Now proceed to the review exercises. Collections of small objects (beads, buttons, seeds) can be used to demonstrate the division of sets into quarters. Ask the children to show $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a collection.

When introducing other fractions (pages 8–9), be careful with the use of language: say ‘one fifth’, not ‘one over five’, and ‘one eighth’, not ‘one over eight’. This reinforces your basic point about fractions involving equal parts. The choice of language is also important when you explain the terms ‘numerator’ and ‘denominator’: you may want to use the words ‘top’ and ‘bottom’ to help children distinguish one from the other.
Equivalence is a very important aspect of fractions, and a fraction board will help you introduce the concept. To make your fraction board, prepare four strips of thick paper, all of equal length. Leave one strip whole, cut the next in half, the next into quarters and the last into eighths. Now pin or cellotape your single, uncut strip onto your board, and write a ‘1’ under it. Next, take the strip divided in half, show the children the two halves, pin them up beneath the first strip, and write ‘1—2’ under each part. Continue the exercise with the strip cut into quarters and the strip cut into eighths. At the end, your blackboard will look like this:

Discuss the fraction board with your children. What patterns do they notice? Write down your findings: for example, \( \frac{1}{2} = \frac{2}{4} = \frac{4}{8} \) and \( \frac{3}{4} = \frac{6}{8} \).

Other boards can be made for thirds and sixths, and for fifths and tenths (see page 16). The fraction board is also useful for comparing unlike fractions (page 10). The children will quickly spot that \( \frac{1}{2} > \frac{1}{3} \), \( \frac{1}{4} > \frac{1}{6} \), \( \frac{1}{6} > \frac{1}{8} \), and so on.

When introducing 4-digit numbers, make sure you review place value thoroughly. Give your children plenty of practice in identifying the different parts of a 4-digit number (pages 32–33). Using expanded form notation (page 33) reinforces understanding here. Skip counting is a concept tailor-made for class team games: for example, teams A and B take it in turns to skip count in 2s / 3s / 4s / 5s / 10s / 100s / 1000s from a given number, earning points for correct answers and losing them for errors.

Some children have difficulty in setting out sums involving big numbers; they may write their columns inaccurately or position their place values wrongly. Set plenty of addition sums involving 3-digit and 4-digit numbers, writing them on the board in horizontal form and ask the children to write them in vertical form in their notebooks. Then check that the columns have been set down accurately. Remember, too, that children often forget to ‘carry’ the ten changed from the units columns to the tens column, or the hundred changed from the tens to the hundreds. Encourage them always to record the changed number (pages 44–45).

PART TWO

In subtraction sums involving changing, watch out for this problem:

\[
\begin{align*}
6500 & \quad \text{Here, the child has changed one of the 6 thousands into} \\
-1800 & \quad \text{10 hundreds. But he has forgotten to change the ‘6’ to ‘5’}. \\
5700 & 
\end{align*}
\]

Make sure your students always record their changing thus:

\[
\begin{align*}
6500 & \\
-1800 & \\
4700 &
\end{align*}
\]

You may need to spend extra time on sums whose minuends have zeros in the hundreds, tens and units; ensure plenty of practice here.
Roman numerals (pages 63–67) offer plenty of scope for imaginative, activity-related teaching. For example, ask your class to set maths homework, based on Roman numerals, for Roman children living 2000 years ago.

As your children move on to more advanced multiplication work, make sure they record the tens and hundreds they ‘carry’ to the next column. Discuss the use of the term ‘product’ to describe the outcome of multiplication sums (page 70). Make sure you emphasize the point that when a number is multiplied by 10, the same digits appear in the answer, but each is one place to the left. This simple but important rule will help your children master decimal fractions when these are introduced in Countdown 4. Emphasize, too, what happens when numbers are multiplied by 100. Multiplicands with 2 digits should present no problems provided children remember to do the two parts of the operation (i.e. multiplying by the units, then by the tens) separately, noting down the two products and then adding them.

As you enter the section on division, check once again to make sure every child is confident of the multiplication facts up to 10 × 10 = 100. Also review the terms ‘dividend’, ‘divisor’ and ‘quotient’. When introducing the remainder (pages 88–89), ensure your students have access to small objects (buttons, seeds, beads) which they can divide in the same way that Sid Spacewalker divides his moon pebbles. The long form of division is easily mastered once children understand that they must record each stage of the operation, and be very careful with their columns. The process is started within the known multiplication facts and with no remainders (page 87). By page 89, children are asked to copy and complete sums: ensure that they do so neatly and accurately. Do not forget to link up dividing by 10 (page 90) with multiplying by 10 (pages 76–77).

When you reach the section on time, remember that children need to understand the use of minutes and the way in which they are read from the clock-face. Use your cardboard clock-face, with each minute clearly marked, to show the children the 60 minute divisions; each minute mark should be pointed at in turn and counted from one to sixty. Practice in counting in fives up to 60 should then be given, perhaps via a number line.

The fives can also be shown as multiplication sums, thus: 5 × 1 = 5, 5 × 2 = 10, 5 × 3 = 15, etc. Link the circled numbers with the numerals shown on the clock face. To show the idea of fives even more clearly, draw this clock-face on the board or on a large chart:
You can now pick up and develop the idea of ‘past the hour’ and ‘to the hour’. Draw a clock-face divided into different coloured halves. Draw hands at different positions and ask the children to tell the time. You will need to give plenty of time and attention to the quite difficult idea that (for example) ‘10 minutes to 5’ can also be written as 4:50. Develop class team games of your own to reinforce the point and make telling the time enjoyable.

When introducing graphs (page 115), ask children to draw picture graphs of their own: animals in a zoo, different coloured cars in a garage, and so on. Then ask them to prepare column graphs showing the same information (squared paper should be provided for this). After your children complete the birthday graph suggested on page 116, ask them to think of other information that can be shown simply by graphs: for example, the number of siblings each child has; favourite flavours of ice-cream (how many like chocolate best? how many prefer strawberry? and so on). Generally, children enjoy graphical work and take pride in producing neat, tidy and colourful work. Don’t forget to display the graphs in your classroom.

In the section on money, the decimal point is introduced (but without the term ‘decimal’ yet attached to it). At this stage, simply explain to your children that the point separates the rupees from the paise, thereby making the notation of money simpler and neater. It is important to stress that the point must be followed by two digits in the paise portion (for example, Re 1 and 5p is written Re 1.05). Bill-making offers plenty of scope for learning-through-fun, as Sid Spacewalker demonstrates. Ask your children to plan their own restaurant menus, and then prepare bills for the items, as shown on pages 129–130.

**PART THREE**

Here, the geometrical concepts of side, face and vertex, introduced in Book 2, are explored further. To help children grasp the properties of shapes shown on page 135, ask them to prepare strips of paper. They can then make the same shapes. Plenty of practical work should accompany the introduction of line segments, so that children become steady and accurate in their use of the ruler. To help reinforce understanding of the perimeter, certain suggestions for practical work have been included (page 144). The measurement section of New Countdown 3 builds on concepts presented in earlier books, and it is important to check that every child remembers that 1 metre = 100 cm, 1 kg = 1000g, and so on.

Once again, wishing you exciting teaching!

Shamlu Dudeja
Introduction

The journey till now in the New Countdown series has been very useful in exposing children to new concepts. Apart from having learnt numbers and newer strategies of working with them, the children are now able to grasp new topics. They can now work independently and their minds are ready to absorb more. New Countdown 3 follows the same activity-based ‘visual’ format of the previous books in the series.

The primary aim of New Countdown series is to ensure that every child develops a strong affinity for mathematics (as against a fear for it). And, for this, the following are necessary:

- Tension-free and fun-filled atmosphere
- Building the concentration
- Logical thinking
- Questioning mind
- Ability to answer without hesitation
- Retentive memory
- Sense of discovery (rather than 'being taught')
- Lateral thinking
- Inclusion of children with different learning abilities

TENSION-FREE AND FUN-FILLED ATMOSPHERE

Such a learning environment establishes greater bonding between children and the teacher and leads to healthier mental growth, greater confidence and better learning. Being in a comfortable, familiar and friendly environment itself is a confidence-building exercise.

The more confident a child is, the easier it is for him or her to absorb new concepts as the year progresses. It is firmly believed that children begin to get more joy by learning new concepts through discovery. If the lessons are based on such mores, there is no reason why the student will not grow up to be a happy and caring child with a bright, thinking mind.

BUILDING THE CONCENTRATION

As children grow older, building concentration becomes more imperative. And nothing helps more than a meditative mode in the morning to kick-start the power of concentration for the day.

Children may be asked to shake their arms and legs while standing in their individual positions and give out a jolly good laugh! Then, they sit down in a comfortable position without undue movement (for about 3 minutes), close their eyes, and mentally focus on whatever they wish to: it could be a favourite flower, the face of a loved one, or a scene from a recent holiday.

The kind of concentration children are likely to develop through this focusing exercise will stay with them for hours. In fact, this focusing exercise may be repeated after break, once the children are back in their seats.

Note: It is essential to mention here that teachers do not mix this exercise with religious meditation, as a matter of respect for the multi-religious societies we live in.
LOGICAL THINKING

Every page in all the books in this series lays stress on logical thinking. The moment a child gets into ‘logic’ mode, thought, concentration and retentive memory will be the natural outcomes.

QUESTIONING MIND

If we want our children to be above-average achievers, we should encourage them to ask as many questions as they wish to. A question from one child will invariably lead to more questions from other children in the class. This is a very healthy exercise. There may be times when the teacher does not have an immediate answer to a question; there is no need to be ashamed of this, as long as it is ensured that the answer is found within a day or two.

ABILITY TO ANSWER QUESTIONS WITHOUT HESITATION

It is important for a teacher to get into question-answer sessions with children, as often as possible. The mother of a well-known intellectual recently said that the reason for her son’s brilliant performance in life was that he always asked too many questions and offered to give answers even when he was not specifically asked. Can one say more? Apart from encouraging children to ask questions, the habit of trying to answer as many questions as possible should also be inculcated.

RETENTIVE MEMORY

Any kind of learning which is based on concentration, logical thinking, asking questions and finding answers will automatically lead to retentive memory. And the power of retentive memory as a tool for learning at any stage in life can never be undermined.

Rote learning, at the most, uses 2 senses—listening and seeing (reading) whereas activity-based learning, on the other hand, involves touching (doing) all the time, and smelling and tasting too, on a few occasions, in addition to listening and seeing. The greater the number of senses used for a learning exercise, the better will be the concentration leading to improved speed of understanding, retention, logic, and application.

It would be great fun if the art and craft classes, off and on, incorporate mathematical shapes, concepts, and language. The joy that children derive out of such a learning experience is an added bonus.

SENSE OF DISCOVERY

Discovery is always more joyous than being told. If a mother tells her son that the teacher loves him, the son believes her. But if he discovers the teacher’s love through a tight hug or a pat on the back, imagine the joy. The same applies to learning in Mathematics.

The sense of joy or pleasure at discovering new things, which is missing in rote, is a great accelerator for learning. Each discovery is the result of a practical activity.

LATERAL THINKING

By this time children know several number facts and are comfortable with addition, subtraction, multiplication, and division. Concepts such as multiplication being a form of repeated addition, and division being a form of repeated subtraction, are used in everyday life without the necessity of going back to the basics. This is an example of lateral thinking.

Vertical learning would be to learn 2s tables, then 3s, then 4s and so on. Lateral thinking would entail understanding the facts behind the tables and applying these to solve everyday problems. In
today’s times, more than ever before, it is important that children think, learn to think and apply their knowledge laterally, i.e. they apply the knowledge gained from books to their environment throughout the day.

INCLUSION OF CHILDREN WITH DIFFERENT LEARNING ABILITIES

In this ‘open’ method of learning, it is possible to include children with different learning abilities. Every child works at his or her own pace without being singled out. With greater exposure, most of them will eventually fall in line with the majority.

Sometimes, learning differences get exaggerated as children advance in learning. These must be taken into account and extra classes should be held for those who are slow learners. The slow learners often have the gift of extra love: they need a hug and a pat more often than an achiever (not to forget that achievers need the hug and the pat, too!). The hug and the pat work as an elixir and must be freely used.

Similarly teachers must come up with challenges for gifted children in the form of extra exercises and innovative worksheets requiring lateral thinking. They help activate their grey cells and keep their attention and interests levels high in the classroom.

GENERAL NOTE

Starting from Book 3, the workbook style followed in junior books is changed to textbook style. Thus, it is essential that each child has a notebook to write in, as he/she works through the book. Greater use of the board will be necessary to demonstrate new ideas. Tick-marks, stars, and smileys give children confidence that they are getting their work right and hence encourage swift progress.
PART ONE

Revision (Pages 1–4)

OBJECTIVE
To revise the lessons learnt and the concepts taught in the preceding year

LEARNING AIDS
The teacher sets up an area for number work, as was done in Class 2, to reinforce the concepts. Net bags, mobiles, number rods, number boxes, grouping on charts for multiplication, and adding up to 100…these are useful in class 3 as well.

PAGES IN THE BOOK
Page 1: Mental maths
Page 2: Place value
Page 3: Greater or less than; multiplication and division
Page 4: Problem sums

Fractions (Pages 5–24)

OBJECTIVES
To revise of the concept of $\frac{1}{2}$ and $\frac{1}{4}$, moving to other fractions such as $\frac{1}{10}$ and $\frac{1}{8}$. Children learn the meaning of the terms ‘denominator’ and ‘numerator’, and names for fractions. They also learn sequences, addition and subtraction of fractions.

LEARNING CURVE (10 MIN)
Children already know that a fraction is a part of a whole. They are familiar with $\frac{1}{2}$ and $\frac{1}{4}$, as used in everyday life, specially with $\frac{1}{2}$ and $\frac{1}{4}$ marked in the books.
They are gradually introduced to other fractions, starting with the simplest: $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ and $\frac{1}{5}$ ……
With practical work, addition and subtraction of like fractions are also introduced.

LEARNING AIDS
1. 10 strips of paper
2. Plasticine solids such as a long cylinder or only a flat cylinder (such as a cake shape)
3. 10 differently coloured circles, each with a diameter of approximately 12cm to 16cm, divided and cut into fractions: $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ and so on upto $\frac{1}{10}$
4. Different net bags with marbles, tied into $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ and $\frac{1}{6}$.
   ($\frac{1}{2}, \frac{1}{4}$ and $\frac{1}{8}$ can be shown together in one net bag, $\frac{1}{3}$ and $\frac{1}{6}$ in another)
5. Fraction stories

LEARNING ACTIVITY (20 MIN)
The teacher begins with a recapitulation of fractions, using a story similar to the one in Teacher’s Book 2, and builds up more stories on the rest of the fractions.
Example: Mamma Bear spread some chocolate sauce over a crusty pie cut in quarters. She put it on one quarter for Baby Bear, one for Papa Bear and one for her own share. How many quarters did she put the sauce on? How many quarters did not have any chocolate sauce?

Answer: Three quarters or $\frac{3}{4}$; and one-quarter or $\frac{1}{4}$

With the use of strips of paper or coloured circles, children are introduced to other fractions. It is better to use one shape at a time, but the same fraction must be demonstrated with different shapes, so that children see a fraction associated with any shape or any set of objects.

This ‘dividing into parts’ is worked with net bags with 8 marbles, a ribbon tied around the centre, so that the children can see 4 marbles in each half of the bag; or 6 marbles in a bag, and two ribbons tied to show 3 parts of the net bag, with 2 marbles in each.

The association of fractions and fraction names is important:

- 2 equal parts: 2 halves in a whole
- 3 equal parts: 3 thirds in a whole
- 4 equal parts: 4 quarters in a whole
- 5 equal parts: 5 fifths in a whole
- 10 equal parts: 10 tenths in a whole
- 100 equal parts: 100 hundredths in a whole

Children work with different shapes of cut outs from card paper, net bags, strings of large wooden beads, Lego blocks or sets of wooden cubes.

They work with fractions drawn on paper in different shapes, and colour fractions of a whole or identify the coloured fraction.

The words numerator and denominator are used first by the teacher in a proper situation, and children follow suit. To ensure that the concept is made clear, children work with oral sums: ‘Write a fraction with denominator 5 and numerator 2’.

Next, children are given pieces of paper where they work on equivalent fractions. The teacher demonstrates with paper first, then works on the board with numbers that when both the numerator and denominator are multiplied by the same number (except 0), we get an equivalent fraction.
Example:

This means half of 1. This also means half of 1.

\[
\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}
\]

This too means \(\frac{1}{2}\) of 1. This too means \(\frac{1}{2}\) of 1.

Children learn that fractions with the same denominator are called like fractions, such as \(\frac{3}{8}, \frac{5}{8}\) and \(\frac{7}{8}\). In a series of like fractions, the greater the numerator, the greater the value of the fraction. \(\frac{7}{8}\) is the biggest fraction in the example given here.

Fractions with different denominators are called unlike fractions, such as \(\frac{2}{7}, \frac{2}{9}, \frac{2}{5}\) and \(\frac{2}{11}\). In a series of unlike fractions with the same numerator, the smaller the denominator, the greater is the value of the fraction. \(\frac{2}{5}\) is the biggest fraction here.

This lesson essentially requires practical demonstration, with fractions in all forms of shapes and sizes, leading to visual comparison first, followed by written work. In keeping with this practical demonstration, the lesson moves from the concrete, to the written. Cream-crackers, with squares of cheese of equal size, prove to be an excellent aid, which each child gobbles up at the end of a lesson. (Clean hands, please!) Children use two cream-cracker biscuits, and work with squares of cheese cut into quarters, and find how the following come true:

\[
\begin{align*}
\frac{1}{4} & + \frac{2}{4} = \frac{3}{4} \\
\frac{4}{4} & - \frac{1}{4} = \frac{3}{4}
\end{align*}
\]

The same is demonstrated using pictures and finally the children move on to calculating with numbers alone.

The subtraction of like fractions is carried out in the same way.
By now the children have a fair idea that even a collection can be divided into fractions. A new word, ‘set’, is added to the vocabulary.

Finally, children divide a whole or a set of objects into fractions.

**Remember:** The teacher needs to reinforce that the denominator indicates the number of parts the whole is divided into, and the numerator indicates the number of these parts that are used.

**PAGES IN THE BOOK**
- Pages 5–6: Review of halves and quarters
- Pages 7–8: More about quarters
- Pages 9–10: Other fractions
- Pages 11–12: Review
- Page 13: Numerators and denominators
- Pages 14–15: Equivalent fractions
- Pages 16–18: Like and unlike fractions
- Pages 19–20: Addition and subtraction of like fractions
- Page 21: Fractions of sets
- Pages 22–23: Fractions and divisions

**ADDITIONAL WORK**  (10 MIN)
Additional activity sheets prepared by the teacher are very useful. Lumps of Plasticine work well for fractions as well.

**CLASSROOM ORGANIZATION**
Charts displaying the following fractions:

\[
\frac{7}{8}, \frac{6}{8}, \frac{3}{4}, \frac{5}{8}, \frac{4}{8}, \frac{1}{2}, \frac{3}{8}, \frac{2}{8}, \frac{1}{4}, \frac{1}{8}
\]

Bulletin board displays with charts on ‘ordering’ of fractions and like/unlike fractions are useful for easy reference.

**Place Value (Pages 25–41)**

**OBJECTIVES**
Children already understand the concept of ‘digits’ and have learnt to write 3-digit numbers. They can work simple addition and subtraction with 3-digit numbers. They are now introduced to 4-digit numbers.

**LEARNING CURVE**  (10 MIN)
Children have been working with numbers up to 999. They are familiar with a 1000-rupee note. The addition of 1 to 999 follows the same pattern as the addition of 1 to 99. They work with numbers from 1000 to 9999. (The comma is often omitted from 4-digit numbers.)
LEARNING AIDS
1. Blocks arranged in stacks of hundreds
2. Exercise books with squares
3. 1s, 10s, 100s and 1000s tabs
4. Any material that can be used for counting 1000 to 9999 (paper money is ideal)
5. Number lines, with 10s, 100s and 1000s

LEARNING ACTIVITY (20 MIN)
The teacher starts by building on the introduction used in Teacher's Book 2. Paper money is the best aid for this activity.

Example: A walkers' group in a park agreed to donate money for the flood victims in Sindh. They collected nine Rs 100 notes, nine Rs 10 notes and one Rs 5 coin and four Re 1 coins. There were a total of Rs 999 in the collection box.

Christine donates one more rupee. Reza exchanges one Rs 5 and the five Re 1 coins for one Rs 10 note. Then, there were ten Rs 10 notes. Asma exchanges the ten Rs 10 notes for one Rs 100 note. Yippee! There were ten Rs 100 notes, and Rabia had one Rs 1000 note which she exchanged for the ten Rs 100 notes.

So, the walkers' group had collected Rs 1000 for the flood victims.

It is necessary to emphasize the fact that:

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

Ten ones make 1 Ten, written as 1 0 0
Ten Tens make 1 Hundred, written as 1 0 0 0
Ten Hundreds make 1 Thousand, written as 1 0 0 0 0

Each digit has a place, and each place has a special value.
In the first column from the right, each numeral is single One (as the Re 1 coin).
In the 2nd column from the right, each numeral is Ten (as the Rs 10 note).
In the 3rd column from the right, each numeral is Hundred (as the Rs 100 note).
In the 4th column from the right, each numeral is Thousand (as the Rs 1000 note).

A few charts (as shown below) with randomly filled in 4-digit numbers are put up.

<table>
<thead>
<tr>
<th>1050</th>
<th></th>
<th>1056</th>
</tr>
</thead>
<tbody>
<tr>
<td>1056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1065</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1071</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1083</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1090</td>
<td>1098</td>
<td>1099</td>
</tr>
</tbody>
</table>

The children are asked to go up to the chart and fill in a number or two. This is an extremely useful exercise. Children observe the ‘order’ of numbers horizontally and vertically.
The children work with blank crosses and fill in numbers, as they like, and check with the chart.

PAGES IN THE BOOK
Page 25: Revision of 3-digit numbers.
Pages 26-27: Concept of the fourth digit, and the smallest 4-digit number, 1000. Children simply fill in the empty places on the abacus and write down the number in digits.
Pages 28-32: Number names and the place value of each digit in the 4-digit numbers; the expanded form of 4-digit numbers.
Pages 33-37: Putting numbers in ascending or descending order and distinguishing between the larger and smaller numbers.
Pages 38-41: Skip counting 4-digit numbers in 2s, 3s, 4s, 5s, 10s, 100s and 1000s.

ADDITIONAL WORK
Place value cards makes the concept more clear.
Nine cards of each kind are required.
Cards with numbers 1, 2, 3 ……9.
Cards with numbers 10, 20, 30…..90.
Cards with numbers 100, 200, 300 ….900.
Cards with numbers 1000, 2000, 3000 ….9000.

PART ONE/PART TWO
Addition and Subtraction (Pages 42-62)

OBJECTIVES
To revise the addition and subtraction of 3-digit numbers and continue the same method for addition and subtraction of 4-digit numbers

LEARNING CURVE  (10 MIN)
The children are able to add and subtract numbers till 999. With the help of practical work as well as written sums in these pages the children will add and subtract numbers with results up to 9999. They learn how to group ones into 10s, then tens into hundreds and hundreds into 1000s (carry over sums). The children first subtract 4-digit numbers without borrowing. Next, they convert 1000s to 100s, 100s to 10s, and 10s to ones by ‘borrowing’ from the thousands, hundreds, and tens columns respectively. The methods are identical, and this transition does not take long.

LEARNING AIDS
1. The abacus
2. House board
3. Flannelograph
4. Charts showing addition/subtraction sums
5. Number line
6. Number strips  
7. Marbles in a plastic bowl  
8. Fish cut-outs with small iron blobs at the back  
9. A magnet at the end of a cord, to act as a fishing hook

LEARNING ACTIVITY (20 MIN)

As mentioned in Teacher’s Books 1 and 2, teaching of any number operation follows the following pattern:

• concrete objects  
• pictures only  
• picture and number  
• numbers  
• number crosses

Once children are able to handle numbers, they move from horizontal to vertical calculation, to story sums and word problems, with much larger numbers, based on the concepts learnt earlier.

The teacher should resort to stories as often as possible. Children love to solve story-type problems and love to make up their own stories.

Example: The sums:
Add: 4624 and 1118.
Subtract: 666 from 5544.

can be presented in a story format, as given below:

1. ADDITION:

Class 10 raised Rs 4624 and Class 9 collected Rs 1118 at the Christmas Bazaar. How much money did they collect altogether?

\[
\begin{array}{cccc}
\text{Th} & \text{H} & \text{T} & \text{O} \\
4 & 6 & 2 & 4 \\
+ & 1 & 1 & 1 \ 8 \\
\hline
5 & 7 & 4 & 2 \\
\end{array}
\]

Total money collected (altogether): Rs 5742

2. SUBTRACTION:

Imsaal takes 5544 bangles to sell at a fair. In one day she sells 666. How many does she have left for the next day?

\[
\begin{array}{cccc}
\text{Th} & \text{H} & \text{T} & \text{O} \\
4 & 5 & 5 & 4 \\
- & 6 & 6 & 6 \\
\hline
4 & 8 & 7 & 8 \\
\end{array}
\]

Start from the ones: 6 ones cannot be taken away from 4. So, 1 bundle of tens needs to be opened. 6 cannot be taken away from 3. So, 1 bundle of hundreds needs to be opened.

6 cannot be taken away from 5. So, 1 bundle of thousands needs to be opened.

Number of bangles left for the next day: 4878
3. ADDITION AND SUBTRACTION:
2345 walkers walk between 6 a.m. and 10 a.m. on Sunday mornings. On weekdays, the number is 1350 each day.
(i) Find the number of walkers on Monday and Tuesday.
(ii) Does Sunday get more walkers than Monday and Tuesday together?

Once the children have enough practice of both concrete objects and numbers, they are given number problems to solve.

PAGES IN THE BOOK
Pages 42-62: More practice for addition and subtraction; children move on from vertical sums to story sums.

IMPORTANT:
(i) For addition, they convert ones into 10s, 10s into 100s, and then 100s into 1000s.
(ii) For subtraction, they convert 1000s into 100s, 100s into 10s, and 10s into ones.

ADDITIONAL WORK (10 MIN)
The fishing game may be used here:
Each fish cut-out in a bowl has a two, three or four digit number written on it, such as 2045, 1000, 997 and so on. On the reverse, it has a metal clip attached to it. A small magnet is attached at the end of a ‘fishing rod’.

One child catches 2 fish with his magnet, and adds and subtracts the numbers written on them.

\[
\begin{align*}
\text{2985} & \quad \text{5074} \\
+ & \quad - \\
\text{5074} & \quad \text{2985}
\end{align*}
\]

This gives the following sums:
\[
\begin{align*}
\text{2985} + & \quad \text{5074} \\
& \quad - \text{2985}
\end{align*}
\]

Constant additions and subtractions must be carried out, using fingers, house board, flannelograph or anything else that is a part of children’s everyday school life. Flash cards are also a delight for the children to work with. Crosses are cut out from stiff paper, with 5 small squares as shown. Only the central number is in position. There can be two activities for every cross:

i) Children find positions for the rest of the numbers on the relevant number squares.
ii) Each child works out two pairs of numbers, which add up to the central number, and writes them in. For example, if the central number is 347, the pair of horizontal numbers could be: 300 and 47, and the pair of vertical numbers could be 155 and 192.

\[
\begin{array}{c}
155 \\
300 \\
347 \\
47 \\
192
\end{array}
\]

This sounds difficult, but is very easy to work. Subtract any number smaller than 347: For example: 347 – 47 = 300. The two numbers can be placed across 347, to the right and left (in any order) or above and below 347, in any order. (300 and 47 are added to check the answer.)

More worksheets on addition and subtraction are necessary for practice.

CLASSROOM ORGANIZATION

In a corner, the teacher puts up a flannelboard on the wall, and keeps some number squares made from rough paper, in a bowl. One child comes up to the board and puts up an addition sum. The rest of the class works it out. One of the numbers is subtracted from the total to check the working. Another child comes up and puts up a subtraction sum and this goes on.

\[
\begin{array}{c}
4 \\
3 \\
2 \\
4
\end{array} + \begin{array}{c}
3 \\
2 \\
5 \\
6
\end{array}
\]

Roman Numerals (Pages 63–67)

OBJECTIVE

To introduce Roman numbers to children

LEARNING CURVE  (10 MIN)

The children may have seen Roman numbers on clocks and watches. They learn about the letters of the alphabet, which represent different numbers, and the order in which they are placed.

LEARNING AIDS

1. A bulletin board display with the Roman symbols and their corresponding Indo-Arabic numbers

\[
\begin{array}{cccccc}
I & V & X & L & C & D & M \\
1 & 5 & 10 & 50 & 100 & 500 & 1000
\end{array}
\]

2. Clocks or watches with time written in Roman numbers

LEARNING ACTIVITY  (20 MIN)

The teacher moves from the known to the unknown. Today’s number system uses the Indo-Arabic numerals. What happened before that? Stories of barter system in the ancient times and charts with number representation are very interesting.
Using the bulletin board display (based on the diagram on page 64 in the textbook), the teacher introduces Roman numbers to the children. They are then asked to find similar numbers in other places, inside or outside the classroom. A smart child may spot it on the watch brought to the class by the teacher, or sometimes in books showing chapter numbers.

WAYS OF REMEMBERING THE SYMBOLS

I is one finger. Most people start off by counting on their fingers.

The letter X denotes the number 10.

Work with your hands:

I or II or III are different numbers of fingers held up.
Five fingers make V, for 5 in Roman numbers.
The two Vs of the two hands put together make an X.

In the ancient days, Romans spoke Latin, and the Latin word for hundred is Centum. C was thus an obvious letter for 100. Cent in English refers to 100, e.g. 100 cents in a dollar, 100 centimetres in a metre, 100 years in a century and ‘per cent’ which means ‘for every hundred.’

The letter L denotes 50.

Fifty is half of a hundred. Cut C into half, horizontally, and it looks like L.

The Latin word for thousand is Mille. So M is the letter for one thousand. 1000 years is a millennium or a thousand millimetres make a metre.

Two 500s make 1000, or half of 1000 is 500.

A curvy M stands for 1000. Cut vertically into halves, gives sort of a curvy D. D stands for 500.

Now, why does IV stand for 4, IX for 9, VI for 6, XI for 11, VII for 7 and XII for 12.

Children find the significance of ‘to the left’ and ‘to the right’, and learn the two rules of Roman numerals:

Rule 1: This rule is applied first: Smaller value symbol before bigger value symbol means subtract smaller from bigger. In Roman IV (4), I comes before V. I is smaller than V and when it comes before V, ‘I’ is subtracted from V, the bigger number.

∴ IV = 5 – 1 = 4.

Rule 2: Smaller value symbol after greater value symbol means add smaller to greater.

In Roman VI (6), I is smaller than V and when it comes after V, ‘I’ is to be added to V, the bigger number.

∴ VI = 5 + 1 = 6

The same rules apply to X and I, C and X and other Roman numbers. Children in Class 3 learn Roman numbers only up to one hundred.
Children need to be able to do further mental addition, in order to work with Roman numbers. And, a short Roman number can have a big value:
VIII = 8, and X = 10
XVIII = 18 and MM = 2000

PAGES IN THE BOOK
Pages 63–67: Children write Roman numbers for Indo-Arabic numbers and vice-versa. They write and decode messages written to Sid in Roman numbers, to make numbers fun. They also write their own names in codes, using Roman numbers.
A = I, B = II, C = III, D = IV, E = V …. children complete this series. CAB is written as III I II. They can write COUNTDOWN in Roman numbers, in a similar way.

ADDITIONAL WORK (10 MIN)
The teacher can create worksheets with different alpha-numeric codes for the children to decipher. They learn to write the years of birth of members of their family or their friends.

Multiplication (Pages 68–86)

OBJECTIVE
To make multiplication with bigger numbers quick and easy. Children learn that multiplication is a short and quick form of repeated addition, for large numbers as well.

LEARNING CURVE (10 MIN)
The children are able to skip-count using the number line. They know their tables till 10, and are able to multiply 3-digit numbers by a 1-digit number. (They already know conversions.) Here, they move a step forward, and multiply 3-digit numbers by 2-digit numbers with ease.

LEARNING AIDS
1. Abacus
   \[ \times 15 \]
   \[ \begin{array}{c}
   42 \\
   \hline
   \end{array} \]
2. Paper and pencils
   \[ \begin{array}{c}
   - 210 \\
   + 420 \\
   \hline
   \end{array} \]
   \[ \begin{array}{c}
   630 \\
   \end{array} \]

LEARNING ACTIVITY (20 MIN)
Revision is the best way to start off a lesson, especially with multiplication, because the modus operandi is similar. The children revise the work done in Book 2. Then they move on to multiplying 3-digit and 4-digit numbers with a 1-digit number, based on the method mentioned in Teacher’s Book 2, and then with 2-digit numbers.

As children are familiar with skip-counting and 10s tables, they multiply numbers by 10 (and later its multiples) first vertically, and then horizontally. Based on this, they move on to multiplying by 100 (and later its multiples).

Example: \( 42 \times 15 \)
Children know that \( 15 = 1 \text{ ten} + 5 \text{ ones} \)
So, they know they must multiply 42 by 1 ten and by 5 ones.
Steps: 
1. Multiply 42 by 5 ones. \( (42 \times 5 = 210) \)
2. Multiply 42 by 1 ten. \( (42 \times 10 = 420) \)
3. Add the two products. \( (210 + 420 = 630) \)

After some practice, children work with bigger numbers.

Some teachers argue that with the availability of calculators, exercises such as physical multiplication, square roots and cube roots are not necessary. However, mathematicians feel that handling numbers, in any manner, improves thinking power and logic, and somehow activates grey cells.

PAGES IN THE BOOK

Pages 68-86: These pages make the children more comfortable with multiplication. They work from horizontal multiplication to vertical multiplication, with ones and tens, without carrying over in the initial stages. Once the concept is clearly understood, children work with multiplications involving conversions from ones to tens, with 2-digit and 3-digit numbers.

ADDITIONAL WORK (10 MIN)

Work cards are very useful. Memorizing multiplication facts (even in the age of computers and calculators) is highly recommended. In addition to instant speed and accuracy in everyday calculations, it helps hone memory skills.

Division (Pages 87–99)

OBJECTIVE
To divide 3-digit numbers by a single digit with remainders

LEARNING CURVE (10 MIN)
Children are familiar with multiplication. Division can only be understood if there is a sound knowledge of multiplication and children have had adequate practical exercise in this area. Children are also familiar with long divisions. Now, they learn to divide 3-digit numbers, and are introduced to the concept 'remainder', first in practical situations and then in division sums.

LEARNING AIDS
1. Concrete objects of different types such as bottles full of marbles or pebbles and heaps of sweets with gift bags to be filled with 8 or 12 sweets per bag
2. Number line
3. Sorting trays to group the same number of buttons/counters in each compartment

LEARNING ACTIVITY (20 MIN)
The teacher first revises the previous year’s work. Then, a number of verbal sums are given for the children to solve, after which they solve problems using long division.

In Book 2, the children solved sums easily as they were well-versed with their tables, and the numbers were small. At this stage, children solve sums with larger numbers, using the following steps.

In the division box, this is how the Divisor, the Quotient and the Dividend are written:
Division is preceded by practical work.

1. This is a set of 72 sweets, 8 sweets to go into each gift pack. How many gift packs will get the sweets? Or
2. There are 72 sweets, and 8 children to share them. How many sweets does each child get?

It is important to remember that in both the cases, the problem involves repeated subtraction:

In 1, 8 sweets are taken out each time, to be put in a gift bag. This is repeated till all the sweets are used up.

In 2, 8 sweets are taken out (1 sweet for each child), and this is repeated till all the sweets are used up. Once the concept of repeated subtraction is clear, children move on to dividing 3-digit numbers, first without a remainder, and then with a remainder.

Example: Divide 728 by 8.

The following steps are used:

Step 1: 8 goes into 728, 90 times.
Step 2: Write 90 as quotient.
Step 3: Write 720 (8 × 90) below 728.
Step 4: Subtract 720 from 728. Remainder is 8.
Step 5: 8 goes into 8 once (1 time).
Step 6: Write 8 (8 × 1) below 8.
Step 7: Write 1 above 90.
Step 8: 8 – 8 = 0 (remainder)

After some practice, children move on to dividing 3-digit numbers, first without a remainder, and then with a remainder. The following steps are used:

Example: Divide 693 by 3

Step 1: 3 goes into 6, 2 times, or into 600, 200 times. Write 200 as quotient.
Step 2: Subtract 600 from 693; you get 93.
Step 3: 3 goes into 90, 30 times. Write 30 above 200 in the quotient. Subtract: you get 3.
Step 4: 3 goes into 3, once. Write 1 above 30.
Subtract; you get 0.
Now, add all the quotients, and you get 231.
Remainder is 0.

\[200 + 30 + 1 = 231\]
\[\therefore 693 \div 3 = 200 + 30 + 1 \text{ (rem. 0)}\]

This method is used, keeping the following facts in mind:
First, divide the hundreds, tens and then the ones.
This division is then condensed, omitting the use of 0s in the quotient.
\[\therefore 693 \div 3 = 231 \text{ (rem. 0)}\]

The steps are the same: instead of saying, “3 goes into 600, 200 times” it is more convenient to say “3 goes into 6, 2 times” and imagine the 0s.

Similarly, in the next step, instead of saying “3 goes into 90, 30 times”, it is easy to say “3 goes into 9, 3 times” and imagine the 0s.

**First**, divide the hundreds and write the quotient 2 (6 ÷ 3 = 2).
Then, write the product 6 (3 × 2) below the hundreds column.
Then, subtract (6 – 6 = 0).

**Second**, divide the tens and write the quotient 3 (9 ÷ 3 = 3).
Then, bring down digit 9 from 693 and write the product 3 × 3 = 9 in the tens column.
Thereafter, subtract (9 – 9 = 0).

**Third**, they divide the ones and write the quotient 1 (3 ÷ 3 = 1).
Then they carry down the digit 3 in the ones. Thereafter they write the product 3 (3 × 1 = 3) and finally they subtract (3 – 3 = 0).
If there is something left over after the subtraction, the number left over is called the ‘remainder’.
0 implies that there is no remainder.

Many divisions need to be worked out, on the board (in both formats, so that children understand the short form, without 0s, which will be used most of the time). It is only a matter of practice and patience.

**PAGES IN THE BOOK**
Pages 87-99: In these pages, children solve sums using the long form of division. They divide 3-digit numbers with and without remainder. They even solve story problems involving division, based on the same method.

**Time (Pages 100–114)**

**OBJECTIVES**
To measure time past the hour and to the hour, and to convert days into hours, and hours into minutes. Children learn to measure time by minutes and hours, and learn the use of a.m. and p.m.
LEARNING CURVE (10 MIN)
Children are familiar with the clock-face and know how to read time half past the hour, quarter past the hour and on the hour. They have a fair idea about simple fractions, and are able to skip-count in fives.

Intuitively, children are able to read time in hours, and, with some help, in minutes. With a little practice, they will be able to use a.m. and p.m. and read the clock face accurately.

LEARNING AIDS
1. Clock-faces with movable hands on the bulletin board
2. An actual clock
3. Toy clock faces
4. Digital toy clocks
5. Rubber stamps, to print clock-shapes on paper
6. Time tables such as Air schedules, Railway timetables, T.V. programme schedules

LEARNING ACTIVITY (20 MIN)
A recapitulation exercise with concepts of ‘half past’, ‘quarter past’ and ‘quarter to’ the hour is helpful and serves as a base to start newer concepts.

Children are aware that a day has 24 hours. Soon, they understand that the time from 12 midnight to 12 noon is called a.m. which means in the morning (in Latin, ante meridiem means ‘before noon’) and between 12 noon and 12 midnight is called p.m. (in Latin, post meridiem means after noon). A list of exercises is given out, where children use a.m. or p.m. according to normal usage.

Bath time: 7 (some might say ‘a.m.’ some might say ’p.m.’)
Bed time: 8 p.m. (cannot be 8 a.m.)
Lunch time: 12 noon
Play time: 4 p.m. (at 4 a.m. children should be asleep!)

The toy clock is used, with the long, minute hand and the short, hour hand. Children know that there are 60 minutes in an hour, and the teacher points out the 60 small divisions on the clock. Each division represents a minute. When the minute hand goes all around the clock face, 60 minutes have passed or an hour has passed. The minute hand goes once around the clock face in one hour.

In one hour, children observe the movement of the hour hand. It moves only 5 spaces on the clock face: from 1 to 2, or 2 to 3, or 3 to 4 and so on.

The numbers around the clock-face act like numbers on a number line: they are always skip-counting in 5s as it takes 5 minutes to move from one number to the other. If the minute hand is on 8, it means ‘40 minutes past the hour’ revise 8 times 5s is 40. Working in reverse (at a later stage), it means ‘20 minutes to the hour.’

A clock-face with shaded halves is useful at this stage.

'TO' the hour. 'PAST' the hour.
If the minutes hand is on the right-half of the clock (shaded grey), the time is said to be ‘past the hour.’
If the minute hand is on the left-hand side (not shaded), the time is said to be ‘to the hour.’

Once the children know how to read the clock-face accurately, they start with conversions. They begin by converting days into hours, followed by converting hours into minutes.

IMPORTANT: Whenever referring to ‘half past ___’ or ‘half hour to ___’ remember to point out the position of the hour hand. When the minute hand is at 6, the hour hand WILL ALWAYS BE HALFWAY BETWEEN ANY TWO NUMBERS. ‘Half past 8’ or ‘half an hour left to 9’ means the hour hand must be between 8 and 9.

It is useful to work with digital clocks, where the time is clearly mentioned in digital figures.

**PAGES IN THE BOOK**

Pages 100-101: Revision of the work learnt earlier. Writing the time shown on the clocks.
Page 102: Drawing the hands on the clock to indicate the time mentioned or indicated at 5-minute intervals
Page 103: Learning the usage of a.m. and p.m. to write time
Page 104: Quick-think exercise on questions based on time
Page 105: Solving word problems, after extensive practical work
Page 106: Solving simple time problems
Page 107: Revision of concepts
Pages 108-109: Telling time in hours and minutes
Pages 110-112: Telling time in words using phrases ‘to the hour’ and ‘past the hour’
Pages 113-114: Converting days into hours and hours into minutes

**ADDITIONAL WORK**  (10 MIN)

The children are asked to write down the names of 10 of their favourite TV programmes. They note down the scheduled time of the starting of the programmes and the time they actually start. (Often the times are a few minutes away.)

A little railway station scene can be worked out, where children play act. One child is the announcer. He has the timetable. The teacher sets the clock face to a particular time. The announcer, with that time underlined on his timetable, stands up and makes an announcement. “All aboard! 5 minutes for the train to depart; ..... 4 minutes ..... 3 minutes .....Rush.... 2 minutes left... hurry now....1 minute. All aboard: (counting in seconds) 60, 59, 58, 57, 56, ...........1, 0 ....train leaves.”

**Graphs (Pages 115-119)**

**OBJECTIVE**
To enable the children to see differences quickly between different types of data using pictographs and block graphs.
LEARNING CURVE (10 MIN)
Children have worked with graphs earlier. They made a tally graph to see how many come to school by bus, car, motorbike, metro or walking. A graph is shown to be the best way to compare these figures.

LEARNING AIDS (10 MIN)
1. Charts with columns
2. A variety of sweets/pencils/shapes in large numbers

LEARNING ACTIVITY (20 MIN)
The teacher asks the children to hold up their pencils. Five columns are made on a chart paper, and the colours red, black, blue, green, and yellow are written below each column. Children come up and write their names in the column according to the colours of their pencil. They count the number of red/black/blue/green/yellow pencils in the classroom.

Then, children are shown column graphs of other situations (made in advance by the teacher), and the significance of each is discussed.

Children collect data of different types: number of different trees or animals in the park, number of different types of cars on the road during a period of 10 minutes (cars in a parking lot), soaps used by children in the class, shoes worn at a birthday party (black, brown, white keds, black keds, sandals), A, K, Q, J and cards from 2 to 10, from a random number of cards. The list is endless.

The bars can be drawn horizontally or vertically.

ADDITIONAL WORK (10 MIN)
The teacher may help the children draw graphs based on:
- birthday months
- their heights
- their ages
- their weights
- favourite TV programmes
- favourite cricketers
- favourite actors

Money (Pages 120–130)

OBJECTIVE
To enable children to convert rupees into paise and work with the four operations, using money

LEARNING CURVE (10 MIN)
The children know how to add rupees. They have been shopping in the classroom shop. They are aware that 100 p = Re 1.

After a quick revision exercise, children work with small amounts of money, and document their ‘shopping’ with rupees and paise written in separate columns, as shown:

<table>
<thead>
<tr>
<th></th>
<th>Rs</th>
<th>Paise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar of chocolate</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>Box of Twisters</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Pair of shoes</td>
<td>349</td>
<td>25</td>
</tr>
</tbody>
</table>
Then, these sums are written with a ‘point’ between Rupees and Paise. (The word ‘decimal’ is not used at this stage.)

<table>
<thead>
<tr>
<th>Rs</th>
<th>Paise</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>349</td>
<td>25</td>
</tr>
</tbody>
</table>

Children learn to convert rupees into paise, and vice-versa. Finally, they use the four operations which are useful in everyday life.

**LEARNING AIDS**

1. Play coins and paper money of all denominations.
2. ‘Our Shop’ selling chocolates, sweets, pencils, erasers and items of use for children. Every item has a price tag in Rs, as is usually done. A pair of socks: Rs 32.50 (Some prices in whole rupees, such as a notebook: Rs 5.00.)
3. Our ‘Veggie Shop’
   A chart on the wall showing prices of each item:
   (a) in two columns: Rupees and Paise
   (b) in the ‘dot’ format: Rupees.Paise

**LEARNING ACTIVITY   (20 MIN)**

For paise, it is useful to have cardboard 1p coins (if real ones are not available), for children to see that 100 p = Re 1. Children play with various denominations, and find different ways of making up Re 1 from coins. This is similar to the H, T and O as done in place value:

Ten 1 p coins = one 10 p coin
Ten 10 p coins = 100 p = Re 1 coin (or note)
Rs 100 note displays the value of the note, quite clearly. Children recognize that Rs 100 = one hundred Re 1 notes or coins.

After a quick revision, they solve word problems of addition, subtraction, multiplication and division (in rupees only).

Back to ‘Our Shop’ where children shop for toothpastes and toothbrushes, soaps and shampoos, chocolates and toffees, pencils and paper, etc. all priced in rupees and paise.

Finally, the decimal point (.). A pair of socks costs Rs 32.50. What does this mean? Instead of writing the price as Rs 32 and 50 p (which is too long), a special symbol ‘(.)’ is used to separate the Rupees column from the paise column. This is written as Rs 32.50.

A toy car costing Rs 75.00 means Rs 75 and 0 paise.

The conversion of rupees to paise is simple. After some practical shopping with rupees and paise, children simply remove the point, and Voila! The value can be read in paise only.

Rs 29.50 paise = 2950 paise (because 100 p make Re 1)

They tabulate these facts:

<table>
<thead>
<tr>
<th>Rs</th>
<th>=</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.50</td>
<td></td>
<td>3250</td>
</tr>
<tr>
<td>19.80</td>
<td></td>
<td>1980</td>
</tr>
</tbody>
</table>
| 31   |   | 3100| (Rs 31 = Rs 31.00)
Children move on to the four operations with money. They work in exactly the same way as with other four-digit numbers, except that they add a point two places from the right to get the answer in Rs and p. Billing at ‘Our Shop’ helps. Bills are the best way to revise the four operations:

Add the prices of the various items purchased.
Subtract to get the amount of change to be returned.
Multiply the cost of 1 item with the number of articles of the same item bought.
Divide to know the cost of each article, if the cost is written for a pair, or for 5. (Such prices must be incorporated in ‘Our Shop’.)

ADDITIONAL WORK  (10 MIN)
A plastic fruit and vegetable market, with play money, can work well. Some children shop, others raise bills.
It is an interesting idea to make children design menu cards, with prices for restaurants.

Chicken corn soup … 1 bowl
Rupees thirty and fifty paise only
Crisp baby-corn … 1 plate
Rupees twenty-five

One group of children design cards, another places orders, and yet another group makes bills. Based on the order, a bill is generated. The group members may divide the bill by the number of members to find out how much each has to pay.

PAGES IN THE BOOK
Page 119: Revision of concepts already learnt
Pages 120-121: Introduction of ‘point’
Page 122: Conversion of Rs and p
Pages 123-126: The four operations on money
Pages 127-128: Word problems
Pages 129-130: Making bills
Pages 131-134: Revision

CLASSROOM ORGANIZATION  (10 MIN)
Different markets could be set up by the children:

- Card shop
- Shoe box shop
- Grocery store
- Flower shop
- Toy shop
Revision (Pages 131–134)
Creative and fun pages, where the following concepts have been revised:

- Addition
- Subtraction
- Roman numbers
- Multiplication
- Word problems based on the four operations

All these reinforce the earlier concepts and prepare children for the discovery ahead.

PART THREE
Shapes (Pages 135–147)

OBJECTIVE
To learn about 4-sided shapes and their properties, and to calculate the perimeter of 2-D shapes.

LEARNING CURVE (10 MIN)
Children recognize 3-D objects and their names. They are aware of the number of faces, edges and vertices each shape has. At this level they are introduced to terms such as parallel lines, points, line segments, and the calculation of the perimeter of shapes.

LEARNING AIDS
1. 8 short strips of paper of equal length
2. 8 long strips of paper of equal length
3. Cut-outs of different geometrical shapes, for measuring perimeter
4. A ball of wool
5. Measuring tape/ruler

LEARNING ACTIVITY (20 MIN)
After a revision of 3-D shapes, the teacher discusses some examples of parallel lines from everyday life such as railway tracks, roller coaster tracks, the two sides of a road or edges of a board, a TV screen, a desk or a door frame. Children observe that the railway lines are parallel because they never meet. Certain shapes too have parallel sides, such as squares, rectangles and diamonds. A triangle cannot have parallel sides.

Children identify shapes and objects in the classroom which have parallel lines. They use strips of paper to construct 4-sided shapes (quadrilaterals: quadri means ‘four’) with parallel sides.

Children then move on to constructing line segments according to the measurement provided to them. The beginning and end points of the line are marked with letters, say, A and B. The line segment is then called AB. These line segments are useful for drawing and measuring the sides of 2-D shapes.
Using line segments, children then construct shapes. It is more like a dot-to-dot exercise for them. They are informed that the place where line segments meet is called a point, or a vertex, in the case of a shape.

With the help of a trundle wheel in the garden, or a ruler in the classroom, children find perimeters of various shapes. First, the concept is introduced to them and then the term. A perimeter is the path taken by an ant around the table or a horse around a field.

**PAGES IN THE BOOK**

- Pages 135-136: Revision of work learnt earlier, identification of shapes in the pictures given, writing the number of sides and vertices of the shapes
- Page 137: Learning about and drawing parallel lines
- Pages 138-139: Learning about 4-sided shapes and their properties, solving a crossword as a recapitulation exercise
- Pages 140-141: Learning about points and line segments; drawing and measuring line segments
- Pages 144-146: Working out the perimeter of shapes, using lengths of line segments, work on word problems to calculate perimeter
- Page 147: A review page to consolidate all that has been done so far with shapes

**ADDITIONAL WORK (10 MIN)**

A trundle wheel is great fun, and children enjoy measuring perimeters of different shapes in the garden: the garden itself, a flower bed, the sandpit, etc.

**Length, Weight And Capacity (Pages 148–163)**

**OBJECTIVES**

To understand and use the four operations (+, −, ×, and ÷) with accuracy, using units of length (cm, m and km), weight (g and kg) and capacity (l and ml).

**LEARNING CURVE (10 MIN)**

Children are able to convert:
- metres to centimetres and kilometres to metres
- kilograms to grams
- litres to millilitres.

They are able to solve word problems involving addition and subtraction with length, weight and capacity. (Children are already familiar with the use of the four operations, working with 4-digit numbers.)

**LEARNING AIDS**

1. Pieces of ribbons and ropes for length
2. Different balls and stones for weight
3. Unbreakable glasses, cups and jugs of various sizes for capacity

**LEARNING ACTIVITY (20 MIN)**

Simple addition, subtraction, multiplication and division of units in the metric system is essentially an extension of the four rules with numbers. A little practical work makes this clear to the children.
Practical work is done in the classroom or outdoors, with objects suitable for length, to firmly register the concepts such as:

- **Addition of lengths:** A lorry is carrying 4 cars, one on top of the other. The floor of the lorry is at a height 1 m 10 cm from the road surface. The three cars (without wheels) are 1 m 30 cm high. Will the lorry be able to go under a flyover, which is 8 m from the ground?
  Or, Curtains are to be put on two walls of the sitting room: one along the length, 8 m, and the other along the width, 5 m. Find the total length of the curtain rod required.
  Record the addition, with m and cm in separate columns.

- **Subtraction:** Cut a piece of ribbon from a longer one, and find how much is left,
  Or, Find the difference between heights of the Eiffel Tower and the Qutub Minar (all information is available on the Internet).

- **Multiplication:** Find the total length of a fabric needed for 7 uniforms, if the length of the fabric used for 1 uniform is 2 m.

- **Division:** The height of a 6-storeyed building is 27 m. The height of the garage is 3 m, and the rest of the 6 floors have the same height. Find the height of 1 floor.
  Similar activities can be carried out for weight, using a weighing scale, and capacity using a beaker marked with graded capacity. A few examples are given:

1. The total weight of 8 watermelons is 16 kg 800 g. Calculate the approximate weight of 1 watermelon.
2. The total height of 6 members of a group is 6 m 49 cm. Calculate the total height of 6 members of your group and say which group is taller and by how much?
3. Three cola bottles come in capacities of 2 l, 1 l 500 ml and 250 ml. If Ahmed buys one bottle of each size, how much cola does he have in his basket?

These sums give the children some change from the monotony of paper work. They actually calculate their height, weight and water bottle capacity using measuring tape, weighing machine and measuring cylinders, to solve the problems.

**PAGES IN THE BOOK**

Page 148: Addition of m and cm
Page 149: Subtraction of m and cm
Page 150: Multiplication of m and cm
Page 151: Division of m and cm
Page 152: km and m
Page 153: Addition of km and m
Page 154: Subtraction of km and m
Page 155: Addition of kg and g
Page 156: Subtraction of kg and g
Page 157: Multiplication of kg and g
Page 158: Division of kg and g
Page 159: Word problems on weight
Page 160: Review exercise on weight
Page 161: Addition and subtraction of l and ml
Page 162: Multiplication and division of l and ml
Page 163: Revision exercises on capacity
CLASSROOM ORGANIZATION (10 MIN)

The classroom needs to be set up in such a way that it provides a large number of things for measurement and measuring equipment too. Children work in pairs: one child guesses the length of a piece of a ribbon and the rim of a bucket, and the other writes it down. Then, they take actual measurements and decide whether the guesses were correct or not.

Similarly, with capacity, after working with several containers of different shapes and sizes, children try and ‘guess’ the capacity of each one. Will a tall vase hold more water than a flat thaali? By how much?

A child holds a papaya in one hand and a banana in the other hand. Which is heavier? By how much?

A chart each for length, weight and capacity gives a vast variety of objects children are exposed to.

Worksheets (Pages 168–171)

Worksheets are a condensed revision of the entire book, and the same objectives and learning activities apply, as has been done in the entire book.

Maths Lab Activities (Pages 172–174)

Some activities are suggested which are carried out by children for lateral growth, and to make lessons more meaningful. This is only a sampling, based upon which other Maths Lab Activities may be created, when necessary.

The activities cater to:

- Logic improvement and development of a sense of numbers by assigning values to letters of the alphabet
- Developing a knack of solving maths puzzles
- Concept of fractions vis-à-vis a whole
- Learning more about length.
Answers

PART ONE

Page 1

(1) 189 (2) 3 (3) 24 (4) 110 (5) 4 (6) 350 (7) 1080 (8) 72

Pages 2–3

(2) (b) 306 (c) 720 (4) 840
(5) (b) 999 (c) 793 (e) 243 (f) 106
(6) (b) < (c) < (d) <
(7) (b) 980, 981 (c) 96, 97, 98, 99, 100, 101, 102
(8) (b) 981 (c) 504 (d) 69
(9) (b) 6 (c) 10 (d) 6
(10) (b) 48 (c) 70 (d) 72
(11) (c) 90 (d) 40 (e) 6 (f) 64 (g) 9 (h) 36 (i) 6

Page 4

(1) 31 (2) 91 (3) 22 (4) 54 (5) 12

Page 6

(5) (b) $\frac{1}{4}$ (c) $\frac{1}{4}$ (d) $\frac{1}{4}$ (e) $\frac{1}{2}$ (f) $\frac{1}{2}$

Pages 11–12

(3) (b) $\frac{1}{6}$ (c) $\frac{1}{4}$ (d) $\frac{2}{3}$ (e) $\frac{1}{3}$ (f) $\frac{3}{5}$
(5) (b) $\frac{3}{6}$ (c) $\frac{5}{8}$ (d) $\frac{6}{10}$ (e) $\frac{3}{4}$ (f) $\frac{4}{9}$

Page 13

(1) (b) 5, 6 (c) 8, 4 (d) 6, 7 (2) (b) $\frac{1}{7}$ (c) $\frac{9}{5}$ (d) $\frac{8}{3}$

Pages 14–15

(1) (b) $\frac{2}{6}$ (c) $\frac{6}{9}$ (d) $\frac{3}{12}$ (e) $\frac{2}{10}$ (f) $\frac{9}{9}$
(2) (b) 2 (d) 6 (e) 4 (f) 3 (g) 4 (h) 4

Pages 16–18

(1) (c) < (d) > (e) > (f) < (g) > (h) < $\frac{3}{5}$
(2) (b) $\frac{1}{6}$ $\frac{2}{6}$ $\frac{3}{6}$ $\frac{4}{6}$ (c) $\frac{1}{9}$ $\frac{2}{9}$ $\frac{5}{9}$ $\frac{8}{9}$
(d) $\frac{3}{10}$ $\frac{4}{10}$ $\frac{7}{10}$ $\frac{9}{10}$ (e) $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ (f) $\frac{1}{7}$ $\frac{2}{7}$ $\frac{5}{7}$ $\frac{6}{7}$
(4) (b) < (c) < (d) > (e) > (f) < (g) > (h) < (i) <
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Page 19
(1) (a) $\frac{7}{8}$ (b) $\frac{6}{7}$ (c) $\frac{8}{9}$ (d) $\frac{4}{5}$ (e) $\frac{2}{3}$ (f) $\frac{7}{8}$ (g) $\frac{9}{10}$ (h) $\frac{3}{4}$ (i) $\frac{5}{6}$
(2) (a) 1 (b) $\frac{7}{9}$ (c) $\frac{6}{7}$ (d) $\frac{8}{10}$ (e) $\frac{7}{8}$ (f) $\frac{7}{9}$

Page 20
(1) (a) $\frac{5}{9}$ (b) $\frac{1}{5}$ (c) $\frac{5}{7}$ (d) $\frac{6}{10}$ (e) $\frac{2}{8}$ (f) $\frac{1}{6}$ (g) $\frac{1}{4}$ (h) $\frac{3}{9}$ (i) $\frac{2}{10}$
(2) (b) – (c) + (d) + (e) – (f) + (g) + (h) – (i) –

Page 21
(1) (b) $\frac{4}{8}$ (c) $\frac{0}{5}$ (d) $\frac{7}{10}$ (e) $\frac{3}{7}$ (f) $\frac{5}{6}$

Pages 22–23
(1) (b) 2 (c) 3 (d) 2
(2) 10g, 6ml, 50g, 60ml, 10kg, 8kg, 6g, 70ml, 30g; 6 hours, 8 hr, 3hr; 15 min, 6 min.
(3) (b) 3 (c) 5 (d) 6
(4) (a) 2 (b) 7 (c) 6 (d) 12 (e) 6 (f) 30

Pages 24–25
(2) (a) $\frac{3}{6}$ (b) $\frac{4}{7}$ (c) $\frac{8}{9}$
(3) (a) $\frac{3}{10}$ $\frac{3}{7}$ $\frac{3}{5}$ $\frac{3}{4}$ (b) $\frac{1}{7}$ $\frac{2}{7}$ $\frac{5}{7}$ $\frac{7}{7}$ (c) $\frac{2}{8}$ $\frac{5}{8}$ $\frac{8}{8}$ $\frac{8}{8}$
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(5) (a) $\frac{3}{5}$ (b) $\frac{4}{9}$ (c) $\frac{9}{10}$ (d) $\frac{2}{10}$ (e) $\frac{3}{10}$ (f) $\frac{6}{7}$ (g) $\frac{5}{9}$ (h) 0
(8) (a) 199 (b) 310 (c) 651 (d) 444
(9) (a) 634, 636, 638, 640
(b) 900, 902, 904, 906, 908
(c) 430, 435, 440, 445, 450
(d) 100, 105, 110, 115, 120,
(e) 417, 427, 437, 447
(3) (b) 5604 (c) 9052 (d) 7120 (e) 1111 (f) 6009 (g) 8900 (h) 3441

(2) (b) 4 ones, 4
(c) 0 ones, 0
(d) 8 tens, 80
(e) 8 ones, 8
(f) 7 tens, 70
(g) 8 hundreds, 800
(h) 4 thousand, 4000
Smallest: 100, 1000; greatest: 99, 999.

(4) (b) 8072 (c) 3603 (d) 4980 (e) 5105 (f) 9261 (g) 2099 (h) 1454 (i) 2608

(1) (a) 3274, 1092, 9997, 4600, 6366, 2085, 1989, 7833, 999
(b) 8643, 5488, 3200, 2850, 1028, 2000, 4736, 7001, 9910
(c) 9659, 1010, 4307, 5000, 6250, 3024, 2000, 8461, 5089
Predecessor: 100, 869, 6923, 5019
Successor: 2100, 2130, 1000, 7010

(2) 10, 99, 100, smallest, 999, 1000, smallest.

(3) (b) predecessor (c) predecessor (d) successor (e) predecessor (f) predecessor

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(2) (b) < tens (c) > thousands (d) < hundreds
(e) > thousands (f) < hundreds (g) < ones (h) > tens

(3) 6430 (4) 8621

(5) (a) 4769, 4829, 4932
(b) 2629, 4999, 5090, 5099
(c) 4999, 5009, 5090, 5099
(d) 1459, 1559, 1945, 1954
(e) 3760, 7036, 7306, 7603
(f) 6111, 6113, 6311, 6316

(6) (a) 8491, 8149, 4819
(b) 4001, 3961, 3892, 3691
(c) 6884, 5684, 4926, 4864
(d) 9901, 9190, 9109, 9091
(e) 7362, 4726, 3627, 3276
(f) 2755, 2650, 2506, 2056
Pages 38–41

(1)  
(b) 7646, 7648, 7650, 7652, 7654  
(c) 6036, 6038, 6040, 6042, 6044, 6046  
(d) 5159, 5161, 5163  
(e) 8409, 8411, 8413, 8415, 8417  
(f) 9322, 9324, 9326, 9328

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(c) 2016, 2022, 2025  
(d) 4906, 4912, 4915, 4918  
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(f) 3493, 3496, 3505, 3508

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(4)  
(b) 2445, 2450, 2455, 2460, 2465  
(c) 4695, 4700, 4705, 4710, 4715  
(d) 7005, 7010, 7015, 7020  
(e) 3995, 4000, 4005, 4010, 4015  
(f) 7905, 7910, 7915, 7920  
(g) 8695, 8700, 8705, 8710, 8715  
(h) 995, 1000, 1005, 1010, 1015  
(i) 6000, 6005, 6010, 6015, 6020

(5)  
(b) 3250, 3260, 3270, 3280, 3290  
(c) 2580, 2590, 2600, 2610  
(d) 8690, 8700, 8710, 8720, 8730  
(e) 7980, 7990, 8000, 8010, 8020  
(f) 4280, 4290, 42300, 42310, 42320  
(g) 5990, 6000, 6010, 6020, 6030

(6)  
(a) 1651, 1661, 1671, 1681  
(b) 4092, 4120, 4112, 4122  
(c) 2695, 2715, 2725, 2735  
(d) 3500, 3510, 3530, 3540  
(e) 89990, 9000, 9010, 9030  
(f) 6980, 6990, 7000

(7)  
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(b) 8660, 8860, 8960  
(c) 2900, 3000, 3100, 3200, 3300  
(d) 9050, 9250, 9350  
(e) 1182, 1282, 1482, 1582
(2) (b) 9, 90 (c) 7, 63 (d) 6, 42 (e) 5, 45 (f) 8, 72 (g) 6, 48 (h) 9, 54
(3) a - i All answers = 0.
(4) (a) 36 (b) 20 (c) 72 (d) 0

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<td>(1)</td>
<td>2100</td>
<td>9400</td>
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</table>
Page 82

(1) (b) 490 (c) 630 (d) 918 (e) 672 (f) 1075 (g) 1118 (h) 1224 (i) 1920
   (j) 1296 (k) 817 (l) 2117 (m) 1512 (n) 1815 (o) 1638 (p) 4130

Page 83

(1) (a) 1612 (b) 4716 (c) 4347 (d) 3900 (e) 8844 (f) 6194
    (g) 3696 (h) 4650 (i) 4116 (j) 9510 (k) 5516 (l) 4048

Page 84

(1) (a) 2400 (b) 3600 (c) 2700 (d) 10,200 (e) 8736 (f) 4480 (g) 10,000

Pages 85–86

(2) (b) 56 (c) 10 (d) 7 (e) 5 (f) 4 (g) 72 (h) 9
(3) (b) divisor (c) dividend (d) divisor
(4) (c) 12 (d) 7 (e) 4
(5) 7, 4, 10, 9, 5, 9, 7, 5, 9, 11, 8, 7

Page 87

(1) (b) 2 (c) 5 (d) 9 (e) 3 (f) 8 (g) 2 (h) 5 (i) 4 (j) 8 (k) 6 (l) 5

Pages 88–89

(1) (b) 4 r3 (c) 7 r1 (d) 6 r2 (e) 5 (f) 5 r2 (g) 6 r3 (h) 3 r1
(2) (b) 8 r1 (c) 7 r2 (d) 9 r2 (e) 3 r1 (f) 8 r2 (g) 8 r2 (h) 10 r7
   (i) 5 r1 (j) 8 r7 (k) 10 r3 (l) 9 r8 (m) 7 r5 (n) 9 r4 (o) 8 r4
(3) (a) 9 r7 (b) 6 r4 (c) 5 r6

Page 90

(1) (c) 99 r9 (d) 7 r2 (e) 40 r8 (f) 11 r9 (g) 8 (h) 75 r6 (i) 20 r1
(2) (c) 94 (d) 10 (e) 488 (f) 865 (g) 56 (h) 578

Pages 91–92

(1) (a) 23 (b) 12 (c) 11 (d) 32 (e) 11 (f) 32 (g) 11 (h) 41 (i) 11 (j) 12
(2) (a) 22 r1 (b) 14 r1 (c) 30 r1 (d) 11 r2 (e) 11 r3 (f) 12 rl (g) 44 rl (h) 10 r2
(3) (a) 101 (b) 110 (c) 106 (d) 321 (e) 234 (f) 332 (g) 110 (h) 111
   (i) 212 r1 (j) 232 rl (k) 222 rl (l) 111 r2
(4) (a) 110 (b) 101 rl (c) 11 r1 (d) 211 r2 (e) 301 r1 (f) 321 rl (g) 321 r2
   (h) 120 r3 (i) 144 r1 (j) 220 r2
(5) (a) 110 (b) 313 rl (c) 110 r5
(1) (a) 421  (b) 221  (c) 323  (d) 111  (e) 131  (f) 101

Pages 94–95
(1) (a) 148  (b) 116  (c) 217  (d) 290  (e) 229  (f) 118  (g) 316  (h) 116  
(i) 119  (j) 213  (k) 114  (l) 214  (m) 337  (n) 112  (o) 113  (p) 119 
(q) 115  (r) 119  (s) 112  (t) 114 
(2) (a) 141  (b) 151  (c) 182  (d) 172  (e) 284  (f) 171  (g) 131  (h) 161 
(i) 163  (j) 191  (k) 109  (l) 190 
(3) (a) 122  (b) 258  (c) 167  (d) 159  (e) 146  (f) 265  (g) 144  (h) 124

Page 96
(1) (a) 118 r3  (b) 116 r3  (c) 227 r1  (d) 116 r2  (e) 426 r1  (f) 152 r4  (g) 158 r1 
(h) 353 r1  (i) 142 r2  (j) 133 r5  (k) 112 r3  (l) 244 r3  (m) 161 r2  (n) 110 r8 
(o) 143 r3  (k) 122 r3  (q) 154 r2  (r) 315 r2  (s) 121 r2  (t) 283 r1

Page 97
(1) (a) 159 r5  (b) 37  (c) 76  (d) 183 r3  (e) 130  (f) 35 r2

Page 98
(1) 46 r2  (2) 92 r6  (3) 59 r1  (4) 17 r1

Page 99
(1) (a) 24 r2  (b) 14 r3  (c) 18 r2  (d) 20 r1  (e) 13 r4  (f) 322  (g) 229 
(h) 205 r3  (i) 119  (j) 158 r1  (k) 107  (l) 196 r4  (m) 91  (n) 236 r1 
(o) 106 r6  (p) 121 r5  (q) 100 r7  (r) 70 r4  (s) 473 r1  (t) 284 r2

(2) (a) 32  (b) 98  (c) 60  (d) 51  (e) 80  (f) 81  (g) 69  (h) 39

(i) 62  (j) 10  (k) 48  (l) 11 
(3) (a) 7  (b) 121  (c) 421  (d) 8  (e) 132  (f) 113  (g) 9  (h) 102  (i) 334

Pages 100–101
(1) (b) 7  (c) 8  (d) 9
(3) (a) 3:30  (b) 8:30  (c) 4:30
(5) quarter past 6, 6:15; quarter to 2, 1:45; quarter to 10, 9:45; quarter to 5, 4:45

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Pages 103–106
(1) (b) 3p.m.  (c) 7a.m.  (d) 10p.m.  (e) 1a.m.  (f) 9p.m.  (g) 11:30a.m.  (h) 7p.m.
Page 107

(1) (a) 12:25  (b) 8:30  (c) 10:15  (d) 1:45
(3) (a) 24  (b) 84  (c) hour, hour hand  (d) hour  (e) 60  (f) 12  (g) 30, 15

Pages 108–109

(2) (b) 25  (c) 45  (d) 20  (e) 40  (f) 60
(3) (a) 15  (b) 3  (c) 3  (d) 15
(4) (b) 5, 55  (c) 20, 40  (d) 30, 30
(5) (a) 10  (b) 20  (c) 25  (d) 15, 45  (e) 15  (f) 55

Pages 110–112

(1) (b) 9:15  (c) 20 minutes past 1, 1:20  (d) 10 minutes past 6, 6:10  (e) half past 4, 4:30
(3) (b) 6:45  (c) 25 minutes to 12, 11:35  (d) 5 minutes to 8, 7:55  (e) 20 minutes to 4, 1:40
(4) 25 minutes past 11, 11:25  (b) 25 minutes to 2, 1:35  (c) 30 minutes past 10, 10:30
(4) (d) 5 minutes past 9, 9:05  (e) quarter past 8, 8:15  (f) 5 minutes to 4, 3:55

Pages 113–114

(1) (b) 96 hours  (c) 240 hours  (d) 288 hours
(2) (a) 72 hr  (b) 272 hr  (c) 180 hr  (d) 28 hr
(3) (c) 60 + 15 = 75  (d) 60 + 45 = 105 min
(4) (a) 300 mins  (b) 720 mins  (c) 900 mins  (d) 330 mins  (e) 600 mins
(f) 90 mins  (g) 270 mins  (h) 540 mins
(5) (a) 260  (b) 435  (c) 200  (d) 740  (e) 125  (f) 875  (g) 390  (h) 645
(6) (a) 70 mins  (b) 285 mins  (c) 350 mins

Pages 115–118

(1) (a) 1  (b) 1  (c) 2  (d) 13
(2) (a) 7  (b) 3  (c) May  (d) March  (e) 16  (f) 44
(3) (a) 10  (b) 3  (c) 15  (d) 8  (e) 30  (f) 22
(4) (a) 30  (b) Cricket  (c) 4  (d) hockey  (e) 8  (f) 20  (g) 15

Page 119

(1) (a) 60  (b) 10  (c) 4  (d) 24
(2) (a) 294  (b) 300  (c) 829  (d) 86  (e) 31 r2
Pages 120–121

(2) (b) Rs 10.50 (b) Rs 103 (c) Rs 55.25 (d) Rs 28

Page 122

(1) (b) 12345 (c) 985 (d) 49615 (e) 2105 (f) 1875
(2) (a) 7.25 (b) 10.35 (c) 3.80 (d) 9.05 (e) 38.40
   (f) 45.00 (g) 3.45 (h) 59.65 (i) 76.05

Page 123

(1) (b) 16.00 (c) 70.90 (d) 70.25 (e) 60.90 (f) 79.50 (g) 7.75 (h) 19.35 (i) 46.00
(2) (b) 1.25 (c) 1.30 (d) 1.25

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(1) (b) 2.25 (c) 3.85 (d) 11.63 (e) 13.45 (f) 13.60 (g) 56.55 (h) 6.85
   (i) 11.45 (j) 21.65 (k) 11.35 (l) 26.65
(2) (a) 21.50 (b) 36.05 (c) 11.55 (d) 20.99 (e) 50.65 (f) 10.00

Page 125

(1) (a) 25.40 (b) 22.75 (c) 43.20 (d) 20.60 (e) 65.80 (f) 15.80
   (g) 25.80 (h) 56.40 (i) 90.40 (j) 63.90 (k) 60.25 (l) 7805
(2) (a) 16.00 (b) 7.50 (c) 29.50 (d) 84.50 (e) 43.50 (f) 3.00

Page 126

(1) (a) Rs 1.28 r1p (b) 3.45 (c) Rs 1.38 r3 (d) 2.05 (e) Rs 2.64 r2 (f) 5.60
   (g) 16.86 (h) 7.85 (i) Rs 6.07 r7
(2) (a) Rs 4.80 (b) 2.29 (c) 1.80 (d) 9.90

Pages 127–128

(1) (a) Rs 26.50 (b) Rs 25.75 (c) Rs 165.90 (d) Rs 24.40 (e) Rs 55 (f) Rs 9.90
   (g) Rs 50 (h) Rs 7450
(2) (a) Rs 90 (b) Rs 2625 (c) Rs 75 (d) Rs 5.35
   (e) Rs 1455 (f) Rs 35 (g) Rs 377.40 (h) Rs 175 (i) Rs 13

Pages 131–133

(1) (a) 1355 (b) 5805 (c) 6415 (d) 10620
(2) (a) Rs 6.25 (b) Rs 8.05 (c) Rs 16.10 (d) Rs 99.80
(3) (a) 85.85 (b) 68.70 (c) 71.20 (d) 90.00 (e) 38.85 (f) 87.55
(4) (a) 76.00 (b) 10.40 (c) 26.95 (d) 8.50
(5) (a) 96 (b) 167 (c) 90 (d) 45
(7) (a) 1715 (b) 2216 (c) 3387 (d) 3279 (e) 1388 (f) 4711
   (g) 2643 (h) 3554 (i) 4373 (j) 3533 (k) 1005 (l) 2024
(8) (a) II (b) C (c) L (d) XX (e) XII
(9) (a) 22 (b) 19 (c) 36 (d) 16 (e) 25 (f) 11
(10) (a) 2264 (b) 1488 (c) 3241 (d) 5481 (e) 4413 (f) 8376 (g) 7798 (h) 8380
     (i) 405 (j) 1235 (k) 1078 (l) 900 (m) 2312 (n) 3424 (o) 3042 (p) 8505
(11) (a) 100 (b) 200 (c) 26 (d) 3900 (e) 3500 (f) 68 (g) 660
     (h) 2400 (i) 260 (j) 630 (k) 560
(12) I 480 II 26 r1 III 7588 IV 160 V 2763

Page 135

Circle 4, oval 3, rectangle 3, J, F, G

Page 136

4, 4; 5; 6, 6; 4, 4,

(6) (a) F (b) O (c) G (d) any other capital letter may be used, eg. E, X, etc.

Page 146

(2) (a) 35cm (b) 896m (c) 600cm (d) 18m

Page 147

(3) (a) 2m 51cm (b) 1m 90cm (c) 12m (d) 62m 95cm (e) 3m 22cm
     (f) 7m 6cm (g) 13m 41cm (h) 70m 31cm (i) 85m 79cm
(4) (a) 318cm (b) 1840 (c) 635 (d) 905 (e) 505
     (f) 415 (g) 9999 (h) 810 (i) 2816
(5) (a) > (b) > (c) < (d) > (e) < (f)

Page 148

(1) (a) 16m 10cm (b) 19m 63cm (c) 45m 20cm
(2) (a) 23m 42cm (b) 47m 73cm (c) 31m 28cm (d) 71m 52cm
(3) (a) 6m 49cm (b) 32m 25cm (e) 35m 40cm

Page 149

(1) (a) 10m 90cm (b) 26m 69cm (c) 35m 70cm (d) 2m 31cm
(2) (a) 2m 40cm (b) 14m 94cm (c) 7m 50cm (d) 12m 88cm
(3) (a) 79m (b) 7m 45cm (c) 10m 44cm (d) 2m 68cm and 1m 24cm

Page 150

(1) (a) 50m 70cm (b) 77m 35cm (c) 11m 85cm (d) 74m 20cm
(2) (a) 25m 44cm (b) 49m 84cm (c) 28m 15cm (d) 3m 74cm (e) 8m 73cm
     (f) 5m 26cm (g) 34m (h) 51m 90cm
(3) (a) 13m 68cm (b) 10m 90cm (c) 25m 60cm
Page 151

(1) (a) 2m 31cm (b) 4m 30cm (c) 69cm (d) 70cm r5 (e) 86cm r7  
(f) 4m 43cm (g) 3m 21m r4 (h) 8m 39cm r3
(2) (a) 1m 8cm r2 (b) 2m 22cm r3 (c) 5m 46cm r1 (d) 2m 45cm  
(e) 2m 54cm r4 (f) 3m 2cm
(3) (a) 3m 80cm (b) 5m 63cm

Page 152

(1) (a) 3km 528m (b) 2km 23m (c) 6km 401m (d) 9km 9m  
(e) 4km 962m (f) 6km 200m (g) 7km 29m (h) 85km 70m
(2) (a) 3591m (b) 8082m (c) 1099cm (d) 6009m (e) 9630m (f) 9011m
(3) (a) < (b) > (c) < (d) < (e) = (f) >

Page 153

(1) (a) 8km 546m (b) 7km 530m (c) 7km 86m (d) 7km 542m
(2) (a) 7km 133m (b) 4km 829m (c) 9km 84m 3m (d) 4km 50m
(3) (a) 4km 370m (b) 4km 670cm (c) 6km 70m (d) Aliya

Page 154

(1) (a) 2km 520m (b) 3km 791m (c) 4km 549cm (d) 4km 322m  
(e) 2km 365m (f) 2km 399m
(3) (a) 1km 380m (b) 1km 400m

Page 155

(1) (a) 6kg 27g (b) 9kg 447g (c) 8kg 63g (d) 8kg 231g  
(2) (a) 9kg 53g (b) 8kg 782g (c) 8kg 467g (d) 2kg 838g
(3) (a) 7kg 335g (b) 9kg 295g (c) 5kg 835g (d) 7kg 900g

Page 156

(1) (a) 4kg 205g (b) 2kg 906g (c) 2kg 238g (d) 3kg 466g  
(2) (a) 1kg 910g (b) 3kg 415g (c) 2kg 368g (d) 1kg 226g
(3) (a) 1kg 830g (b) 5kg 545g (c) 7kg 550g (d) 5kg 500g

Page 157

(1) (a) 9kg 75g (b) 8kg 324g (c) 5kg 410g (d) 2kg 970g  
(2) (a) 6kg 315g (b) 9kg 700g (c) 8kg 20g (d) 7kg 724g (e) 6kg 580g (f) 9kg 75g
(3) (a) 4kg 720g (b) 3kg 750g (c) 4kg 5g (d) 3kg 450g
Page 158

(1) (a) 2kg 832g (b) 2kg 831g r2 (c) 1kg 410g r2 (d) 1kg 825g r2 (e) 1kg 868g r1 (f) 1kg 833g r1
(2) (a) 2kg 116g r2 (b) 1kg 776g r2 (c) 2kg 821g r2 (d) 1kg 761g r2 (e) 1kg 503g r3 (f) 1kg 841g
(3) (a) 210g (b) 350g (c) 1kg 800g

Page 159

(1) (a) 6kg 700g (b) 383g (c) 1kg 350g (d) 4kg 797g (e) 7kg 100g (f) 4kg 770g (g) 1kg 420g (h) 1kg 449g (i) 7kg 60g
(2) (a) > (b) = (c) < (d) >
(3) (a) 37kg 870g (b) 22kg 921g (c) 15kg 644g

Page 160

(1) (a) 4kg (b) 5kg 2g (c) 1kg 111g (d) 8kg 460g (e) 2kg 15g (f) 9kg 400g
(2) (a) 3761g (b) 1966g (c) 1015g (d) 4004g (e) 7043g (f) 8673g
(3) (a) > (b) = (c) < (d) >
(4) (a) 38l 800ml (b) 50l 800ml (c) 23l 32m 805ml (d) 96l 440ml (e) 87l 830ml (f) 73l 377ml

Page 161

(1) (a) 3l 960ml (b) 3l 545ml (c) 4l 538ml (d) 10l 27ml
(2) (a) 3l 820ml (b) 9l 200ml (c) 2l 850ml (d) 9l 830ml
(3) (a) 9l 630ml (b) 2l 150ml (c) 5l 4ml (d) 9l 260ml; Ali, 1l 37ml

Page 162

(1) (a) 9l 545ml (b) 7l 944ml (c) 27l 225ml (d) 8l 178ml
(2) (a) 2l 60ml (b) 1l 370ml (c) 1l 156ml (d) 2l 494ml
(3) (a) 800l (b) 20 times (c) 2l 580ml (d) 600ml

Page 163

(1) (a) 6l (b) 7l 6ml (c) 2l 32ml (d) 3l 605ml (e) 7l 320ml
(f) 5l 1ml (g) 6l 408ml (h) 4l 5ml
(2) (a) 2618ml (b) 3015ml (c) 6006ml (d) 5739ml (e) 8002ml
(f) 2815ml (g) 4102ml (h) 6103ml (i) 1750ml
(3) (a) < (b) = (c) = (d) > (e) > (f) <
(4) (a) 38l 800ml (b) 50l 800ml (c) 23l 32m 805ml (d) 96l 440ml
(e) 87l 830ml (f) 73l 377ml

Page 164

(1) (a) 18cm (b) 1km 40m
(2) (a) Rectangle, 3cm (b) kite, 4cm (c) Square 2cm (d) parallelogram 4cm
(3) (a) (i) 2423 (ii) 1301 (iii) 4909 (iv) 8040
(b) (i) 8000 + 400 + 70 + 9 (ii) 2000 + 0 + 0 + 8 (iii) 5000 + 0 + 60 + 9
(iv) 1000 + 600 + 90 + 0
(4) (a) 4906    (b) 7470, 7490, 7500    (c) 5332    (d) 3828, 4028
(5) (a) 7349    (b) 8581    (c) 708    (d) 2408    (e) 8189    (f) 716
(6) (a) (i) 240    (ii) 900    (iii) 3640    (iv) 660    (v) 640    (vi) 2970
   (b) (i) 735    (ii) 1152    (iii) 1395    (iv) 627    (v) 1450    (vi) 1085
(7) (a) (i) 7    (ii) 9 r2    (iii) 33 r6    (iv) 8 r4    (v) 33 r6    (vi) 828 r2
   (b) 228    (ii) 161    (iii) 132    (iv) 80 r3    (vi) 466
(8) (a) 36    (b) 1248    (c) 4159    (d) 6265
(9) (a) I, II, III, IV, V, VI, VII, VIII, IX, XIV, CXIX, XX, XXV
   (b) 1781
(10) (a) (i) \(\frac{3}{5}\)    (ii) \(\frac{2}{3}\)    (iii) \(\frac{2}{7}\)    (iv) \(\frac{3}{8}\)
    (b) (i) unlike fractions    (ii) smaller    (iii) denominators    (iv) equivalent fraction
    (c) (i) \(\frac{7}{8}\)    (ii) \(\frac{4}{9}\)    (iii) \(\frac{5}{10}\)    (iv) \(\frac{6}{6}\) =1
(11) (a) 2l 202ml    (b) 288hrs

Page 168

(1) <    (2) <    (3) >    (4) <    (5) <    (6) =    (7) >    (8) <    (9) =    (10) >    (11) <

(12) >    (13) <    (14) >    (15) <    (16) <    (17) <    (18) <    (19) <    (20) >

Page 169

(2) 56 ÷ 8    (3) 3 x 3, 81 ÷ 9, 72 ÷ 8    (4) 77 ÷ 7, 132 ÷ 12    (5) 46 ÷ 2, 2 x 12
(6) 2 x 5, 100 ÷ 10    (7) 8 x 1, 64 ÷ 8    (8) 21 ÷ 7, 3 x 1

Page 170

(2) 30    (3) 81    (4) 39    (5) 99

Page 171

(1) (a) i    (b) iv    (c) iii    (d) ii    (e) \(\frac{5}{8}\)