New Countdown

Second Edition

5

Teaching Guide

OXFORD
UNIVERSITY PRESS

Contents

OXFORD
UNIVERSITY PRESS

A Note to the Teacher from the Author

New Countdown 5 is the last of a seven-book journey into maths designed for the young mathematician of today's fast-evolving world. It carries concepts introduced earlier to a more advanced plane and presents some exciting new ideas: rounding off; simplification with and without brackets: the line graph; volume; multiplication and division with common fractions and decimal fractions; percentages and their everyday application; averages; the relationship between distance, speed and time; and measurement of temperature. Students are introduced to more advanced geometry assignments, learning to use instruments to construct circles and triangles of given dimensions and to draw perpendicular and parallel lines.

New Countdown 5 covers all the concepts recommended for Class Five learners by all major syllabuses. It also reaches beyond them in a careful, systematic way. As before, worked examples are provided for every new concept or technique. Plenty of practice exercises reinforce learning, and a range of puzzles and activities seek to guarantee the interest and involvement of every child, and help the child to grow laterally.

New Countdown 5 comprises four parts, each containing work which can be covered comfortably in the time available for each term. I recommend that you follow the four parts in sequence, since later portions of the book relate directly to work done or concepts introduced at an earlier stage. Review pages appear regularly and a review section is included at the end of each part.

But no textbook—however comprehensive—can do full justice to a subject as exciting and varied as mathematics. There is so much that you, as a creative and imaginative teacher, can do to enrich the content of this book. Here are my suggestions for teaching ideas and activities you might like to incorporate in your classes.

PART ONE

The introduction of the line graph (page 4) provides an opportunity for exciting practical work right at the start of the new school year. Give your children plenty of practice in reading data from simple line graphs, discussing why some graphs take the form of a straight line while others show variation. Ensure that all children have access to graph paper by the time you reach page 7. Before children attempt Exercise 1 on that page, make sure you have thoroughly discussed how the axes of the graph should be positioned and how the squares of graph paper should be used. Follow up this exercise with your own variants: for example, packets of pop-corn sold at a fun-fair over the course of a day; or the number of children entering a museum one Sunday afternoon.

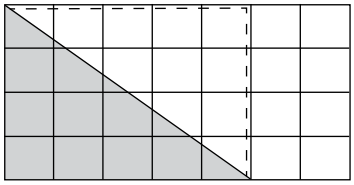
Enrich your teaching of 'place value' in relation to 7-digit and 8- digit numbers by asking your children to bring to class press clippings, magazine articles and other real-life references to big numbers. The Census data presented on page 25 is one example of the plentiful material that exists about us all. With firm grasp on place value, your students will also enjoy talking about even bigger numbers: you can introduce the idea of one billion (1,000,000,000) and its two distinct meanings [one thousand million (1000,000,000) universally); one hundred crores (100,00,00,000) in Pakistan and some other parts of Asia.]

'Rounding off' (pages 22-25) lends itself very well to team games. Divide your class into rival teams, then ask each member to round off a given number, making sure you vary the multiple of 10 to which the number should be rounded off: '11,464 to the nearest 1000', '4545 to the nearest 10', and so on. Maintain a brisk pace of questioning, so that children learn to react quickly as well as accurately.

When introducing 'simplification', make sure every child sees (i) that the outcome of multi-operation sums varies according to the sequence in which their various parts are done, and (ii) that although

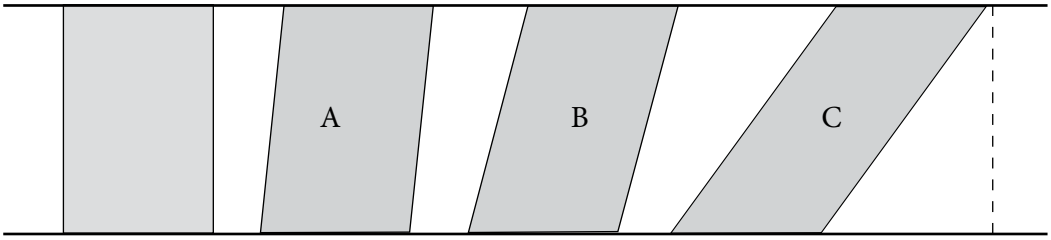
there is no 'wrong' order of working out operations, the convention is to do them according to the DMAS sequence, thereby avoiding the confusion of several possible answers. Make plenty of use of the board, presenting simple two-operation sums like those on page 34 and asking the children which part of the sum should be tackled first. The children can then copy and complete the sums in their exercise books. Progress to 3-operation and then 4-operation sums, again discussing the order of operations with the class. After this, brackets will naturally appear to children as 'helpers', simplifying the job of solving multi-operation problems by telling us what to do, and when.

More advanced work with 'area' provides further opportunities for practical work. On page 44, an activity is suggested as a means to introducing the area of 'triangles'. You can supplement this by distributing sheets of 1 cm squared paper and asking the children to draw a right-angled triangle as shown:



The children draw two dotted lines to form a rectangle. The area of the rectangle is calculated and, by dividing the answer by two, the area of the triangle is found.

When discussing the area of 'parallelograms', make sure that every child understands clearly what is meant by the height of a parallelogram. Some children make the mistake of multiplying one edge length by the other to find the area. Prepare a worksheet showing a set of parallelograms of equal base length and equal height, with a rectangle of the same base length and height to act as a reference point:



Ask the children to show the height of parallelograms A, B and C by drawing a dotted line. Make sure the height is a whole number, and that the base length, too, is a whole number (here, the height is 3 cm and the base length is 2 cm). The children should be able to see that although the slanting edge of the parallelogram gets longer as we move from A to C, the height remains the same and all the parallelograms cover the same area.

Introduce 'volume' as the word we use when we think about the amount of space an object takes up. The term 'capacity' is usually used when we think about how much a vessel or container holds; while we can measure capacity directly, for example by using a litre measure to fill a bucket with water, we cannot measure volume directly: we have to calculate it. A simple and effective way of introducing volume is to ask children to make shapes from cubes (building blocks borrowed from your KG section or handmade cardboard boxes of equal sizes), recording how many cubes are used for each shape. Ask the children to use the cubes to make cuboids only, again writing down the number of cubes needed to make a given cuboid. Some children will count the cubes one by one,

but others will begin to see quicker methods, noting that, for example, one layer contains 4 cubes and that there are 3 layers altogether. The children are now ready for Exercise 1 on page 45. Once the idea of layers is grasped, the practical activity on page 47 can be thoroughly explored: ask the children to apply the same thinking to cubes of other dimensions (2 cm, 3 cm, 8 cm and so on). By now, the role of multiplication in calculating volume will be well established and children can proceed to the more advanced exercises on pages 48–50.

PART TWO

In this part of **New Countdown 5** we look in detail at two areas of primary-level maths which commonly present problems to young learners: 'multiplication and division', firstly in relation to 'common fractions' and secondly in relation to 'decimal fractions'. A large part of the difficulty is removed by paying close attention to the language in which these concepts are presented and by careful progression of stages.

When your children begin to multiply with common fractions, it is essential that they understand exactly what is happening. Language, therefore, should be kept simple, and there should be no rush to impose 'rules' which may make little sense to children. I suggest that you begin with multiplication of fractions as repeated addition (see page 67). For example, the children will quickly see that:

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

What happens, then, when we multiply a fraction by another fraction: On page 72 this idea is presented in a sequence of diagrams, each explained in the language of multiplication. I recommend that you reproduce this exercise on the blackboard, explaining each stage slowly and carefully so that no child gets left behind. Children will begin to see that the answer to the multiplication, say $\frac{1}{2} \times \frac{3}{4}$, can be obtained from $\frac{1 \times 3}{2 \times 4}$, a very important step. Language is important at every stage of your discussion; when looking at the example $\frac{3}{4} \times \frac{3}{5}$, emphasize that this mulplication asks us to find 'three-quarters of three-fifths', and draw a diagram on the board to illustrate the point. Multiplication with mixed numbers is the ideal moment for you to bring in the idea of cancelling, since numerators become large and unwieldy at this stage, and the purpose of cancelling—making multiplication simpler and quicker—is easily demonstrated.

Your success in teaching 'division by fraction' depends largely on the extent to which your students understand the concept and language of division. This is why, on page 75, we return briefly to the beginner's language of division and put students through some very simple exercises just to remind them of exactly what they do when they divide. This division language is then applied to a simple problem involving a common fraction divisor: $1 \div \frac{1}{4}$.

If you ask 'how many quarters make a whole?', the answer will come back loud and clear! Progress to more complex calculations: ' how many sixths (of one whole) make 2 wholes?' 'How many twelfths (of one whole) make 9 wholes?'. By the time the children have completed the exercises on page 76, they will realize that they have been using multiplication to solve division problems. This is the moment to introduce the idea of reciprocal fractions. Children will now proceed quickly through the various stages of division with fractions, applying the language of division to their actions.

If they have to understand what happens when they multiply or divide with decimal fractions, and to handle calculations confidently, they must be able to multiply and divide by 10, 100, 1000 and so on. So start your teaching with some oral exercises or team games designed to test this ability: ask 'What is 492 multiplied by 100?' 'What is 48,300 divided by 10?', and so on. After this, the

application of the same basic rules to decimal numbers (pages 89–90) should be plainsailing; again, reinforce written work with oral exercises.

Multiplication with decimal numbers should proceed carefully, according to the stages suggested in the book. Begin with a decimal number multiplier having tenths only (page 91); the graph paper exercises on pages 91-92 show children that when they multiply together two decimal numbers with tenths only, this is the same as multiplying two whole numbers and then dividing the product by 100. The next step is to multiply with a decimal number having tenths and hundredths. If we turn each decimal number into a common fraction, it is easy to see that a decimal with tenths multiplied by a decimal with tenths and hundredths will produce a decimal product with tenths, hundredths and thousandths.

Dividing by a decimal fraction should pose few problems provided your students understand the equivalence set out on pages 94–95 and provided they can divide by 10, 100, 1000 (and so on) quickly and confidently.

Use of calculators is recommended for Part Two.

PART THREE

When introducing the concept of 'percentage', be sure to establish the links between common fractions, decimal fractions and percentages, and avoid imposing 'rules' which children do not fully understand. **New Countdown 5** presents percentage as a special kind of fraction.

All that children need to grasp is that instead of using common fractions having different denominators (for example, $\frac{1}{2}$; $\frac{3}{4}$; $\frac{7}{10}$), we turn these into fractions with the common denominator 100 $\left(\frac{50}{100}\ \frac{75}{100}; \frac{70}{100}\right)$. And instead of using decimal fractions written to different places of decimals (0.2; 0.03; 0.115), we turn them all into common fractions expressed in hundredths $\left(\frac{20}{100}; \frac{3}{100}; \frac{11.5}{100}\right)$. As Sprog Spacewalker demonstrates on page 104, thinking of fractions in this way has several advantages: comparison becomes easier, and if we think of each fraction as a point on a scale numbered from 0 to 100, we can quickly get an idea of its size. Several pages of exercises designed to help children understand this basic equivalence precede the introduction of the word 'percentage' and the special symbol. Percentages are so much a part of everyday life that you will want to include plenty of activities, perhaps extending the idea of the reduction sale at Sid's local store (page 110) to a pretend sale of classroom items (10% off a desk costing Rs 530, 15% off a pen costing Rs 10, and so on). The concept of simple interest, besides providing more practice with percentages, gives you a chance to talk about banks and their role in society. Why not plan a visit to a local bank to coincide with this part of your teaching?

In the geometry section, check that your children are using their 180° protractors correctly by asking them to first estimate (and jot down) what they think an angle is likely to measure before they actually measure it. If the children are reading the wrong set of markings, this procedure will quickly reveal the problem. Make sure you have a directional compass on hand when you reach page 123; discuss the similarities between this and the circular protractor, emphasizing that North on the compass is equal to 0° / 360° on the circular protractor. The properties of the circle are introduced via a practical activity in which all the children can easily participate (page 124). The fact that the radius of a circle is exactly half its diameter is instantly revealed by this exercise. Try a real-life demonstration of Sid's 'Pencil and Pin' method of drawing a circle (page 126) and then graduate to a pair of compasses. Ensure that each child gets plenty of practice in the handling of compasses before asking the class to construct circles of specific radii. They will then be well prepared to tackle the precision work of constructing triangles (pages 131-133). Similar practice

OXFORD
UNIVERSITY PRESS

will be needed with the set square before children can construct perpendicular and parallel lines accurately and neatly.

The concept of 'average' is well linked up with column graph work, since column graphs help students to see that the average of a set of numbers is roughly half-way between the largest and smallest numbers of the set. Line graphs make a re-apperance to help illustrate the relationship between speed, distance and time; you may want to prepare additional graph worksheets here.

Make sure you have a thermometer (ideally two thermometers: one Celsius, the other Fahrenheit) to show to the class during the discussion of 'temperature' and its measurement (page 144). Ask the children to record temperatures given in TV or radio weather bulletins over a 7-day period; these Celsius temperatures can then be converted into the Fahrenheit scale. For a reverse exercise, collect a list of temperatures recorded at various places throughout the world (many newspapers carry such listings in their business sections or supplements) and ask the children to convert these into Celsius. Find the hottest place and the coldest place in the world on a particular day and discuss how people respond to temperature in terms of clothing, housing, appearance, occupation and so on. Temperature thus becomes a way of linking up maths with science, geography and even history, providing an exciting end to your maths teaching year.

PART FOUR

The concept of algebra and the use of symbols to denote objects has been introduced (page 146). Students have been familiarized with the addition and subtraction of algebraic expressions using common letters of the alphabet. Going a bit further, multiplication of unlike terms has also been introduced. Ample exercises have been provided for practice.

Wishing you a thoroughly enjoyable teaching year!

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 5** 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
- Concentration Building
- 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 the children and the teacher and leads to a 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.

CONCENTRATION BUILDING

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

The 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 lunch 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, uses 2 senses at the most—listening and seeing (reading) whereas activity-based learning, 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 his teacher loves him, the son believes her. But if he discovers the teacher's love through a 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.

Revision (Pages 1–3)

OBJECTIVE

These pages reinforce and consolidate the lessons learnt and the concepts taught in the preceding year.

LEARNING AIDS

The teacher uses the same aids that were used in the previous year for each topic. It helps in rapid recapitulation of the matter to be revised.

ADDITIONAL WORK

At this stage, it is always interesting to collect as many related topics from daily life as possible and create a fresh set of problems for children to solve.

Graphs (Pages 4–7)

OBJECTIVE

The children learn to use line graphs to observe differences quickly in the given data.

LEARNING CURVE (10 MIN)

The children have worked with pictographs, pie charts, and column graphs, earlier. Here they work with line graphs.

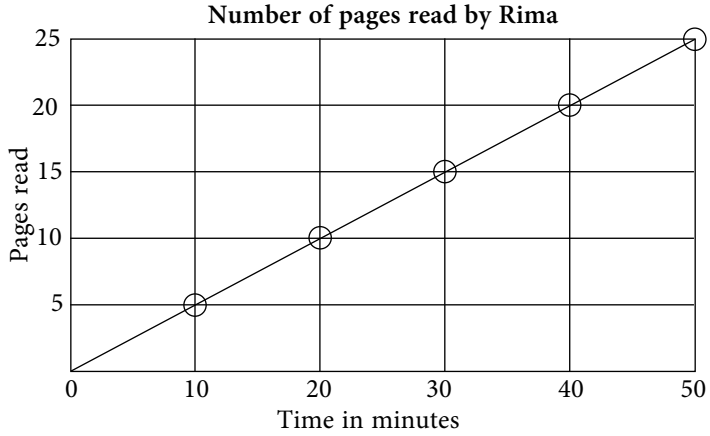
LEARNING AIDS

Weather charts, charts showing holiday destinations of children, other simple charts from magazines pasted on hard board, graph book/ graph sheet with big squares.

LEARNING ACTIVITY (20 MIN)

The children know how to plot column graphs and pie charts. They learn that line graphs can be plotted when they want to measure something that is gradually changing.

Example: The following chart has been created for Rima during a speed-reading session in a school. The horizontal line tells us the time elapsed in minutes and the vertical line indicates the number of pages Rima reads.



The chart shows that Rima reads five pages per ten minutes. Children study the graph and answer questions based on this like (a) How many pages does Rima read in thirty minutes? (b) If she reads at the same speed, how many pages will she finish in an hour?

The children work with line graphs given in the textbook. They either study a given graph and answer questions based on it, or they plot their own line graphs.

ADDITIONAL WORK (10 MIN)

The teacher helps the children draw more graphs based on questions given in extra worksheets. The questions may be based on real-life situations to make them more interesting.

Place Value (Pages 8–18)

OBJECTIVE

Children are introduced to 7- and 8-digit numbers and they learn to use them in real life in both Pakistani and International system of numeration.

LEARNING CURVE (10 MIN)

The children have worked with numbers up to 9,99,999 (6-digit numbers). The addition of 1 to 9,99,999 follows the same pattern as the addition of 1 to 9999 and 99,999. They work with numbers from 10,00,000 to 9,99,99,999 now.

LEARNING AIDS

Data sheets using 7- and 8-digit numbers; exercise copies having squared sheets; 1s, 10s, 100s, 1000s, 10000s, 100000s and 1000000s tags; house-boards and number cut-outs.

LEARNING ACTIVITY (20 MIN)

By now the children are aware that numbers just don't stop at 9,99,999, so they are prepared to move on to bigger numbers. Thanks to T.V. and newspapers, children have already heard of such number names as ten lakhs, a million or a even a crore. Thus, they will not face much difficulty in grasping the formation of bigger numbers.

They need not be shown a pictorial formation of 9,99,999 blocks as that might become too cumbersome. They understand that one more than 9,99,999 would make 10,00,000. Thus, a new

house needs to be added to the house-board i.e. the Ten Lakh (TL) house. Children move on to 8-digit numbers quickly, where they add another house to the house-board, viz. the crore house (C).

The rules for placing commas in the bigger numbers are similar to the ones that the children have already learnt in the case of smaller numbers. Start from the right side of the number and place commas as per the rules followed till now.

Thus, the number 23468956 will be written as 2,34,68,956 in the Pakistani system and read as two crore, thirty-four lakh, sixty-eight thousand, nine hundred and fifty-six. In International system, it would be written as 23,468,956 and read as twenty-three million, four hundred and sixty-eight thousand, nine hundred and fifty-six.

ADDITIONAL WORK (10 MIN)

It would be useful to discuss some interesting situations where we may have to deal with big numbers in real life. For example,

a) Finding the number of words in a 200 page book with 37 lines per page and 8 words per line. On multiplication, we find that there would be $200 \times 37 \times 8 = 59{,}200$ words in the book.
b) Finding the number of minutes a 97 year old man has lived. On multiplication, we find the number of minutes to be $97 \times 365 \times 24 \times 60 = 5{,}09{,}83{,}200$
c) Finding the height of a certain mountain in inches! etc.

Addition and Subtraction (Pages 19–21)

OBJECTIVE

The children apply the methods of addition and subtraction, learnt earlier, to larger numbers.

LEARNING CURVE (10 MIN)

The children can already add and subtract numbers till 9,99,999. The results of the practical work and the written sums in this section expose them to numbers upto 9,99,99,999. Since it is basically an extension of the work done with 4-, 5- and 6-digit numbers, children do not take long to understand.

LEARNING AIDS

Charts with various mountain peaks in the Everest range, data about population of states and cities in Pakistan and abroad.

LEARNING ACTIVITY (20 MIN)

As mentioned in previous teacher's books, teaching of any number operation should be in the following order:

- Concrete objects
- Pictures only
- Pictures and numbers
- Numbers only

Once children are able to handle numbers, they move between vertical and horizontal calculations, to story sums (children love stories!) and then to word problems involving much larger numbers on the basis of the concepts learnt earlier.

Example:

Shakina has lived for 31536000 seconds till now and Tanya has lived for 31341200 seconds. Who has lived longer and by how many seconds?

	C	TL	L	T	Th	Th	H	T	U
	3	1	$^{4}\cancel{5}$	$^{1}3$	$^{5}\cancel{6}$		$^{1}0$	0	0
–	3	1	3	4	1		2	0	0
			1	9	4		8	0	0

With time and practice, the children realize that the answers of addition and subtraction sums can be checked by subtraction and addition respectively.

If, 6 – 4 = 2 then, 2 + 4 = 6; If 12 – 4 = 8, so 8 + 4 = 12

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

ADDITIONAL WORK (10 MIN)

Continuous additions and subtractions must be carried out, using fingers, house-boards, flannelograph, or anything else that is a part of children's everyday school life. Despite the advent of calculators, this activity remains an essential part of training logic and memory. More photocopied addition and subtraction pages are necessary for practice.

Rounding Off (Pages 22–25)

OBJECTIVE

Children understand that it is not always necessary to be very exact. Sometimes approximations are very useful.

LEARNING CURVE (10 MIN)

The children are familiar with the number line. The initial emphasis in teaching is always on getting accurate answers. That's why the stress till now was on exact answers. However, there are occasions when an approximation is good enough and serves the purpose on hand. The children are made to understand this by means of examples from daily life.

"How long did you stay at Bangkok?" asks Rehman.

"We stayed there for a week," replies Ahmed.

Even if Ahmed had stayed for 6 days or 8 days, then also the above answer is perfectly acceptable. Similarly, in such cases it is not important to give an answer like '6 days and 14 hours.' An approximation of 'a week' is adequate.

Rounding off, or approximation, is specially useful when adding, subtracting, multiplying, and dividing a group of numbers.

LEARNING AIDS

Number lines; statistics of heights of mountains, population of big cities, length of cross country roads, length of rivers from the foothills of mountains to sea.

LEARNING ACTIVITY (20 MIN)

If a jar of toffees contains 108 toffees, it can be said that the box contains 110 sweets (rounding it off to the nearest tens) or 100 sweets (rounding it off to the nearest 100). Similarly, suppose Rehman has 128 colour pencils. Since 128 is more than halfway between 120 and 130, rounding off upwards we say that Raman has 130 colour pencils. Using the same logic, we would round off 122 to 120. For 125 (exactly halfway) also, we round off to 130.

The children start by plotting number lines in tens, hundreds and in thousands and round off to the nearest hundred or the nearest thousand, as is necessary. With practice, children start rounding off numbers to the nearest five also which can come handy in measuring time, capacity, height, and weight. Large numbers like 1,756,941 can be rounded off as follows:

1.	To the nearest 10	1,756,940
2.	To the nearest 100	1,756,900
3.	To the nearest 1000	1,757,000
4.	To the nearest 10,000	1,760,000
5.	To the nearest 100,000	1,800,000
6.	To the nearest 1,000,000	2,000,000

CLASSROOM ORGANIZATION (10 MIN)

A big map of Pakistan can be displayed on the bulletin board showing the number of children studying in Government schools in each city. The children work group-wise/ individually and round off the numbers of each city to the nearest 10, 100, 1000, 10,000, 100,000 and 1,000,000. Similar data, like number of children in a state between the ages of 5 and 16, number of children in private schools and number of children not in schools can be provided to children for approximation.

Multiplication and Division (Pages 26–29)

OBJECTIVE

Children learn to multiply 4-digit numbers with 3-digit numbers and divide large numbers by 2 and 3-digit numbers, with remainders.

LEARNING CURVE (10 MIN)

The children are able to multiply with ease. They know how to multiply 4-digit numbers by 2-digit numbers. Here they multiply 4-digit numbers by 3-digit numbers using the same method. Although children are familiar with the long division method, a sound knowledge of multiplication and a great deal of practice with division of smaller numbers is absolutely essential to move on to dividing large numbers with 2- and then 3-digit numbers.

LEARNING AIDS

Some multiplication and division tricks from different books on mathematics.

LEARNING ACTIVITY (20 MIN)

Revision is the best way to start off a lesson, especially with multiplication and division, because the method is identical to the methods used for smaller numbers. Then children move on to multiplication and division of larger numbers.

Example: Divide 776,708 by 651

How many 651s in 776? 1

651 × 1 = 651

How many 651s in 1257? Guess=2

651 × 2 = 1302 ✗, answer 1

How many 651s in 6060?

Guess = 9

651 × 9 = 5859 ✓

How many 651s in 2018? Guess = 3

651 × 3 = 1953 ✓

```
        1193r65
651)776,708
   -651
    1257
   -651
     6060
   -5859
      2018
    -1953
        65r
```

Answer 1193 *r* 65 or 1193 $\frac{65}{651}$

Many more multiplication and division sums need to be worked out on the blackboard.

ADDITIONAL WORK (10 MIN)

After practicing multiplication and division extensively, children begin to recognize square roots, cube roots, multiples, factors and other properties of numbers quickly. This not only improves their speed in calculations, memory and logic, but also increases their interest in the subject.

The Unitary Method (Page 31)

OBJECTIVE

To introduce children to the beginnings of commercial maths.

LEARNING CURVE (10 MIN)

The children are familiar with the unitary method and know how to generate bills. Here, they generate bills of larger amounts using measurements of weight and capacity together in a bill.

LEARNING AIDS

Classroom shop ; shopping lists in the following format:

Popcorns : Rs 10 per packet

Flour : Rs 32 per kg

Butter : Rs 250 per kg

Orange Squash : Rs 69 per *l*

LEARNING ACTIVITY (30 MIN)

Students prepare bills based on the above shopping list for a number of problems given to them.

Example: For a house party, Meera buys 20 packets of popcorn ; 2.5 kg flour; 2.25 kg butter ; and 5.25 *l* of orange squash. Prepare a bill for her.

Quantity	Description	Cost per unit	Total cost
20 packets	Popcorn	Rs 10.00	Rs. 200.00
2.5 kg	Flour	Rs 32.00	Rs. 80.00
2.25 kg	Butter	Rs 250.00	Rs. 562.50
5.25 *l*	Orange Squash	Rs 69.00	Rs. 362.25
		Grand Total	Rs. 1204.75

ADDITIONAL WORK

A visit to a real shop, with some real purchasing, helps a great deal.

Simplification (Pages 32–37)

OBJECTIVE

Children learn to solve problems involving all four operations quickly and with accuracy.

LEARNING CURVE (10 MIN)

The children know how to use the four operations in isolation. Here they learn to solve problems invoving two or more of the four operations.

LEARNING AIDS

Basket game, Work cards

LEARNING ACTIVITY (20 MIN)

There is a definite order which must be followed to work out a string of operations like this:
$11 - 6 \div 2 \times 3 + 1$

Solution 1	
1. Subtract first:	$11 - 6 = 5$
2. Next divide:	$5 \div 2 = 2\frac{1}{2}$
3. Multiply:	$2\frac{1}{2} \times 3 = 7\frac{1}{2}$
4. Lastly, add:	$7\frac{1}{2} + 1 = 8\frac{1}{2}$
	Answer: $8\frac{1}{2}$

Solution 2	
1. Add first:	$3 + 1 = 4$
2. Multiply next:	$4 \times 2 = 8$
3. Divide:	$6 \div 8 = \frac{3}{4}$
4. Lastly, subtract:	$11 - \frac{3}{4} = 10\frac{1}{4}$
	Answer: $10\frac{1}{4}$

Solution 3	
1. Divide first:	$6 \div 2 = 3$
2. Multiply next:	$3 \times 3 = 9$
3. Add:	$9 + 1 = 10$
4. Lastly, subtract:	$11 - 10 = 1$
	Answer: 1

It is obvious that a string of operations gives different answers if the order is different. The rule for solving such a sum is:

÷ Division first; × Multiplication second; + Addition third; – Subtraction last.

DMAS for short!

A simple mnemonic can be made to remember this rule like 'Do Musicians Always Sing?' Or 'Dancing Maidens Always Swing?' It is also important to highlight the significance of brackets.

Example: Rana had 4 bags with 2 marbles in each. Her brother Aslam comes along and adds one marble in each bag. How many marbles does she have altogether now?

Rana has $4 \times 2 = 8$ marbles.

Aslam adds one marble in each bag:

$4 \times (2 + 1) = 4 \times 3 = 12$ marbles altogether.

If this problem would have been written as $4 \times 2 + 1$, using DMAS, the answer would have been $4 \times 2 + 1 = 9$, which is wrong because on counting we find the total number of marbles to be 12. Thus, the brackets indicate which operation is to be performed first. They group numbers together and are, therefore, also called *grouping symbols*.

ADDITIONAL WORK (10 MIN)

Problems such as the following may be given to the children to solve:

Insert brackets to make the equation correct:

a) $4 \times 4 \div 4 + 4 + 4 \div 4 = 6$
$= (4 \times 4) \div 4 + (4 + 4) \div 4$
$= 16 \div 4 + 8 \div 4$
$= 4 + 2 = 6$

b) $7 - 7 - 7 - 7 \div 7 + 7 + 7 = 6$
$= 7 - (7 + 7 + 7) \div (7 + 7 + 7)$
$= 7 - \frac{21}{21} = 7 - 1 = 6$

Area (Pages 38–44)

OBJECTIVE

Children learn to calculate the area of composite shapes, parallelograms, and triangles.

LEARNING CURVE (10 MIN)

In Class 3, children have calculated perimeters of triangles and rectangles and in Class 4, they calculated areas and perimeters of some simple shapes. Here, they move on to calculate areas of composite shapes using formulas.

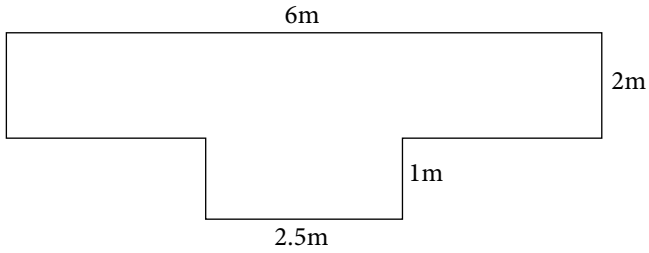
LEARNING AIDS

Measuring tape, exercise copies with squared sheets, chart with composite shapes drawn on a squared paper, various sizes of squares, with sides 1 cm, 2 cm, or 5 cm.

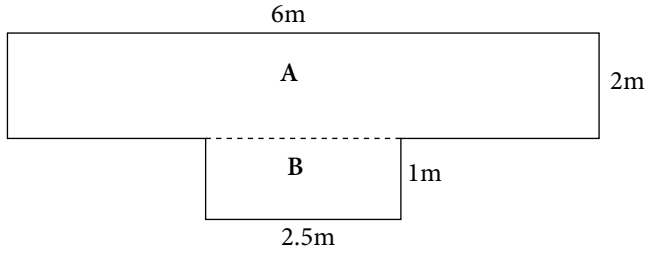
LEARNING ACTIVITY (20 MIN)

The children begin by recapitulating the work done in Class 4 by calculating area and perimeter of simple shapes. Then, they are shown samples of different floor plans of rooms or an entire flat. They realize that most of the shapes are composite rather than simple rectangles and squares.

Example: Find the area of a long verandah that has a small open terrace in the middle as shown below:



This plan can be divided into two rectangles A and B as shown below:

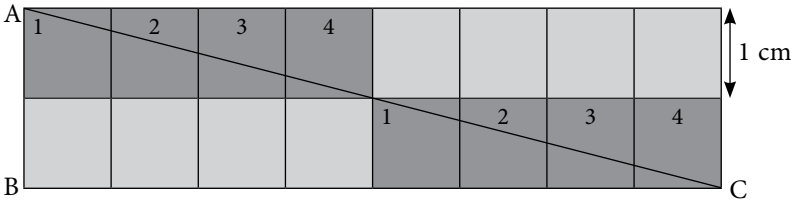


Area of A = 6m × 2m = 12 m^2 and Area of B = 2.5m × 1m = 2.5 m^2

Total area of the figure = 12 m^2 + 2.5 m^2 = 14.5 m^2

In a similar manner, children break other composite shapes to simple shapes and calculate the total area of the figure.

AREA OF A TRIANGLE:



In the above figure, the height of the triangle is 2 cm and its length is 8 cm. The area of the triangle ABC can be calculated in either of the following two ways:

a) One can add the number of squares and parts of squares, covered by the triangle. This is not very accurate and is cumbersome.

b) A look at the rectangle reveals that it is made up of two rows of equal squares. Each of the shaded squares is divided into 2 unequal parts. But, each such part in one part of the triangle has its complement in the other part of the triangle.

Thus, the area of triangle ABC is equal to half the area of the rectangle i.e. area of triangle ABC = $(8 \times 2) \div 2 = 8$ cm^2

Children know how to calculate the area of right-angled triangles. To calculate the area of obtuse-angled and acute-angled triangles they simply divide the obtuse-angled or acute-angled triangle in such a way that they get two right-angled triangles, as explained on page 47 of the textbook.

AREA OF A PARALLELOGRAM:

The area of a parallelogram is equal to the area of a rectangle constructed on the same base. The illustration below shows this.

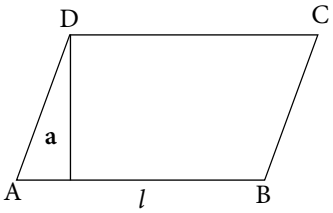


Fig. 1

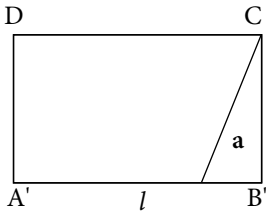


Fig. 2

Triangle '**a**' has been cut out from its place in the parallelogram in Figure 1 and fitted onto the right side of the parallelogram as shown in Figure 2. When seen this way, it can be straight away concluded that:

Area of parallelogram ABCD = Area of rectangle A' B' CD = $l \times b$

ADDITIONAL WORK (10 MIN)

The children measure the area of the floor of their classroom. They can also be asked to prepare a floor plan of their house with approximate measurements. Their floor plan is then displayed on the bulletin board. Children go up to the board, choose a plan other than their own and calculate the total area and perimeter of their friend's floor plan.

Volume (Pages 45–50)

OBJECTIVE

Children are introduced to the term 'volume' and learn how to find space occupied by an object.

LEARNING CURVE (10 MIN)

The children have seen that by finding the floor area of a cupboard, they would simply be finding the measurement of the floor it covers and it will give them no idea of the space within the cupboard that they can use. Here, they are introduced to the term 'volume', which measures the amount of space occupied by an object.

LEARNING AIDS

Concrete items of different sizes, Exercise copy with squared sheets, building blocks, squares with side 1 cm, 2 cm, or 5 cm.

LEARNING ACTIVITY (20 MIN)

The children begin by comparing objects of different sizes like lunch boxes, fish bowls, buckets etc. They gauge which object will occupy more space (or has greater volume) and make a table comparing their guesses with the actual volume (measured by the number of glassfuls of water it can accommodate.)

Next, the teacher constructs models using blocks of similar size to help children gauge which occupies more space or has greater volume.

Concrete examples are always better to teach a concept. The diagram given on page 50 of the textbook makes the children understand the concept of volume easily. They understand that it takes three layers of nine cubes (with each edge 1 cm long) or 27 cubes to cover Sid's hand-made cube completely. The volume of his big cube is thus 27 small cubes.

A Rubik's cube is helpful to demonstrate the calculation of volume. It takes 27 cubes to make a complete Rubik's cube. With more concrete and pictorial examples, children see that in order to calculate the volume of a cuboid, they have to find the number of cubes in each layer ($l \times b$) and multiply it with the number of layers (or the height of the cuboid; h).

Therefore, the formula used for calculating volume of a cube or a cuboid is
$V = (l \times b) \times h$ units^3

In everyday life, containers are used to fill in liquid. The experiment illustrated on page 54 of the textbook shows that 1000 cm^3 = 1 litre = 1000 m*l*. Thus, 1 cm^3 = 1m*l*.

So, if the volume of a cuboid is 90 cm^3, it can hold 90 m*l* of liquid.

ADDITIONAL WORK (10 MIN)

Talk about the water found on the moon by NASA recently. Talk about the large quantities of water-ice and water vapour. The volume has been compared to a dozen, two-gallon, buckets of water.

PART TWO

Multiples and Factors (Pages 52–56)

OBJECTIVE

Children get familiar with 6 more tests of divisibility.

LEARNING CURVE (10 MIN)

The children already know the tests of divisibility for 2, 3, 5, and 9. Here, they learn the tests for identifying multiples of numbers 10, 4, 6, 8, 15, and 12.

LEARNING AIDS

Counters, charts containing lists of multiples of 4, 6, 8, 10, 12, and 15.

LEARNING ACTIVITY (20 MIN)

Test of divisibility by 10 : Its easy for children to learn this test.

Display a chart showing a list of multiples of 10:

10, 20, 30, 40, 50, ….100, 110, 120, 130 …. 500, 510, 520 …

Explain that any number having 0 in the Units column is divisible by 10 e.g. 630,40,1090. This test can easily be extended to test divisibility by 100,1000 and so on. A list containing multiples of 100 can be created as shown below:

Multiples of 100: 100, 200, 300, 400, 500, 600 …..10,000

Thus, any number with 0s in T and U columns is a multiple of 100. Similarly, any number with 0s in H, T and U columns is a multiple of 1000. A few multiplications on the board show how the number shifts to the left by as many places as 0s in the multiplier:

TTh	Th	H	T	U
	5	0	7	9
	×		1	0
0	0	0	0	0
5	0	7	9	x
5	0	7	9	0

Once this principle of shifting of the number to the left by as many places as there are 0s in the multiplier is understood, the entire multiplication is done instantly by merely adding the required number of 0s at the end of the given number.

Test of divisibility by 4: ALL multiples of 100 are divisible by 4. e.g. 100 ÷ 4 = 25; 300 ÷ 4 = 75 and so on. Thus, if any number added to such numbers is also divisible by 4, the whole of the new number so formed is divisible by 4. Hence, we conclude that:

Any number in which the number formed by the digits in T and U columns is divisible by 4, is itself also divisible by 4 e.g. in 784, 700 is divisible by 4 as well as 84 is divisible by 4 so, 784 is also divisible by 4. Now, verify this rule on more numbers such as 208, 916, 1040, and 1312.

Other tests of divisibility, as discussed in the textbook, also need to be explained in detail with lots of examples.

ADDITIONAL WORK (10 MIN)

An introductory lesson may be conducted with small numbers and counters. Any number of counters that can be grouped in smaller sets (without leaving a remainder) is a factor of the larger number. For example, 15 counters can be arranged in either of the following ways:

1	○○○ ○○○ ○○○ ○○○ ○○○	1 $5 \times 3 = 15$
2	○○○○○ ○○○○○ ○○○○○	2 $3 \times 5 = 15$
3	○○○○○○○○○○○○○○○	3 $1 \times 15 = 15$
4	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	4 $15 \times 1 = 15$

Children 'see' how the numbers 3 and 5, as also 1 and 15, are factors of 15. Several similar examples will serve to make the concept clearer.

LCM and HCF (Pages 57–63)

OBJECTIVE

Children learn to find HCF and LCM of larger numbers using the prime factorization method and the long division method.

LEARNING CURVE (10 MIN)

Children know how to calculate LCM and HCF. They are familiar with prime numbers, co-prime numbers, composite numbers, factors, and prime factors. Here, they learn to find HCF and LCM of larger numbers.

LEARNING AIDS

Counters, exercise copies with squared sheets, number lines for marking multiples and factors.

LEARNING ACTIVITY (20 MIN)

Children begin the lesson by a recapitulation exercise of the topics covered in class 4. An oral revision of tables upto 13 would help. They break down composite numbers into prime factors using simple division and find HCF and LCM using the method learnt in previous class.

However, to find the HCF of 4-digit (or larger) numbers, the 'long division' method is preferred. The following example depicts this method.

Example: Find HCF of 2272 and 1278.

Step 1: Taking the bigger number as dividend and the smaller number as divisor, division is carried out:

$$\begin{array}{r} 1 \\ 1278\overline{)\,2272} \\ \underline{1278} \\ 994 = r \end{array}$$

Step 2: The remainder obtained in the previous step becomes the new divisor and the old divisor becomes the new dividend and again division is carried out.

$$\begin{array}{r} 1 \\ 994\overline{)\,1278} \\ \underline{994} \\ 284 = r \end{array}$$

Step 3: Step 2 is repeated. Thus, division is carried out with 284 as the divisor and 994 as the dividend.

$$\begin{array}{r} 3 \\ 284\overline{)\,994} \\ \underline{852} \\ 142 = r \end{array}$$

Step 4: Step 2 is repeated till we have no remainder left.

$$\begin{array}{r} 2 \\ 142\overline{)\,284} \\ \underline{284} \\ 0 = r \end{array}$$

The last divisor in this series of divisions is the HCF of the given numbers. Hence, HCF of 2272 and 1278 is 142.

ADDITIONAL WORK (10 MIN)

Work sheets are the best way to ensure that the concept has been well understood. A chart depicting venn diagrams of factors of different pairs of numbers (see page 66 of text book) can form an interesting aid to teach this concept. Children find HCF and LCM of each pair of numbers.

Fractions (Pages 65–82)

OBJECTIVE

Revision of concepts learnt in Class 4 and moving on to other operations on fractions such as multiplication, division, and simplification of a string of fractions.

LEARNING CURVE (10 MIN)

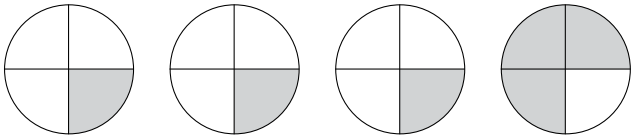
Children already know how to add and subtract like, unlike, and mixed fractions. Here, they learn to multiply, divide, and simplify fractions.

LEARNING AIDS

10 strips of paper folded in $\frac{1}{2}$s, $\frac{1}{3}$s, $\frac{1}{4}$s and so on, Fraction stories.

LEARNING ACTIVITY (20 MIN)

Multiplication of a fraction by a whole number : Children are aware that multiplication is repeated addition. Here they begin with a concrete example again. Raju goes to a super market thrice and picks up $\frac{1}{4}$th pizza each time. How much pizza does he have at the end?



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

OR

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

So, 'three times a quarter is three-quarters'. Thus, for multiplying a fraction with a whole number, we first convert the whole number into a fraction ($3 = \frac{3}{1}$), and then multiply the numerator with the numerator and the denominator with the denominator of the two fractions. Eventually, however, the step involving the conversion of a whole number into a fraction with denominator 1 is omitted. Remember to give the final answer in lowest terms.

Example: $5 \times \frac{1}{4} = \frac{5 \times 1}{4} = 1\frac{1}{4}$.

Multiplication of a fraction by a fraction : The teacher folds a piece of silver paper into two halves vertically, as shown. Each half is now folded into quarters. So, how big is $\frac{1}{4}$ of $\frac{1}{2}$?

$\frac{1}{2}$ $\frac{1}{4}$ of $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{2}$ of $\frac{1}{4}$

This example helps the children understand that the product $\frac{1}{4} \times \frac{1}{2}$ is same as $\frac{1}{2} \times \frac{1}{4}$ just the way 4×3 is equivalent to 3×4.

Now, they work with the expressions $\frac{3}{4}$ of $\frac{1}{2}$ and $\frac{1}{2}$ of $\frac{3}{4}$

(a) $\frac{3}{4}$ of $\frac{1}{2}$
$= \frac{3}{4} \times \frac{1}{2}$

(b) $\frac{1}{2}$ of $\frac{3}{4}$
$= \frac{1}{2} \times \frac{3}{4}$

OXFORD UNIVERSITY PRESS

$\frac{1}{2}$ $\frac{3}{4}$ of $\frac{1}{2}$ $\frac{3}{4}$ $\frac{1}{2}$ of $\frac{3}{4}$

After solving many such sums they will notice that they can find the answer to such questions by simply multiplying the numerator with numerator and the denominator with denominator of the two fractions. In the case above, $\frac{3}{4} \times \frac{1}{2} = \frac{3 \times 1}{4 \times 2} = \frac{3}{8}$

It is important to remember here that the answer must always to be reduced to the lowest terms.

Example: $\frac{7}{10} \times \frac{2}{3} = \frac{7 \times 2}{10 \times 3} = \frac{14^{\div 2}}{30^{\div 2}} = \frac{7}{15}$

The fraction $\frac{7}{15}$ is in its lowest term.

Multiplication of 3 fractions: Earlier in the book, in Part One, children learnt how to solve a sum with multiple operations. They know that if they see brackets in a sum, these are to be solved first. This rule applies in the case of fractions also. Further, as in the case of whole numbers, when three fractions are multiplied, the final answer does not depend upon the order in which they are multiplied.

Example: Simplify $\frac{1}{2} \times \frac{1}{4} \times \frac{1}{3}$

$= \left(\frac{1}{2} \times \frac{1}{2}\right) \times \frac{1}{3} = \frac{1}{8} \times \frac{1}{3} = \frac{1}{24}$

$= \frac{1}{2} \times \left(\frac{1}{4} \times \frac{1}{3}\right) = \frac{1}{2} \times \frac{1}{12} = \frac{1}{24}$

$= \left(\frac{1}{2} \times \frac{1}{3}\right) \times \frac{1}{4} = \frac{1}{6} \times \frac{1}{4} = \frac{1}{24}$

Multiplication of mixed numbers : Children learnt in Class 4 the method of converting a mixed fraction into an improper fraction first and then adding or subtracting them.

While multiplying also, remember to convert the mixed fractions into improper fractions first and then continue to multiply like regular fractions. Look out for common factors in the numerator and denominator and then reduce the fractions to the lowest terms, as far as possible.

Example: Multiply $5\frac{1}{4} \times 3\frac{1}{3}$

$= \frac{\cancel{21}^{\div 3} \times 10}{4 \times \cancel{3}^{\div 3}}$

$= \frac{7 \times \cancel{10}^{\div 2}}{\cancel{4}^{\div 2} \times 1} = \frac{7 \times 5}{2 \times 1}$

$= \frac{35}{2} = 17\frac{1}{2}$

Remember to convert the improper fraction into a mixed number.

Division of a whole number by a fraction : Children are aware that multiplication is repeated addition and division is repeated subtraction. To help them grasp the concept of division better, the vocabulary used by the teacher should to be simple and clear e.g. to demonstrate $2 \div \frac{1}{2}$, the teacher can ask the following questions:

How many $\frac{1}{2}$ s make 2 wholes?

Or

How many people can share 2 pizzas, if each must get $\frac{1}{2}$ a pizza?

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

After solving many such sums, children notice that $2 \div \frac{1}{2} = 4 = \frac{2}{1} \times \frac{2}{1}$. Thus, a sum involving division of a whole number by a fraction can be solved by first converting the whole number into a fraction and then multiplying it by the inverse of the given fraction.

Reciprocals: When the product of 2 numbers is 1, the two numbers are said to be reciprocals of each other. Reciprocal is the inverse of a number.

Examples:

1. Reciprocal of $\frac{1}{2}$ is 2 because $\frac{1}{2} \times 2 = 1$
2. Reciprocal of $\frac{3}{5} = \frac{5}{3}$ because $\frac{3}{5} \times \frac{5}{3} = 1$

Reciprocals of mixed numbers are found by first converting them into improper fractions e.g reciprocal of $1\frac{1}{2}$ can be found by first writing it as an improper fraction viz $\frac{3}{2}$ and then writing its inverse i.e. $\frac{2}{3}$. Thus, $1\frac{1}{2}$ and $\frac{2}{3}$ are reciprocals of each other. Remember,

division by a fraction is the same as multiplication by its reciprocal.

Division of a fraction by a fraction : To divide a fractional number by a fractional number, we use the same rule. i.e division by a fraction is equivalent to multiplication by its reciprocal.

Example: $\frac{1}{2} \div \frac{1}{3} = \frac{1}{2} \times \frac{3}{1}$

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

Dividing mixed numbers : To divide a mixed fraction by a mixed fraction, the following steps are followed:

1. Convert the mixed fractions into improper fractions
2. Use the 'division by a fraction rule' discussed above
3. Reduce the resulting fraction to its lowest terms

Example: $5\frac{1}{2} \div 3\frac{1}{4}$

$= \frac{11}{2} \div \frac{13}{4} = \frac{11}{2^{+2}} \times \frac{4^{+2}}{13}$

$= \frac{11 \times 2}{1 \times 13} = \frac{22}{13} = 1\frac{9}{13}$

ADDITIONAL WORK (10 MIN)

Additional activity sheets prepared by the teacher are always useful. Simple questions such as these help:

1. Which is greater: $\frac{1}{2}$ of $\frac{1}{3}$ *Or* $\frac{1}{3}$ of $\frac{1}{2}$?
2. How many $\frac{1}{2}$s of $\frac{1}{2}$ pizzas will you get out of 1 pizza?
3. Can you take away $\frac{13}{27}$ from $\frac{17}{33}$?

   (Decide on the basis of the fact that $\frac{13}{27} < \frac{1}{2}$ and $\frac{17}{33} > \frac{1}{2}$)

4. Ramla takes 2 toffees from a box and gives 3 times as many to her friends. The box is still half full. How many toffees were there in the box?

Decimals (Pages 84–97)

Objective

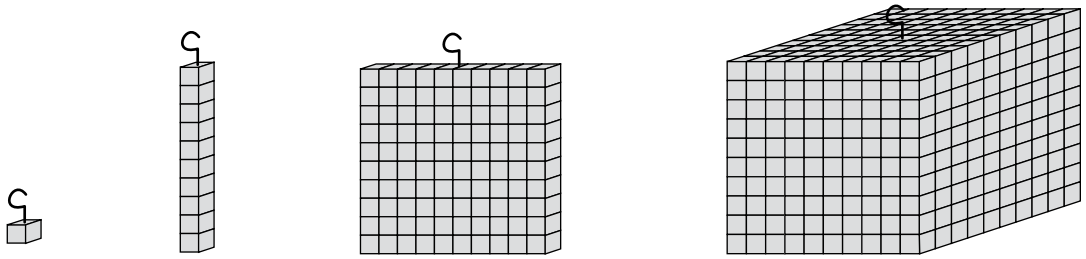
Children learn how to multiply and divide a decimal fraction by 10 and its multiples, and subsequently how to multiply and divide it with a decimal fraction. (A number with a decimal point may be referred to as a 'decimal fraction'.)

LEARNING CURVE (10 MIN)

In class 4, children have studied about decimal places: tenths, hundredths and thousandths. They also know how to add and subtract decimal fractions. Here they learn how to multiply and divide a decimal fraction by 10, its multiples, and other decimal fractions. They also learn how to change common fractions into decimal fractions.

LEARNING AIDS

An exercise book with squared sheets, small cubes, rods of 10 cubes, slabs of 100 cubes, big cubes made of 1000 small cubes, rods of 10 big cubes, with hooks on one end to hang them from.



LEARNING ACTIVITY (20 MIN)

The children begin with a quick revision of the work they did in Class 4. This includes

a) converting common fractions into decimal fractions and vice versa

b) comparing decimal fractions

c) addition and subtraction of decimal fractions working up to the thousandth place.

It is important to keep in mind that whenever you multiply or divide by a whole number, you count from the extreme right of the decimal fraction the number of places after which the decimal point is placed in the multiplicand or dividend. And then mark it exactly in the same place in the product and quotient respectively, as illustrated on page 88 of the textbook.

Multiplying decimal fractions by 10 and its multiples: Children know that when they multiply a whole number by 10, 100, or 1000, the number jumps one, two, or three column(s) to the left respectively. A decimal fraction also moves in the same direction, corresponding to the number of zeroes in the multiplicand.

Example:

$2.4 \times 10 = 2\frac{4}{10} \times 10 = \frac{24}{10} \times \frac{10}{1} = 24$

$2.4 \times 100 = 2\frac{4}{10} \times 100 = \frac{24}{10} \times 100 = 240$

Another way of working out such problems is to count the number of zeros in the multiplier and then shift the multiplicand same numbers of zeros to the left or, alternatively , shift the decimal point same number of places to the right. No need to actually multiply.

H	T	U	t	h	th		Th	H	T	U	t	h	th
		2	4	0	0	× 10 =			2	4	0	0	0
		2	4	0	0	× 100 =		2	4	0	0	0	0
		2	4	0	0	× 1000 =	2	4	0	0	0	0	0

Dividing decimal fractions by 10 and its multiples : When a number is divided by 10, its value decreases whether it is a whole number or a decimal number.

$24.3 \div 10 = \frac{24.3}{10} = 2.43$

Note that the number 4 shifts one place to the right vis-à-vis the decimal when divided by 10 (or, equivalently, the decimal point shifts to the left by one place.)

Similarly, $24.3 \div 100 = \frac{24.3}{100} = 0.243$

In this case, the number 4 shifts 2 places to the right on being divided by 100 i.e. the decimal point shifts to the left by two places. This concept can be confusing sometimes to the children and needs to be grasped well. The table like the one shown above can be prepared in the case of division as also.

Remember: Multiplication gives a bigger number as the answer while division gives a smaller number as the answer. So, move your decimal point accordingly.

Multiplying a decimal fraction by a decimal fraction: In order to multiply two numbers with decimals, it is easy to change the numbers into common fractions and then multiply them.

Example: Solve 3.3×2.3

$= \frac{33}{10} \times \frac{23}{10} = \frac{759}{100} = 7.59$

Dividing a decimal fraction by a decimal fraction: In order to divide two numbers with decimals, it is easy to first change the numbers into common fractions and continue dividing as would be done in case of fractions.

Example: $6.9 \div 2.3$

$= \frac{69}{10} \div \frac{23}{10} = \frac{69}{\cancel{10}} \times \frac{\cancel{10}}{23} = \frac{69}{23} = 3$

Soon, children realize that the same number of decimal places in the numerator and denominator means that the 'decimal points' can be ignored. In other cases, we multiply the dividend and the divisor with 10s or 100s, as need be, to change them into whole numbers and then proceed to divide them as usual.

Example:

- $\frac{19.6}{9.8} = \frac{196}{98} = 2$
- $\frac{1.25}{0.5} = \frac{125}{050} = \frac{5}{2} = 2.5$

ADDITIONAL WORK (10 MIN)

Additional activity sheets prepared by the teacher are always useful.

To get greater familiarity with decimal fractions, teacher encourages children to use decimal fractions in their conversations. She may herself give them instructions as follows:

- "0.5 of your class stays for craft and the balance goes to theatre practice"
- "Each of you who know the answer, put 0.2 of your fingers up." (Can mean 2 out of ten or 1 out of 5 fingers).

Children follow suit by statements like

- "Ma'am, may I go out to play for 0.25 of an hour (keeping in mind that 0.25 of an hour is 15 minutes).
- "I got only 0.1 of my homework wrong." (1 out of 10 sums wrong).

PART THREE

Rounding off (Pages 99–103)

OBJECTIVE

Children learn to round off decimal fractions.

LEARNING CURVE (10 MIN)

The children understand that rounding off is useful to add, subtract and get answers when they do not need to be very accurate. They know how to round off whole numbers. Here they learn how to round off decimals.

LEARNING AIDS

Number line, Measuring tape

LEARNING ACTIVITY (20 MIN)

The children start off by rounding off in real life measures to the nearest tens, hundreds and thousands.

	My guess	Rounded off	Actual no.	Rounded off
Flowers in a vase	12	10 (Rounded off to the nearest 5)	16	15
Animals in a zoo	340	300 (Rounded off to the nearest 100)	280	300
Weight of a car	420 kg	400 kg (Rounded off to the nearest 100 kg)	460 kg	500 kg

Plot these figures on different number lines using different scales and discuss the concept with the students. Similarly, the children proceed by plotting number lines having divisions in decimal fractions and start rounding off numbers till one decimal place i.e. the nearest tenth and then till 2 decimal places i.e. the nearest hundredth.

Example: 5.77 can be rounded off to 5.8 when rounding off to the nearest tenth.

Always keep in mind that halfway numbers are to be rounded upwards.

The numbers with decimals can also be rounded off to the nearest whole number with the help of the number line.

Example: Meena observes that the time taken by her to cover 4 laps around the field in her school is 1.172 hours. Rewrite the time taken by her by rounding off to two decimal places.

Since all halfway numbers and above are rounded upwards, the numbers ending with 5, 6, 7, 8, and 9 in the thousandths column are rounded upwards (as in the case of whole numbers). And numbers less than 5 in the thousandths column are rounded downwards. Thus, 1.172 will be rounded downwards to 1.17

At times, while dividing, we notice that some quotients have an unending string of numbers after the decimal point. In such cases too, the method given above is followed. For example,

	3.3333333… can be rounded off to	0.16346… can be rounded off to
3 decimal places	3.333	0.160
2 decimal places	3.33	0.16
1 decimal place	3.3	0.2

ADDITIONAL WORK (10 MIN)

Till a few decades ago, fractions were used for all measurements including money. The use of 'decimal fractions' was limited. Nowadays, however, it is used in all measurements, except that of time and the computer language. So, decimals have become an important part of our everyday life and are considered merely an extension of the Number System.

Percentages (Pages 104–118)

OBJECTIVE

To enable children to understand that a percentage is a special form of a fraction and to help them use % in their daily lives with equal ease as fractions or decimal fractions.

LEARNING CURVE (10 MIN)

The children are familiar with fractions. They know how to convert a decimal number into a fraction and vice versa. Here they learn how to convert fractions and decimal fractions into percentages and use percentages when necessary.

LEARNING AIDS

Grids with 100 squares (10 × 10), small smooth pebbles or marbles.

LEARNING ACTIVITY (20 MIN)

The teacher can start the lesson by distributing edible Gems (equal amount to each group) and 100-square grids among groups of children. The children in each group first segregate the Gems according to their individual colour preferences and then fill up each small square on the grid with a Gem.

Once this is done, they write down the number of squares occupied by each colour as a fraction by preparing a table in the format shown below. Since any fraction with denominator 100 can be expressed as a percentage, all these fractions can be easily expressed as a percentage.

	Fraction	Decimal Fraction	Percentage
Red: 15 out of 100	$\frac{15}{100}$	0.15	15%
Yellow: 20 out of 100	$\frac{20}{100}$	0.20	20%
Blue: 17 out of 100	$\frac{17}{100}$	0.17	17%
Pink: 35 out of 100	$\frac{35}{100}$	0.35	35%
White: 13 out of 100	$\frac{13}{100}$	0.13	13%

Percentages find use while comparing unlike fractions. These fractions are converted into equivalent fractions having 100 as their denominator.

Example: Write these fractions in descending order: $\frac{4}{5}, \frac{7}{10}, \frac{12}{50}, \frac{3}{20}$

$\frac{4^{\times 20}}{5^{\times 20}} = \frac{80}{100} = 80\%$

$\frac{7^{\times 10}}{10^{\times 10}} = \frac{70}{100} = 70\%$

$\frac{12^{\times 2}}{50^{\times 2}} = \frac{24}{100} = 24\%$

$\frac{3^{\times 5}}{20^{\times 5}} = \frac{15}{100} = 15\%$

Since $\frac{80}{100} > \frac{70}{100} > \frac{24}{100} > \frac{15}{100}$

$\therefore \frac{4}{5}, > \frac{7}{10}, > \frac{12}{50}, > \frac{3}{20}$

Practical application : Children have had their first experience with percentage at stores when the discounts are on! A classroom shop can be set up with tags showing discount on different items. A discount is a special reduction on the price e.g. A toy car costing Rs 300 is being sold at a discount of 10% . The amount of the discount is worked out as follows:

Discount: 10% of 300 $= \frac{10}{100} \times$ Rs 300

$= \text{Rs } \frac{3000}{100} = \text{Rs } 30$

So, the price of the toy is reduced by Rs 30.

Therefore, reduced price = Rs 300 – Rs 30 = Rs 270

With practice and story sums, children realize that percentage makes it easier to compare data. That is why it is so widely used.

Profit and Loss: The children first need to know the vocabulary associated with the calculation of profit and loss. For this, a visit to a small store of any kind is very informative. Children find out that the shopkeeper needs to keep money for his personal use, to pay rent, electricity and telephone bills, to pay salaries to his assistants and to meet other miscellaneous expenses.

Therefore, a 'mark up' on the price that he paid for the goods becomes necessary for him to survive. If they visit a few different stores, they find that the 'mark up' has to be different in different stores because the expenses are different. Here, they may be introduced to the following terms associated with this topic:

Cost price / CP: The price that the shopkeeper pays for buying an item

Selling price / SP: The price at which the item is sold.

Mark up: The extra money over and above the C.P. charged by the shopkeeper.

It is essential to understand that a mark up is not 'profit'. After the extra money the shopkeeper receives at the end of the month, he needs to pay for the overheads such as salaries, rent and other bills. But, for this age group, all overheads are shown in the problems as a part of the C.P only. Thus,

SP > CP implies a profit. Profit *or* Gain = SP – CP, and

CP > SP implies a loss. Loss = CP – SP

Example: Henna buys a bangle for Rs 10 and sells it for Rs 15. Calculate her profit.

Given that CP = Rs 10 and SP = Rs 15

Thus, Profit = SP – CP = Rs 15 – Rs10 = Rs 5

Profit % = $\frac{\text{Rs } 5}{\text{Rs } 10} \times 100\%$

= $\frac{\cancel{5}^{1}}{\cancel{10}_{2}} \times 100\%$

= $\frac{100}{2} = 50\%$

Remember that Profit % = $\frac{\text{Profit}}{\text{Cost price}} \times 100$

Profit percentage is often used to compare profits on different items having different cost prices. This makes comparison very simple. Similarly, we can use percentage to compare deals in which a loss is incurred.

***Simple Interest* :** A mock bank set up in the classroom with paper money makes the concept of simple interest much more meaningful to children. With the help of the teacher, they learn new concepts and the vocabulary associated with simple interest. The main terms associated with this topic are explained below:

Principal: The money which a person deposits at a bank.

Interest: The extra money he/she gets from the bank for keeping this money there.

Amount: The total money that the person will get back at the end of the period for which it was kept. Thus, Amount = Principal + Interest

To calculate the interest, the following factors are taken into consideration:

1. The size of the principal (P)
2. The rate of interest (R)
3. The period of deposit i.e. time (T)

All these factors are combined in the following formula to calculate interest:

Interest = $\frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

ADDITIONAL WORK (10 MIN)

The classroom may be set up as a shop and the children calculate the price of any product after a discount. The classroom can also be set up as a bank where the children deposit money. One group deposits the money while another calculates its interest and returns the final amount using play money.

Angles (Pages 120–122)

OBJECTIVE

Children learn the significance of 360°. They also learn the meaning of a reflex angle and how to measure it.

LEARNING CURVE (10 MIN)

Children know how to measure acute angles, right angles, and obtuse angles using a half-circle protractor. Here, they learn how to draw reflex angles, using a half-circle and a circular protractor.

LEARNING AIDS

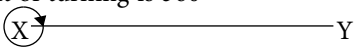
Half-circle protractor, possibly wooden and of a large size ; a large circular protractor.

LEARNING ACTIVITY (20 MIN)

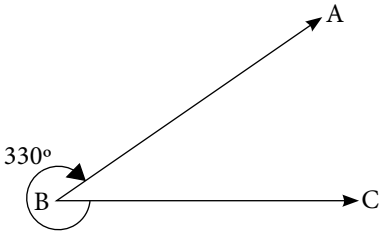
The teacher starts with a quick run through the work done in class 4, before moving on to measuring and constructing angles using a protractor. Working on the blackboard with a large wooden protractor is useful.

Children know that

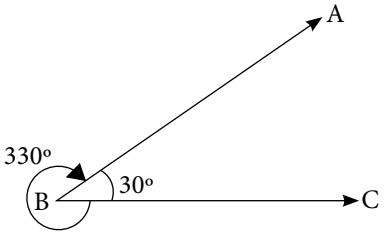
- when a line XY turns a full circle at point X (below) before returning to its original position, the measure of degrees at the point of turning is 360°



- a reflex angle > 180°. Reflex angles can be drawn in two ways. Look at the following figures:



(1)



(2)

1) Simply centre your *circular protractor* on the point B along the line segment BC and mark the reflex angle, ∠ABC = 330°.

OR

2) Use a half-circle protractor and draw the acute angle, ∠ABC = 30° that you get when you subtract 330 from 360° (the reflex angle, to he drawn).

ADDITIONAL WORK (10 MIN)

Working in groups is fun. One group constructs the obtuse/acute angles given to them while the other group measures the corresponding reflex angles. Similarly, the children can be shown that the opening of a shut door forms an acute angle (or a right-angle) but the angle on the 'other side' of these angles is an obtuse angle. It would also be a good idea to do a quick recap of clockwise and anticlockwise movements. The direction in which doors, taps or screws open and close may be discussed.

CLASSROOM ORGANIZATION

Children can work on an assignment where they draw a floor-map of their classroom and highlight the different areas where the angles (acute, obtuse, right, and reflex) are formed. Also, a chart showing different reflex angles can be put up in the class room. Children may be asked to study these angles and make a table as the one shown:

S. No.	Angle	My guess	Actual measure	% deviation
1.	∠ ABC	200°	250°	$\frac{50}{200} \times 100 = 25\%$
2.	∠ PQR	300°	280°	$\frac{50}{200} \times 100 = 6.6\%$
3.	∠ LMN			
4.	∠ XYZ			

The child having the minimum deviation percent is the winner.

Circles (Pages 123–127)

OBJECTIVE

Children follow earlier experiences and draw circles. They also learn new terms associated with circles.

LEARNING CURVE (10 MIN)

The children know what circles look like and that one complete circular turn measures 360°. They are introduced to the instrument 'compass' and many new terms such as a radius, an arc, a diameter, a quadrant, circumference and a chord.

LEARNING AIDS

A stake and a rope for a circle in the backyard, a protractor, a compass, a ruler and a pencil.

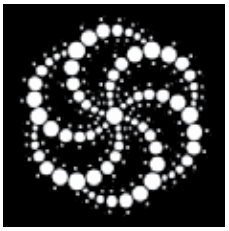
LEARNING ACTIVITY (20 MIN)

Children begin by learning about the instrument 'compass' and new terms associated with a circle. Pages 128-130 of the textbook give a pictorial and detailed explanation of each of these terms.

The children may be asked to measure the radius and the diameter of a circle given to each of them. They understand that the radius is half of the diameter and the diameter is double the radius. A craft-based activity as mentioned on page 126 serves as a good introduction to the geometry compass.

ADDITIONAL WORK (10 MIN)

Many interesting designs can be drawn using a compass and ruler. Two such patterns are shown:



Similar patterns can be created. Designs can also be made on the floor using circle cut-outs.

Triangles, Quadrilaterals and Lines (Pages 128–137)

OBJECTIVE

Children learn to construct different types of triangles.

LEARNING CURVE (10 MIN)

The children are familiar with the different forms of triangles. They know how to measure the angles of a triangle and are aware that the sum of the angles of a triangle is always 180°.

LEARNING AIDS

Cut-outs of triangles of different shapes from cardboard, compass, ruler, pencil, protractor.

LEARNING ACTIVITY (20 MIN)

Children revise the basic facts related to triangles including the angle sum property (sum of three angles of a triangle is 180°) and attempt exercises based on these facts. Then, they move on to constructing triangles. A triangle can be constructed if these are known:

a) length of all three sides

b) length of two sides and the measure of the angle between them

c) the size of two angles and the length of the side between them

It is important to remember that a triangle cannot be constructed if only the 3 angles of the triangle are known. Thus, at least one side of the triangle must be known.

Pages 131–133 of the textbook illustrate and explain in detail how to construct triangles if conditions a), b), or c) are fulfilled.

ADDITIONAL WORK (10 MIN)

Tessellations can be used to convey the shape of triangles in an interesting way.

Average and Speed (Pages 138–143)

OBJECTIVE

Children are introduced to the term average, its meaning and usage.

LEARNING CURVE (10 MIN)

The children know how to add. Here, they learn how to find the average of a set of quantities.

LEARNING AIDS

Graph book, a chart of the ages of the children in the class, a chart showing the numbers of cars going past the school at different times, distance-time graphs of trains and cars.

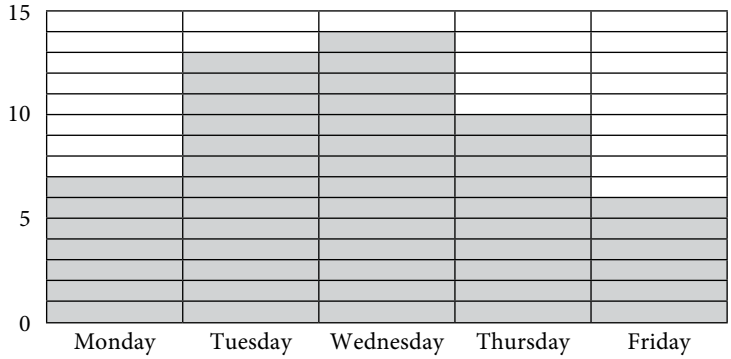
LEARNING ACTIVITY (20 MIN)

The teacher refers to 'the average marks scored by Rehman in one year', 'the average age of the children in the class' etc. The children get some idea of the term 'average' and there is a discussion.

To find the average of a set of quantities, add them and then divide the total by the number of quantities. Suppose there are 35 children in a class and the sum of the ages of all the children is 350. So, the average age is: $\frac{350}{35} = 10$. This means that there may be some children around 11 years of age and some may also be of 9 years age, but the maximum number of children are 10 year old.

Averages and Graphs : The children know from earlier work that a graph is a visual representation of any given data. They work out the problems based on the graphs given to them.

Example: The graph given below shows the number of students of a school who wore wrong dress during a particular week. Study the graph and answer the questions.



a) Find the number of students wearing the wrong uniform on each day of the week.
b) Find the average number of defaulters during the week.
c) On which days was the defaulter's list higher than the average?
d) On which days was the defaulter's list lower than the average?

SOLUTION :

a) Monday: 7 ; Tuesday: 13 ; Wednesday: 14 ; Thursday: 10 ; Friday: 6
b) Average = Total ÷ Number = (7 + 13 + 14 + 10 + 6) = 50 ÷ 5 = 10
c) Tuesday and Wednesday
d) Monday and Friday.

Distance, Speed and Time : In a manner of speaking, the speed of a car over a long distance is also the average of the speeds at which the car travels at different points of time.

A car, on a long distance journey, may travel on a highway at 120 km per hour for 3 hours. However, while passing through villages on the way, the same car may travel at 60 km per hour for 2 hours. If this car travels a total distance of 600 km in these 5 hours, then its average speed is calculated as shown:

Speed = Total Distance travelled ÷ Total Time taken.

= 600 ÷ 6 = 100 km/h

This is said to be the average, long-distance speed of the car although the actual speeds at which it would have travelled at different points of time might have varied.

The 3 factors involved in this problem are: Distance, Time and Speed

These three quantities are related to each other as follows:

Speed = Distance ÷ Time

After the initial chat hour, children realize that whenever 2 out of the 3 factors discussed above are given, it is easy to calculate the third factor e.g. if time and speed are given, it is easy to calculate the distance. Line graphs of time and distance are often used to calculate speed.

ADDITIONAL WORK (10 MIN)

The time taken by an aircraft to reach from one destination, say Karachi, to another, say Lahore, can often be taken from newspaper timetables while the distance between the two cities can be easily ascertained from a map. This information can be used to calculate the average speed of an aircraft.

The figure calculated is regarded as the average speed of the aircraft although it runs at different speeds during different phases of its flight. Its speed during the first 10 minutes of its ascent is obviously different from the maximum speed it reaches during its flight, which in turn would be different from its speed during its descent before coming to a halt.

Temperature (Pages 144–145)

OBJECTIVE

Children learn to measure temperature.

LEARNING CURVE (10 MIN)

The children know about hot and cold food, drinks or objects. They have experienced heat as well as cold, during summer and winter, or while going outside and inside an air-conditioned room. They are aware of changing temperatures, often of their own bodies, and the instrument that is used to read temperature viz. the thermometer.

LEARNING AIDS

Thermometer, ice cubes, water, metal boxes (to be placed in the hot sun or in the fridge), milk.

LEARNING ACTIVITY (20 MIN)

A conversation with the children is useful to gauge their knowledge about temperature and the thermometer. This may be followed up with a little discussion on how a thermometer works and a practical demonstration with a real-life thermometer for children to grasp better.

A glass full to the rim with water may be placed in a micro-wave. As the water heats, it starts going over the rim and spills. The mercury in the thermometer also behaves similarly. When it is heated, it expands and spills in to the bore.

Now keep a small container full of water in the freezer of a refrigerator. After sometime, it turns into ice, but not right up to the rim. The mercury in the thermometer contracts similarly when there is a fall in temperature and goes back into the bulb at 0 °C.

ADDITIONAL WORK (10 MIN)

The children can carry out a fun activity where they record the daily maximum temperature over a week. They plot a graph of the data collected and calculate

- The average maximum temperature of the week
- The hottest day of the week
- The days with temperatures higher than the normal
- The days with temperatures lower than the normal
- The temperature in Fahrenheit for each of the days.

PART FOUR

Algebra (Pages 146–150)

OBJECTIVE

As an introduction to Algebra, the children learn to use symbols for objects. They add, subtract, and multiply these symbols to form algebraic expressions.

LEARNING CURVE (10 MIN)

The children have written abbreviations of words before. They have substituted a word by its first letter, for example, m for metre. Here they write the first letter of the word, not for abbreviation sake but to create algebraic symbols. Then, they learn to use signs of addition, subtraction, and multiplication with the algebraic symbols to create algebraic expressions.

LEARNING AIDS

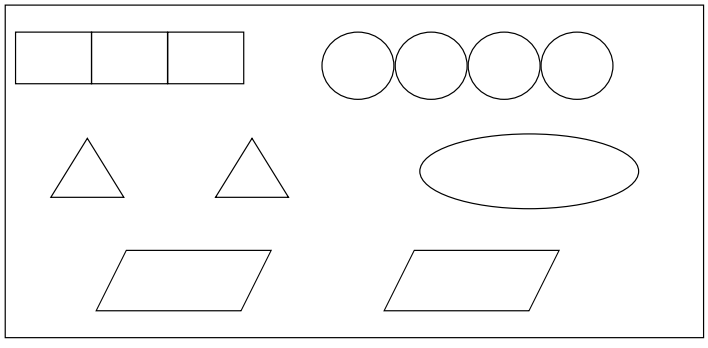
Counters, Flannelograph, Letter cut-outs

LEARNING ACTIVITY (20 MIN)

It is always advisable to begin with concrete objects. The children begin by substituting the names of the fruits kept in a basket in the class with the first letter of their names and express these fruits by way of an algebraic expression as shown on page 147 of textbook.

A flannelograph may also be used to draw different shapes and then create algebraic expressions for the same.

Example: Find the number of different shapes in the following rectangle and express them algebraically.



In the picture there are :

3 rectangles = $1r + 1r + 1r = 3r$; 4 circles = $1c + 1c + 1c + 1c = 4c$

2 triangles = $1t + 1t = 2t$; 1 oval = $1o$; 2 parallelograms = $1p + 1p = 2p$

Algebraically, this can be written as:

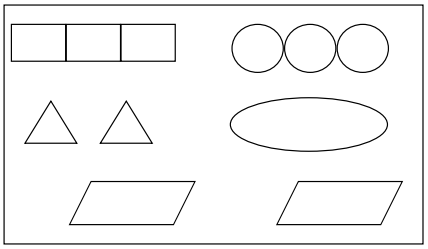
$3r + 4c + 2t + 1o + 2p$

The children work with various pictures of animals, fish, birds, and write each situation as an algebraic expression.

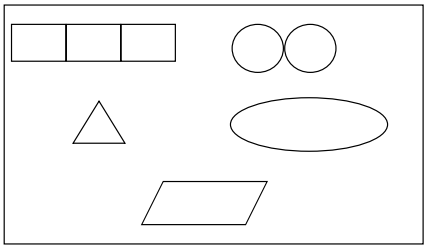
They know that different symbols are used in an algebraic expression. The basic rule for addition and subtraction of algebraic expressions is to add and subtract the terms having similar symbols only.

Example:

Flannelograph A



Flannelograph B



In flannelograph A, there are:	In flannelograph B, there are:
3 rectangles = $3r$	3 rectangles = $3r$
3 circles = $3c$	2 circles = $2c$
2 triangles = $2t$	1 triangle = $1t$
1 oval = $1o$	1 oval = $1o$
2 parallelograms = $2p$	1 parallelogram = $1p$

Shapes on Fannelograph A = $3r + 3c + 2t + 1o + 2p$

Shapes on Fannelograph B = $3r + 2c + 1t + 1o + 1p$

The shapes on both the flannelographs can be added and written as:

$$\begin{array}{rr} & 3r + 3c + 2t + 1o + 2p \\ + & 3r + 2c + 1t + 1o + 1p \\ \hline & 6r + 5c + 3t + 2o + 3p \end{array}$$

Similarly, we can also find how many shapes more does A have? This can be done by subtracting the latter expression from the former:

$$\begin{array}{rr} & 3r + 3c + 2t + 1o + 2p \\ - & (3r + 2c + 1t + 1o + 1p) \\ \hline & 0r + 1c + 1t + 0o + 1p = 1c + 1t + 1p \end{array}$$

ADDITIONAL WORK (10 MIN)

The children work in pairs or in groups. They design work cards for other groups to work on and work on the ones given to them.

CLASSROOM ORGANIZATION

Fruit baskets, picture cards (having multiple pictures of the same item), number books, flannelograph etc. can be put in the number development area for the children to work with.

Worksheets (Pages 157–164)

All the topics covered in the book are revised in the worksheets in a condensed form. Hence, the same objectives and learning activities apply as have been discussed in the previous pages in this book.

Maths Lab Activities (Pages 165–169)

In this portion, some activities have been suggested for lateral growth of children and to make lessons more meaningful. These are only a sample upon which more Maths Lab Activities may be planned.

The activities cater to:

- Studying factorization of prime and composite numbers.
- Introducing decimals to children.
- Learning simple addition and subtraction facts.
- Making a permanent calendar.
- Calculating perimeter of different shapes and making different patterns with these shapes.

Each activity must be preceded and followed by a classroom discussion. For example, the position of numbers, both vertically and horizontally, in the rectangle depicted in Activity no. 4 needs to be explained.

Answers

PART ONE

Pages 1–3

(1) (a) 13, 5 (b) 30, 21, 51, 35, 56, 5 (d) 3, 22, 25, 30, 5, 40 (e) 5, 1, 6, 7, 1, 14, 8, 15, 14

(2) (a) 18 (b) 5m (c) 32 (d) 65 (e) i $\frac{1}{5}$ ii $\frac{1}{20}$ iii $\frac{3}{8}$ (f) Rs 8.10 (g) IX
(h) 86 r 59 (i) 143 (j) 7.25 (k) 14

(3) (a) 9719 (b) 2186 (c) 7923 (d) 4348

(4) (a) four lakhs fifty thousand, two hundred and nineteen (b) nine hundred thousand, six hundred and seventy five (c) one lakh sixty thousand five hundred and twenty-four (d) eighteen thousand three hundred and one

(5) (a) < (b) = (c) > (d) < (e) =

(6) (a) 26503/2650.3 (b) 839.8/83.98 (c) 30729.6/3072.96 (d) 9435.1/943.51

(7) (a) thousand (b) thousandths (c) ten thousand (d) tenth (e) hundredth (f) tens

(8) (a) 123168 (b) 137.46 (c) 5402 (d) 167.12 (e) 7.224 (f) 55.169

(9) (a) 16.25h (b) 23.02h (c) 12:14h (d) 9:18h

(10) (a) 3.15, 3.165, 3.51, 3.55 (b) 0.001, 0.02, 0.112, 0.121

(11) (a) $14\frac{1}{100}$ (b) $625\frac{3}{10}$ (c) $10\frac{5}{1000}$ (d) $497\frac{2}{100}$ (e) $84\frac{38}{100}$ (f) $596\frac{357}{1000}$

(12) (a) 14 r35 (b) 2.106 (c) 15 r35 (d) 36.383

(13) (a) 25mm , 3.5cm , 20cm , $\frac{1}{2}$ m (b) 35cm, $\frac{3}{4}$ m, 120cm, 1.7m
(c) $\frac{4}{5}$ *l*, 3.2*l*, 27*l*, 430*l*

(14) (a) 9 (b) 8 (c) 7 (d) 20

(15) a and b

(16) (a) $6\frac{1}{4}$ (b) $5\frac{7}{24}$ (c) $11\frac{1}{2}$ (d) $7\frac{5}{14}$

(17) (a) 8.05 (b) 7.5 (c) 6.023 (d) 91.124 (e) 4.1 (f) 8.12

(18) (a) 321671 (b) 77441 (e) 167187

Pages 4–6

(1) (a) 2cm (b) 6cm (c) 3cm (d) 2nd and 3rd

(2) (a) Rs 450 (b) 3 (c) Rs 3750

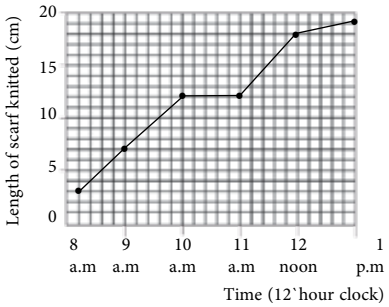
(4) (a) Rs 60 (b) No (c) Rs 60

(5) (a) 100km (b) 1st and 2nd (c) 150km and 75km (d) 1st hour

(6) (a) 9cm (b) 20km (c) 11am (d) 5km (e) 10am

Page 7

(1)



(2) (a) 12cm (b) 3cm (c) 16cm (d) 11-12

Page 8

(1) (a) 20 thousand (b) 1 lakh (c) 4 thousand (d) 2 lakhs

(2) (a) 40000 + 0 + 0 +20 + 4 (b) 400000 + 20000 + 9000 + 500 + 0 + 2
(c) 10000 + 1000 + 200 + 0 + 2 (d) 600000 + 0 + 1000 + 700 + 50 + 1

(3) (a) 7,00,538 (b) 802, 075 (c) 111,001 (d) 5,00,555

(4) (a) 593,162 (b) 817,724 (c) 605,016 (d) 212,212

(5) (a) 1,00,253 (b) 9,99,094 (c) 4,12,084 (d) 3,58,112

(6) (a) 1,00,300 (b) 4,00,000 (c) 2,45,500 (d) 350,000

(7) (a) < (b) < (c) > (d) <

Page 9

(1) (a) fifteen lakhs (b) sixty lakhs (c) forty-eight lakhs

(2) (a) 19,00,000 (b) 84,00,000 (c) 70,00,000

(3) (a) thirty-one lakh nineteen thousand six hundred and twenty-eight.
(b) forty-seven lakh three thousand nine hundred and fifty-five.
(c) sixty lakh thirty thousand one hundred and fifty-eight
(d) eighty lakh two hundred and six

(4) (a) 71, 12, 042 (b) 33, 90, 567 (c) 18, 04, 272

Page 10

(1) (a) 29,05,384 (b) 64,70,317
2,905,384 6,470,317
(c) 13,20,059 (d) 43,05,016
1,320,059 4,305,016

(2) (a) four million (b) 6 million five hundred thousand (c) nine million
(d) five million six hundred and twenty thousand (e) eight million
(f) two million eight hundred and forty thousand

(3) (a) 2,500,000 (b) 5,740,000 (c) 8,600,000 (d) 9,900,000

(4) (a) 6,029,347 (b) 1.903,001 (c) 2,500,123 (d) 849,016 (e) 8,417,869 (f) 1,403,970

Pages 11–12

(1) (a) 70,000 (b) 90,000 (c) 600 (d) 40,000 (e) 20,00,000 (f) 9,000,000

(2) (a) seven hundred two thousand and nineteen (b) sixty lakh three thousand and seven
(c) six million seven hundred and fifty thousand, one hundred and forty-two
(d) ninety-six lakh fifty-two thousand and ninety-five

(3) (a) 28,60,713 (b) 5,008,023 (e) 35,41,018

(4) (a) 4000000 + 500000 + 30000 + 400 + 80 + 1
(b) 6000000 + 0 + 90000 + 3000 + 0 + 40 + 8
(c) 2000000 + 800000 + 10000 + 6000 + 0 + 10 + 9
(d) 3000000 + 700000 + 0 + 50000 + 100 + 30 + 1
(e) 1000000 + 700000 + 50000 + 3000 + 200 + 20 4
(f) 3000000 + 600000 + 20000 + 9000 + 500 + 0 + 3

(5) (a) 18,06,259; 18,06,295; 18,60,995 (b) 4,033,965; 4,035,812; 4,053,612; 4,530,216
(c) 24,05,031; 24,15,396; 24,51,996

(6) (a) 18,20,199 (b) 6,242,999 (c) 53,59,999
(d) 49,49,999 (e) 4,632,449 (f) 12,02,099

(7) (a) 44,06,310 (b) 67,12,504 (c) 3,742,069
(d) 8,503,740 (e) 90,46,191 (f) 1,805,858

(8) (a) eight million ninety-six thousand four hundred and thirty-two
(b) one million, one hundred thousand and one
(c) sixty four lakh three thousand one hundred and fifteen
(d) five million seven hundred thousand, three hundred.
(e) ten lakh one thousand, one hundred
(f) nine million, one hundred and twenty-three thousand, three hundred and twelve

(9) (a) 15,00,962; 15,00; 629,15,00,226 (b) 23,41,380; 23,14,381; 23,14,038
(c) 5,691,441; 5,691,410; 5,690,410

(10) (a) > (b) < (c) > (d) = (e) < (f) =

Page 13

(1) (a) 4 crore (b) 6 crore (c) 2 crore (b) 10 crore (e) 5 crore (f) 9 crore

(2) (a) 8,00,00,000 (b) 1,00,00,000 (c) 11,00,00,000
(d) 4,00,00,000 (e) 5,00,00,000 (f) 20,00,00,000

(3) B: 3,80,19478 C: 3,93,26,301 D: 12,75,317

Page 14

(1) (a) six crore, seventy-three lakh one hundred and fifty nine
(b) three crore, twenty-four lakh fifty-six thousand nine hundred
(c) three crore, eight lakh forty-six thousand and two
(d) one crore, seventy lakh, eighteeen thousand and thirty-seven

(2) (a) 3,11,42,300 (b) 8,30,19,461 (c) 4,86,50,092 (d) 6,49,703 (e) 7,00,00,300

(3) (a) eight lakh (b) ninety thousand (c) sevnty lakh (d) seven lakh

(4) (a) 60000000 + 10 00000 + 800000 + 30000 + 0 + 500 + 90 + 6

(b) 50000000 + 9000000 + 400000 + 0 + 3000 + 0 + 70 + 5

(c) 70000000 + 0 + 500000 + 10000 + 2000 + 800 + 40 + 7

(d) 30000000 + 4000000 + 200000 + 0 + 1000 + 600 + 90 + 0

(e) 10000000 + 1000000 + 0 + 90000 + 5000 + 700 + 30 + 8

(f) 40000000 + 0 + 0 + 600000 + 7000 + 100 + 40 + 3

(5) (a) 3,18,72,500 (b) 4,08,24,000 (c) 8,72,40,000 (d) 9,58,00,000 (e) 6,00,00,000

Page 15

(1) (a) thirty-eight millin, one hundred thousand, five hundred and eighty.

(b) sixty million, one hundred and seventy-four thousand, and five.

(c) fifty-one million, sixty-nine thousand one hundred and twenty.

(d) twenty-five million, four hundred and thirty thousand, seven hundred and fifty six.

(e) nineteen million four hundred and five thousand, three hundred and twenty-eight.

(f) ten million one hundred and sixty-fie thousand and thirty-two

(2) (a) (i) 38106259 (ii) 38,106,259 (b) (i) 6,00,54,291 (ii) 60,054,291

(c) (i) 4,19,65,478 (ii) 41,965,478 (d) (i) 5,60,30,201 (ii) 56,032,201

(e) (i) 1,24,50,031 (ii) 12,450,031 (f) (i) 9,37,68,325 (ii) 93,768,325

(3) (a) 31,510,603 (b) 78,400,812 (c) 88,000,015 (d) 12,964,201 (e) 50,390,781

Pages 16–17

(1) (a) 61,892,079 (b) 80,069,464 (c) 35,406,295 (d) 43,701,695

(2) (a) eighty-five million six hundred and twenty-three thousand and five.

(b) eight crore fifteen lakh, sixteen thousand and seventy-five

(c) seven crore forty-eight lakh, one thousand six hundred and twenty-three

(d) thirty million five hundred and eighty-five thousand, six hundred and twenty-four

(3) (a) 4,10,15,804 (b) 86,027,320 (c) 1,94,06,413

(4) (a) 18,349,999 (b) 1,38,12,099 (c) 3,03,99,999 (d) 16,799,999

(5) (a) 50000000 + 2000000 + 0 + 10000 + 8000 + 600 + 20 + 3

(b) 10000000 + 2000000 + 900000 + 40000 + 2000 + 0 + 60 + 0

(c) 40000000 + 5000000 + 300000 + 0 + 8000 + 400 + 90 + 2

(d) 10000000 + 1000000 + 900000 + 50000 + 8000 + 100 + 20 + 1

(6) (a) 10,100 (b) 50

(7) (a) 49,603,298; 49,613,829; 49,630,928 (b) 3,41,06,235; 3,41,59,332; 3,41,60,532

(c) 84,041,362; 85,004,632; 85,011,184; 85,014,623

(8) (a) 8,07,50,000 (b) 30,20,00,000 (c) 24,100,010 (d) 2,48,40,000

(9) (a) 19,643,399; 19,643,498; 19,643,598; 19,643698

(b) 65,031,016; 65,031,116; 65,031,216; 65,031,316

(c) 37,199,934; 37,200,034; 37,200,134; 37,200,234

(d) 2,08,52,715; 2,08,52,815; 2,08,52,915; 2,08,53,015

(10) (a) < (b) < (e) = (d) > (e) = (f) <

(11) (a) 1,105,000; 1,106,000 (b) 58,000,000; 58,000,100 (c) 20,800,107; 20,900,107

(d) 6,18,09,999; 6,18,10,099 (e) 46,101,095; 46,101,195 (f) 37,561,000; 37,561,100

Page 18

(1) (a) 40 million (b) 5 hundred thousand (c) 1 million 3 hundred thousand (d) 10 million

(e) 2 million 5 hundred thousand (f) 16 million 7 hundred thousand.

(2) 8,72,68,000; 4,50,00,000; 4,20,00,000; 1,50,00,000; 2,14,00,000; 13,20,00,000; 1,50,000; 2,75,000; 1,5,00,000; 1,70,00,000

Page 19

(1) (a) 3,999,969 (b) 29,263,556 (c) 39,99,999 (d) 7,333,720 (e) 4,781,971

(f) 88,680,191 (g) 42,72,771 (h) 4,53,98,548

(2) (a) 6,037,686 (b) 2,692,219 (c) 1,070,510 (d) 24,53,371 (e) 2,49,01,878

(f) 5,62,94,723 (g) 85,91,442

(3) (a) 20,050,624 (b) 1,26,96,182 (c) 14,82,834 (d) 2,707,148 (e) 5,625,440

Page 20

(a) 1,291,610 (b) 31,109,187 (c) 3,643,111 (d) 84,64,653 (e) 14,46,207

(f) 22,047,868 (g) 13,53,784 (h) 1,61,86,207

(2) (a) 99,99,999; 1,00,000 (b) 99,900,000 (c) 90,00,001

(3) (a) 68,402,276 (b) 19,961,615, (c) 3,974,662

(d) 7,94,86,516 (e) 9,954,308 (f) 30,569,512

(4) (a) 49,838,328 (b) 7,592,700 (c) 5,208,864

Page 21

(2) (a) 1,26,96,679 (b) Sindh 10,40,62,441 (c) 3,36,17,547

(f) FATA 7,04,44,894 (e) 73,71,555

Pages 22-25

(1) (a) 50 (b) 110 (c) 1000 (d) 50 (e) 150 (f) 1250

(2) (a) 200 (b) 2000 (c) 9700 (d) 200 (e) 6300 (f) 4000

(3) (a) 110 (b) 2340 (c) 16,000 (d) 120 (e) 1560 (f) 7000

(4) (a) 400 (b) 1700 (c) 14,000 (d) 200 (e) 2600 (f) 19,700

(5) (a) Rs 2200 (b) 10,500 (c) 3500 (d) 8600

(6) B = 5000 C = 9000

(7) (a) Rs 2600 (b) 99,000 (c) 65,000 (d) 103,000

(8) (a) 12:15pm (b) 1:05pm (c) 11:20am (d) 12:20pm

(9) (a) 11 yrs (b) 9 yrs (c) 8 yrs

(11) 8600; 8100; 7700

(12) (a) 90 (b) 140 (c) 80

(13) (a) 270,000 (b) 1,400,000 (c) 150,000 (d) 2,120,000 (e) 380,000
(f) 5,600,000 (g) 750,000 (h) 6,000,000

(14) (a) 3,000,000 (b) 2,000,000

(15) 7,000,000; 6,000,000; 1,000,000

(16) (a) 6,570,000 (b) 73,620,000 (c) 3,180,000 (d) 810,000

Page 26

(1) (a) 664,740 (b) 2,970,213 (c) 1,275,742 (d) 2,984,256 (e) 2,883,412 (f) 1,357,720
(g) 772,005 (h) 1,180,012

Page 27

(1) (a) 1120 r17 (b) 14811 r16 (c) 780 r6 (d) 18507 r1 (e) 1484 r32 (f) 17,437 r30

(2) (a) 203 r2 (b) 1051 r46 (c) 161 r31 (d) 702 r38 (e) 606 r10 (f) 91 r61

(3) (a) 520 (b) 200 (c) 100 (d) 300 (e) 2000 (f) 650

(4) (a) 104,136 r20 (b) 118,345 r18 (c) 133,793 r20

Page 28

(1) (a) 131 r 73 (b) 157 r7 (c) 138 r155 (d) 104 r238

(2) (a) 119 r332 (b) 125 r169 (c) 116 r389 (d) 75 r121 (e) 54 r42
(f) 33 r 409 (g) 87 r357 (h) 78 r182

(3) (a) 1800 (b) 1200 (c) 1000 (d) 4000 (e) 738 (f) 30

Page 29

(1) (a) 695 (b) Rs 15,31,66,720 (c) Rs 78.02 (d) (i) Rs 6,36,528 (ii) Rs 76,38,336

(2) (a) 71288mm (b) 51115.5kg

Page 30

(1) (a) Summer Vacations (b) 2000 (c) 3500

(2) (a) 900000 + 60000 + 2000 + 400 + 30 + 0
(b) 10000000 + 0 + 700000 + 20000 + 0 + 400 + 80 + 2
(c) 2000000 + 400000 + 60000 + 4000 + 200 + 0 + 9
(d) 40000000 + 6000000 + 700000 + 30000 + 0 + 100 + 40 + 1

Page 31

(1) (a) Rs 3055 (b) Rs 614

(2) (a) Rs 27200.70 (c) Rs 17791.90

(3) Rs 544.00 Rs 344.00 Rs 142.25 Rs 600.00 = Rs 163.25

Page 32

(1) (a) 9 (b) 16 (c) 25 (d) 9 (e) 27 (f) 15 (g) 32 (h) 20

(2) (a) 24 (b) 45 (c) 120 (d) 55 (e) 21 (f) 16 (g) 55 (h) 117

(3) (a) 9 (b) 92 (c) 33 (d) 30

(4) (a) 61 (b) 74 (c) 111 (d) 6 (e) 14

(5) (a) 21 (b) 34 (c) 19 (d) 66

(6) (a) 33 (b) 124 (c) 224 (d) 68

(7) (a) 35 (b) 12 (c) 36 (d) 2

(8) (a) $\frac{5}{7}$ (b) $\frac{5}{7}$ (c) $-\frac{1}{9}$ (d) $\frac{13}{15}$

(9) (a) 9 (b) 4 (c) 9.6 (d) 4

(10) (a) $2 \times 2 \times (2-2) = 0$ (b) $2+2+ (2 \div 2) = 5$ (c) $(18-6) \div 3 = 4$

(11) (a) 14 (b) 18 (c) 101 (d) 200 (e) 31 (f) 2

(12) (a) $2\frac{1}{24}$ (b) $1\frac{1}{2}$ (c) $1\frac{1}{20}$ (d) $1\frac{1}{30}$

(13) (a) $12\frac{19}{20}$ (b) $3\frac{9}{40}$ 4 (c) $\frac{7}{8}$

(14) (a) 1890 (b) 15200 (c) 238.2

(15) (a) 3.35 (b) 111.02 (c) 190

(16) (a) $\frac{5}{12}$ (b) Rs 165

Page 38

(1) (a) $3\frac{1}{2}$ cm^2 (b) $2.4cm^2$

(3) $16cm^2$

(4) (a) $A = 15m^2$ $P = 17m$ (b) $A = 2.6m^2$ $P = 21m$

(5) (a) 1.8m (b) 18m

Pages 39–44

(1) (a) $37m^2$ (b) $42m^2$

(2) Classroom A $144m^2$, Playroom $410m^2$,
Classroom B $165.5m^2$, Toilet $35m^3$.

(3) (a) $6cm^2$ (b) $8cm^2$ (c) $3cm^2$ (d) $4.5cm^2$

(4) (a) $10m^2$ (b) $15m^2$

(5) (a) $7cm^2$ (b) $6cm^2$

(6) (a) $6cm^2$ (b) $6cm^2$

(9) (a) $6.5cm^2$ (b) $7.5cm^2$

(10) (a) $5cm^2$ (b) $6.875cm^2$ (c) $7cm^2$

Page 45

(2) (a) 5 (b) 4 (c) 10 (d) 12 (3) (a) No (b) No

Pages 46–49

(1) (a) 25 (b) 5

(2) 15; 3; 45

(3) (a) $9cm^3$ (b) $12cm^3$

(4) (a) $27cm^3$ (b) $36cm^3$

(c) $40cm^3$ (d) $24cm^3$

(5) (a) $120cm^3$ (b) $360cm^3$ (c) $1080cm^3$ (d) $288cm^3$

(6) (a) $120cm^3$ (b) $112cm^3$

(7) (a) $54cm^3$ (b) $120cm^3$ (c) $693cm^3$

(8) (a) 6cm (b) 5cm

(9) (a) 11cm (b) 8cm (c) 12cm

(10) (a) $15000cm^3$ (b) 2m (c) 20cm

Page 50

(1) (a) $300cm^3$ 300ml (b) $288cm^3$ 288ml

Page 51

(2) (a) 12,49,00,938 (b) 5,16,70,324

(3) (a) 15600 (b) 85000

(4) (a) 1034 r43 (b) 1337 r 166

(5) (a) 17cm (b) 23cm

(6) (a) 53 (b) 28 (c) 31 (d) 12

(7) (a) 10.8 (b) 57 (c) $1\frac{11}{18}$ (d) $1\frac{3}{8}$

(8) (a) $3m^2$ (b) $32m^2$

(9) (a) $357cm^3$, 357ml (b) $441cm^3$ 441ml (c) $644cm^3$ 644ml

Page 52

Across: Multiples, coprime, two, itself; seven, four Down: Prime, composite, remainder, twelve, factor, six

Page 53

(1) (a) 24 (b) 21 (c) 45

(2) 1, 2, 4, 7, 14, 28

(3) (a) 8 (b) 8 (c) 6 (d) 3 (e) 9 (f) 4

(4) (a) 1, 3 (b) 1

(5) <

(6) F F T T F T

(7) (a) 1008, 2457 (b) 2 (c) 1 2, 4, 8, 16, 32; 1, 3, 5, 9, 15, 45 (d) 19

Pages 54–56

(1) (a) units (b) even (c) three (d) nine (e) 4030

(2) b, c

(3) a, b, c

(4) 234 323; 356472; 199320; 532751; 213421; 111432

(5) a, b

(6) a, b

(7) a, d

(8) a, c

(9) b, c, d

(10) b (11) b, c

Pages 57–58

(1) (a) $2 \times 2 \times 3 \times 13$ (b) $2 \times 3 \times 11$ (c) $5 \times 5 \times 19$ (d) $2 \times 2 \times 53$ (e) 2×47 (f) $2 \times 2 \times 41$

(2) (a) 100 (b) 140 (c) 45 (d) 180

(3) (a) 9 (b) 6 (c) 9 (d) 2

(4) (a) 4; 2368 (b) 9; 756 (c) 2; 1248 (d) 1; 3510

(5) (a) 20 (b) 30 (c) 75

(6) (a) 2 (b) 10

Pages 59–60

(1) (a) 44; 660 (b) 36; 1260 (c) 24; 840 (d) 25; 35700 (e) 7; 20580

(2) (a) 3 (b) 2 (c) 37 (d) 27

(3) (a) 10; 163900 (b) 38; 26714 (c) 53; 21624 (d) 142; 20448

Page 61

(1) (a) 126 (b) 280

(2) (a) 84 (b) 24 (c) 100

(3) (a) 48 (b) 135 (c) 72 (d) 330 (e) 160 (f) 375 (g) 490 (h) 120

Page 62

(1) (a) 90 (b) 60 (c) 180

(2) (a) 60 (b) 24

(3) (a) 60 (b) 120

Page 63

(2) (a) 70 (b) 3 (c) 1845 (d) 75

Page 64

(1) a, c

(2) a, b

(3) 4335

(4) a, b, d

(5) (a) yes (b) yes (c) no (d) yes

(6) (a) No (b) no (c) yes (d) yes (7) (a) 360 (b) 126

(8) (a) 2 x 2 x 37 (b) 2 x 3 x 5 x 7 (c) 5 x 37 (9) (a) 36 (b) 8 (c) 19

(10) (a) 24 (b) 315 (c) 350

(11) (a) 126 (b) 210 (c) 240 (d) 120 (12) (a) 126 (b) 21

Page 65

Tent of Transformation: (a) $\frac{20}{3}$ (b) $\frac{34}{3}$ (c) $\frac{75}{7}$ (d) $\frac{129}{7}$

Wheel of Reduction: (a) $\frac{9}{14}$ (b) $\frac{7}{9}$ (c) $\frac{7}{9}$ (d) $\frac{9}{11}$ (e) $3\frac{1}{3}$ (f) $2\frac{5}{8}$ (g) $3\frac{1}{2}$

Addition Hoopa: (a) $5\frac{2}{3}$ (b) $1\frac{1}{15}$ (c) $5\frac{5}{6}$ (d) $7\frac{17}{30}$

Common Denominator Corner: (a) $\frac{15}{20}$ $\frac{8}{20}$ (b) $\frac{12}{28}$ $\frac{7}{28}$ (c) $\frac{15}{18}$ $\frac{4}{18}$ (b) $\frac{5}{30}$ $\frac{12}{30}$ $\frac{9}{30}$

Subtraction Shooting: (a) C (b) A (c) E

Page 66

(1) (a) $\frac{5}{11}$ (b) $\frac{8}{9}$ (c) $\frac{1}{10}$

(2) (a) 20 (b) 11 (c) 5 (d) 35

(3) (a) $8\frac{12}{30}$ (b) $7\frac{5}{8}$ (c) $7\frac{7}{10}$

(4) (a) $\frac{71}{12}$ (b) $\frac{51}{7}$ (c) $\frac{52}{5}$ (d) $\frac{90}{7}$

(5) (a) 84 (b) 126 (c) $\frac{9}{12}$

(6) (a) $2\frac{3}{8}$ (b) $1\frac{5}{6}$ (c) $1\frac{5}{6}$

(7) (a) $\frac{24}{40}$ and $\frac{15}{40}$ (b) $\frac{21}{32}$ and $\frac{12}{32}$ (c) $\frac{25}{40}$ and $\frac{6}{40}$ (d) $\frac{15}{20}$ and $\frac{18}{20}$

(8) (a) $\frac{13}{20}$ (b) $8\frac{7}{12}$ (c) $2\frac{7}{30}$ (d) $3\frac{5}{6}$

(9) (a) $2\frac{1}{8}$ (b) $4\frac{7}{15}$ (c) $4\frac{2}{9}$ (d) $6\frac{1}{20}$

Page 67

(1) (a) $\frac{5}{2}$ (b) $\frac{4}{4}$ (c) $\frac{3}{5}$ (d) $\frac{4}{3}$

(2) (a) $\frac{8}{3}$ (b) $\frac{14}{5}$ (c) $\frac{9}{4}$ (d) $\frac{7}{3}$ (e) $\frac{5}{6}$ (f) $\frac{6}{2}$

(3) (a) $\frac{12}{3}$ (b) $\frac{24}{4}$ (c) $\frac{20}{2}$ (d) $\frac{28}{8}$ (e) $\frac{12}{9}$ (f) $\frac{14}{7}$

Page 68–70

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

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

(4) (a) $\frac{3}{8}$ (b) $\frac{1}{10}$ (c) $\frac{1}{12}$ (b) $\frac{1}{6}$

(5) (b) $\frac{2}{15}$ (b) $\frac{2}{15}$ (c) $\frac{1}{5}$ (d) $\frac{1}{12}$

(6) (a) $\frac{2}{27}$ (b) $\frac{7}{40}$ (c) $\frac{5}{48}$ (d) $\frac{5}{16}$ (e) $\frac{3}{44}$ (f) $\frac{7}{40}$

(7) (a) $\frac{1}{20}$ (b) $\frac{4}{35}$ (c) $\frac{1}{18}$ (d) $\frac{1}{11}$ (e) $\frac{3}{20}$ (f) $\frac{7}{66}$ (g) $\frac{3}{56}$ (h) $\frac{5}{108}$

(8) (a) $\frac{1}{6}$ (b) $\frac{2}{5}$ (c) $\frac{1}{2}$ (d) $\frac{5}{9}$ (e) $\frac{2}{5}$ (f) $\frac{9}{16}$

(9) (a) $\frac{2}{5} \times \frac{5}{6}$ (b) $\frac{3}{8} \times \frac{5}{6}$

(10) (a) $\frac{4}{15}$ (b) $\frac{5}{9}$ (c) $\frac{1}{2}$ (d) $\frac{3}{5}$ (e) $\frac{8}{15}$ (f) $\frac{1}{8}$

(11) (a) $\frac{4}{7}$ (b) $\frac{1}{30}$ (c) $\frac{7}{18}$ (d) $\frac{1}{60}$

Page 71

(1) (a) $\frac{5}{9}$ (b) $\frac{7}{15}$ (c) $\frac{3}{5}$ (d) $\frac{18}{35}$

(2) (a) $\frac{1}{40}$ (b) $\frac{1}{30}$ (c) $\frac{1}{18}$ (d) $\frac{1}{6}$

(3) (a) $\frac{1}{10}$ (b) $\frac{5}{36}$

Page 72

(1) (a) $7\frac{1}{5}$ (b) $\frac{15}{16}$ (c) $3\frac{21}{32}$ (d) $20\frac{5}{8}$ (e) $1\frac{1}{27}$ (f) $2\frac{71}{80}$ (g) $20\frac{1}{4}$
(h) 3 (i) $9\frac{11}{32}$ (j) $\frac{2}{3}$ (k) $5\frac{2}{5}$ (l) $9\frac{7}{9}$

Page 73

(1) (a) 33 girls (b) 1/2m (c) $7\frac{1}{5}$ cm

(2) (a) $\frac{1}{6}$ (b) $8\frac{1}{8}$ km

Page 74

(1) (a)$10\frac{1}{2}$ (b) $22\frac{4}{5}$ (c) $72\frac{33}{35}$

Pages 75–76

(1) (a) 50; 81; 23

(2) (a) 52 (b) 43 (c) 57 (d) 17

(3) (a) 3 (b) 8 (c) 9 (d) 5 (e) 8 (f) 15

(4) (a) 21 (b) 90 (d) 168

(5) (a) 12 (b) 10 (c) 15 (d) 16

(6) (a) 54 (b) 600 (c) 182 (d) 196 (e) 270 (f) 84 (g) 544
(h) 323 (i) 182 (j) 92 (k) 110 (l) 473

(7) (a) $\frac{3}{2}$ (b) $\frac{8}{7}$ (c) 12

(8) (a) $\frac{2}{3}$ (b) $\frac{3}{8}$ (c) $\frac{8}{13}$

Pages 77–78

(1) (a) $\frac{4}{1}$ (b) $\frac{12}{1}$ (c) $\frac{100}{1}$

(2) (a) $\frac{10}{1}$ (b) $\frac{21}{1}$ (c) $\frac{2397}{1}$

(3) (a) 6 (b) 3 (c) 4

(4) (a) 36 (b) 1000 (c) 75 (d) 192

(5) (a) 4 (b) 30

(6) (a) $1\frac{1}{30}$ (b) $1\frac{11}{14}$ (c) $\frac{1}{18}$ (d) $\frac{3}{20}$

(7) (a) $1\frac{1}{2}$ (b) $\frac{1}{2}$

(8) (a) $\frac{5}{6}$ (b) $\frac{5}{8}$

(9) (a) 2 (b) multiplying

Page 79

(1) (a) $2\frac{1}{10}$ (b) $1\frac{13}{30}$ (c) $2\frac{10}{21}$ (d) $5\frac{2}{5}$ (e) $3\frac{7}{19}$ (f) $3\frac{2}{7}$ (g) $1\frac{24}{25}$ (h) $2\frac{14}{17}$

(2) (a) $2\frac{8}{29}$ (b) $1\frac{13}{15}$

(3) (a) T (b) T (c) F (d) T (e) F (f) T (g) T (h) T

Page 80

(a) 1 (b) 1 (c) $\frac{8}{11}$ (d) $\frac{10}{3}$ (e) $\frac{9}{4}$ (f) $\frac{19}{20}$ (g) 1 (h) $\frac{4}{7}$ (i) $\frac{40}{39}$ (j) Not possible

(k) $\frac{5}{14}$ (l) Not possible (m) Not possible (n) Not possible

Page 81

(1) (a) 12 (b) 4 (c) (i) $\frac{2}{5}$ (ii) 40cm (d) 450 pancakes

Page 82

(1) (a) $8\frac{1}{2}$ (b) $\frac{3}{16}$ (c) $17\frac{3}{4}$ (d) $16\frac{1}{3}$ (e) $18\frac{2}{3}$ (f) $16\frac{7}{10}$

(2) (a) $22\frac{61}{72}$ (b) $13\frac{3}{4}$ (c) $14\frac{19}{20}$ (d) $63\frac{1}{3}$ (e) 48 (f) $13\frac{3}{8}$ (g) $17\frac{5}{6}$

Page 83

(1) (a) $\frac{2}{15}$ (b) $\frac{3}{2}$ (c) $\frac{7}{12}$

(2) (a) $\frac{15}{32}$ (b) 0 (c) $1\frac{1}{6}$ (d) $1\frac{1}{4}$

(3) (a) $\frac{5}{106}$ (b) $\frac{5}{54}$ (c) $\frac{4}{9}$ (d) 999 (e) $\frac{1}{100}$ (f) $\frac{3}{46}$

(4) (a) 24 (b) $\frac{3}{8}$ (c) $\frac{1}{24}$ (d) $1\frac{1}{15}$

(5) (a) (i) $4\frac{1}{2}$ (ii) 4 kg 500g (b) (i) 36 min (ii) $\frac{3}{5}$ h

(6) (a) $7\frac{65}{72}$ (b) $3\ \frac{1}{6}$ (c) $79\ \frac{1}{4}$

Page 84

(2) 0.2*l*, $\frac{47}{100}$, 0.003, $\frac{8}{10}$, 0.019, 0.245, $\frac{69}{100}$, 0.7, $\frac{732}{1000}$, 0.14

(3) Across: (1) tenths (3) right (6) hundredths (8) fractional (II) point.

Down: (1) two (2) thousandths (4) tens (5) zero zero

(7) half (8) factor (9) ten (10) nine

Page 85

(1) (a) 3.5 (b) 0.1 (c) 2.7 (d) 100.5 (e) 10.6 (f) 3.8

(2) (a) $10\frac{1}{100}$ (b) $18\frac{5}{100}$ (c) $35\frac{75}{100}$ (d) $25\frac{25}{100}$ (e) $33\frac{4}{100}$ (f) $100\frac{2}{10}$

(3) (a) 6.5cm (b) 15.9cm (c) 10.1cm (d) 8.7cm

(4) (a) x (b) ÷ (c) – (d) +

(5) (a) 49.06 (b) 9.005

(6) (a) 2.005 (b) 8.09 (c) 200.9 (d) 4.021 (e) 0.111 (f) 15.05

(7) (a) hundredth (b) thousands (c) thousandth (d) tenths

(8) (a) 3.16 (b) 8.035 (c) 14.130

Page 86

(1) (a) < (b) = (c) < (d) =

(2) (a) $\frac{17}{1000}$ $\frac{13}{100}$ $\frac{17}{100}$ $\frac{17}{1000}$ (b) 18.143, 18.341, 18.413, 18.431

(c) 0.001, 0.002, 0.012, 0.12 (d) $\frac{1}{25}$, $\frac{5}{100}$, $\frac{3}{50}$, $\frac{90}{1000}$

(3) (a) 5.6, 5.36, 5.063, 5.003 (b) 11.604, 11.406, 11.1, 11.064 (c) $\frac{4}{25}$, $\frac{6}{50}$, $\frac{8}{100}$, $\frac{1}{20}$

(4) (a) 18.95 (b) 606.05

(5) (a) $4\frac{2}{5}$ (b) $1\frac{1}{1000}$

Page 87

(2) (a) 94.24 (b) 960.058 (c) 26.61

(3) (a) 1136.048 (b) 39.964 (c) 40.64 (d) 703.178

Page 88

(1) (a) 4213.98 (b) 15637.5 (c) 169.23 (d) 21228.9 (e) 32.55 (f) 78.311

(2) (a) 7.2 (b) 23.715 (c) 21 (d) 23.36 (e) 39.2 (f) 2868.3 (g) 156.48 (h) 14.97

(i) 191.97 (j) 37.07 (k) 1061.75 (l) 43.884 (m) 107.52 (n) 227.552

(3) (a) 3.4 (b) 2.08 (c) 2.9 (d) 4.39 (e) 3.4 (f) 18.21 (g) 1.3 (h) 6.01 (i) 0.93

(j) 0.21 (k) 9.49 (l) 0.75 (m) 7.63 (n) 8.54 (o) 6.04 (p) 9.99

Page 89

(1) (a) 596 (b) 1298 (c) 3648 (d) 7301 (e) 4697.8 (f) 3410 (g) 34637 (h) 7349

(2) (a) 530 (b) 496 (c) 1900 (d) 395678 (e) 80 (f) 7001 (g) 35635 (h) 0.02 (i) 293

Page 90

(1) (a) 0.318 (b) 0.0651 (c) 0.624 (d) 0.0694

(e) 0.083 (f) 0.0483 (g) 0.0041 (h) 0.0045

(2) (a) 10 (b) 100 (c) 1000 (d) 100 (3) 0.132

Pages 91–92

(1) (a) 1161m^2, 11.61cm^2 (b) 1632mm^2, 16.32cm^2

(2) (a) 672cm^2, 6.72cm^2 (b) 1596mm^2, 15.96cm^2 (c) 5460mm^2, 54.60cm^2

(3) (a) 0.28cm^2, 28mm^2 (b) 0.10cm^2, 10mm^2 (c) 0.24cm^2, 24mm^2 (d) 0.63mm^2, 63mm^2

(4) (a) 0.462 (b) 13.49 (e) 0.36 (d) 5.12 (e) 0.78 (f) 8.88

Page 93

(1) (a) 3.792 (b) 5.430 (c) 15.566 (d) 36.784

(2) (a) 0.8660 (b) 0.9158 (c) 3.3810 (d) 2.9300 (e) 4.0942 (f) 29.857

(3) (a) 1000, 8.586 (b) 1000, 29.336 (c) 1000, 22.815

(4) (a) 10000, 1.8347 (b) 10000, 5.9157 (c) 10000, 6.8256 (d) 10000, 0.5236 (e) 10000, 48.7136

Page 95

(1) (a) 84 ÷ 12 = 7 (b) 219 ÷ 3 = 73 (c) 63 ÷ 21 = 3 (d) 8.5 ÷ 5 = 1.7

(2) (a) 4 (b) 0.7 (c) 4 (d) 5 (e) 0.8 (f) 1.1

(3) (a) 200 (b) 80 (c) 60 (d) 50

Page 96

(1) (a) 0.5 (b) 0.02 (c) 0.5

(2) (a) 0.25 (b) 0.06 (c) 0.875 (d) 20.55 (e) 0.40 (f) 0.52

(3) (a) Rs 2.50 (b) Rs 0.20

Page 97

(1) (a) 15.582 (b) 107.68 (c) 28.154 (d) 62.7 (e) 113.017

(2) (a) 6.252 (b) 9.07 (c) 1.743 (d) 21.1 (e) 7.1 (f) 66.44

(3) (a) five (b) 1000 (c) 6.085 (d) 0.649 (e) 0.2369 (f) 0.45 (g) 23.87 (h) 100

Page 98

(1) (a) 3.301, 3.101, 3.011, 3.001 (b) $\frac{500}{1000}$, $\frac{3}{10}$, $\frac{28}{100}$, $\frac{8}{100}$,

(2) (a) 7.121 (b) 559.178

(3) 4.058, 6.000, 7.290, 17.300

(4) (a) 1769 (b) 10.27 (c) 1728.816 (d) 0.0351

(5) (a) 6.39 (b) 3 (c) 6.211 (d) 80

(6) (a) 1.5 (b) 0.6 (e) 1.625

(7) (a) 20 (b) 18 (c) 7 (d) 2.90kg (e) 0.3 (f) 28.15m

Page 99

Lucky stores (a), Wings (a), Star Travels (c) Guzzle (c). Yes

Page 100

(1) (a) 7.1 (b) 15.4 (c) 26.3 (d) 10.2 (e) 27.1 (f) 40.0

(2) (a) 54 (b) 53 (c) 134 (d) 396 (e) 608 (3) (a) 2.1, 2 (b) 1.5, 2

Page 101

(1) (a) 6.13 (b) 14.11 (c) 2.49 (d) 148.00 (e) 8.03 (f) 1792.01

(2) (a) 21.798, 21.80 (b) 13.437, 13.44 (c) 113.925, 113.93 (d) 53.097, 53.10
(e) 22.363, 22.36

(3) (a) 26.703/26.7 (b) 297.57 (c) 137.826/137.83 (d) 7 (e) 8 (f) 3

Page 102

(1) (a) 2.111 (b) 3.333 (c) 6.333 (d) 2.666 (e) 2.286 (f) 4.143

(2) (a) 0.167 (b) 0.364 (c) 0.429 (d) 0.667 (e) 4.333 (f) 0.889

Page 103

(1) (a) 318.84 (b) 7385.77 (c) 1263.05 (d) 7068.51

(2) (a) 0.167 (b) 0.364 (c) 0.667 (d) 4.333

Page 104

B $\frac{3}{10}$ C $\frac{7}{10}$ D $\frac{18}{50}$ E $\frac{33}{100}$; B $\frac{30}{100}$ C $\frac{35}{100}$ D $\frac{36}{100}$ E $\frac{33}{100}$ B, E, C, D, A

Page 105

(1) (a) $\frac{70}{100}$ (b) $\frac{90}{100}$ (c) $\frac{80}{100}$ (d) $\frac{20}{100}$ (e) $\frac{44}{100}$ (f) $\frac{84}{100}$

(2) (a) 57.14 (b) 78.57 (c) 18.75 (d) 10.53

Page 107

(1) (a) 70 per cent (b) 25 per cent (c) 37.5 per cent (d) 19 per cent (e) 90 per cent
(f) 16.67 per cent

(2) (a) 70% (b) 99% (c) 60% (d) 80% (e) 60% (f) 32%

(3) (a) $\frac{3}{10}$ (b) $\frac{9}{20}$ (c) $\frac{89}{100}$ (d) $\frac{6}{25}$ (e) $\frac{8}{25}$ (f) 1

(4) (a) 28.57% (b) 35.71% (c) 55.56% (d) 46.15% (e) 23.08% (f) 13.33%

Pages 108–111

(1) (a) 425% (b) 635% (c) 606% (d) 160% (e) 380% (f) 870%

(2) (a) 600% (b) 1700% (c) 5800% (d) 900% (e) 2300% (f) 7900%

(3) (a) 23% (b) 7394% (c) 701% (d) 469% (e) 390% (f) 300%

(4) (a) $\frac{3}{4}$ (b) 3 (c) $\frac{21}{100}$ (d) $\frac{19}{50}$ (e)1 $\frac{7}{20}$ (f) 8

(5) (a) 0.35 (b) 0.018 (c) 0.98 (d) 1.40 (e) 0.06 (f) 0.163

(6) (a) 39% (b) 60% (c) 100% (d) 4% (e) 55% (f) 152%

(8) (a) Rs 52 (b) Rs 340 (c) Rs 11.88

(9) (a) Rs 5 (b) 7.5g (c) 500km (d) 72*l* (e) 4.5m

(10) (a) Rs 3850; Rs 46,200 (b) 14,00,000

(11) (a) 50%; 53.3% (b) 48%; 54.1%

(12) (a) Urdu 66%; History 70% (b) Sid 49.23%; Sara 70%

Pages 112–113

(1) (a) Rs 2550 (b) Rs 5925 (c) Rs 3550 (d) Rs 2250

(2) (a) 20% (b) 33.3% (c) 10.6% (d) 8.84%

(3) (a) Rs 850 (b) Rs 2775 (c) Rs 1750

(4) (a) Rs 500=20% (b) Rs 1250=22.78% (c) Rs 1250=17.24%

Page 114

(1) (a) P = Rs 355 (b) L = Rs 445 (c) L = Rs 146

(2) (a) Rs 858 (b) Rs 516 (c) Rs 2007

(3) (a) Rs 569 (b) Rs 1372 (c) Rs 1334

(4) (a) Rs 100; 11.11% (b) Rs 800; 25% (c) Rs 240; 50%

(5) (a) Loss 35.71% (b) Gain 37.50% (c) Gain 50% (d) Gain 15.38% (e) Gain 40%

Pages 116–118

(1) (a) Rs 3600 (b) Rs 1075 (c) Rs 690

(2) (a) Rs 12,720 (b) Rs 22,500 (c) Rs 19,980

(3) (a) Rs 9 (b) Rs 600 (c) Rs 50 (d) Rs 450 (e) Rs 2880 (f) Rs 7906.25
(g) Rs 18,000 (h) Rs 4648 (i) Rs 1440

(4) (a) Rs 6500 (b) Rs 1440; Rs 4,440

Page 119

(1) (a) 18.49 (b) 143.10 (c) 475.20

(2) (a) 0.444 (b) 0.857 (c) 0.933

(3) (a) 35% (b) 222.22% (c) 51% (d) 32% (e) 457.14% (f) 120%
(g) 88.89% (h) 800% (i) 103.2%

(4) (a) $\frac{7}{25}$ (b) $\frac{18}{25}$ (c) 6

(5) (a) 0.48 (b) 0.025% (c) 1.42

(6) (a) Rs 192 (b) 450*l* (c) 350km

(7) (a) Rs 4.95 (b) Rs 208 (c) Rs 106.25

(8) (a) Rs 72 (b) Rs 618.75 (c) Rs 562.50 (d) Rs 1134

(9) (a) (i) Rs 3397.50 (ii) Rs 10,947.50 (b) Zeba

Page 134

(1) Across: 1.Opposite, 4. Square, 5. Kite, 6. Rhombus 7. Rectangle.
Down: 2. Parallelogram, 3. Trapezium, 4. Sixty, 8. Ten

Pages 138–139

(1) (a) 15 (b) 42 (c) 18

(2) (a) 3 (b) 370 (c) 44, 11

(3) 36.5kg

(4) (a) Rs 9.75 (b) Rs 984 (c) (i) 23 (ii) 21.6 (iii) 312 (iv) 44.6

Pages 140–141

(1) (a) Mon 25, Tue 28, Wed 27, Thu 24, Fri 21 (b) 25 (c) Thu, Fri

(2) 12.8; Bop, Tiff, Kit.

(3) 89.25

(4) (a) 40km ph (b) 70km ph (c) 45km ph

(5) (a) 21km ph (b) 300km ph (c) 56km ph

Pages 142–143

(1) (a) 5hr (b) 2hr (c) 9hr

(2) (a) 0.5hr (b) 5hr

(3) (a) 150km (b) 220km (c) 125km

(4) (a) 72km ph (b) 75km ph (c) 71km ph

(5) (a) 12 hr (b) 144km ph (c) 61km ph (d) 27hr (e) 150km (f) 315km

(6) (a) 40km ph (b) 20km (c) 5 hr (d) 60km ph

(7) (a) 18km ph (b) 3 hr (c) 84km (d) $1^1/_2$ hr; 6km ph

Page 146

(1) a, b, c

(2) A: 1s + 1s + 1s; 3s; 1c + 1c; 2c.1b + 1b + 1b + 1b 4b

B: 2w, 2*x*, 2a, 2p. C: 7*x*, 5*x*, 10*x* D: $7x + 5x + 10x = 22x$

Page 147

(1) (a) 2l + 3s + 2c + 4b

(2) (a) 2a + 3b + 1m + 1w (b) 2s + 2k + 3f + 1t; 2r + 2e + 3m + 1y

Page 148

(1) (a) $5x + 3y + 1z$ (b) 1p + 1q + 2r (c) 4a + 3b + 12c + 1d

(2) (a) $7x + 5y + 8z$ (b) 7a + 7b + 6c (c) 3p + 4q + 6r

(3) (a) $3x + 5y$ (b) 2p + 2r + 3s (c) 1d

Page 149

(1) (a) 3*x* (b) 4y (c) 6f

(2) (a) 3*x* (b) 4y (c) 6z

(3) (a) g + g + g (b) q + q + q + q + q (c) z + z + z + z + z + z + z + z

(4) (a) 8x + 10y (b) 6p + 3q + 9r

Page 150

(1) (a) pq cm^2 (b) s cm^2 (c) fq cm^2

(2) (a) m + m + m + m + m + m (b) z + z + z + z + z + z + z + z + z (c) p cm x q cm

Pages 151–152

(1) (a) Rs 50 (b) Rs 30 (c) 10x

(2) $3l$ + 4s + + $3l$ + 4s = 2 ($3l$ + 4s) = $6l$ + 8s

(3) 3p + 4s + c

(4) 4s – 2s = 2s

(6) 3r + 3s

(7) (a) 6p (b) k + k + k + k (c) d (d) 12x (e) 6c

(8) (a) 7a + 9b + 2c (b) 5x + 7y

(9) (a) 2x + 2y (b) 6p + 4r

(10) (a) ab (b) pr (c) yz

Pages 153–156

(1) (a) 56,72,318 = fifty-six lakhs seventy-two thousand three hundred and eighteen
(b) 7,40,28,301 = seven crores forty lakhs, twenty-eight thousand, three hundred and one
(c) 60,09,053 = sixty lakhs, nine thousand and fifty-three
(d) 9,07,55,620 = nine crores, seven lakhs, fifty-five thousand, six hundred and twenty.

(2) (a) 4,203,721 = four million two hundred and three thousand, seven hundred and twenty one
(b) 31,672,049 = thirty-one million, six hundred and seventy-two thousand and forty-nine.
(c) 5,047,834 = five million forty-seven thousand, eight hundred and thirty-four
(d) 80,246,118 = eighty million two hundred and forty-six thousand, one hundred and eighteen

(3) six hundred thousand (b) four lakhs (c) twenty lakhs (d) eighty million

(4) (a) 2,347,999; 2,348,001 (b) 6,09,99,999; 10,00,001 (c) 14,17,599; 14,17,601
(d) 83,999,999; 84,000,001

(5) (a) 10,05,155 (b) 3,055,494 (c) 18,96,27,197 (d) 488.75

(6) (a) 640; 600 (b) 82560; 82600 (c) 1,29,390; 1,29,400

(7) (a) 2.5, 2.46 (b) 84.1, 84.10 (c) 6.2; 6.19 (d) 100.3; 100.34

(8) (a) 5,08,248 (b) 295.092 (c) 47,87,882 (d) 817.125

(9) (a) 225 (b) 902.36 (c) 996.57 (d) 1111.88

(10) (a) Rs 683.00 (b) Rs 376.93

(11) (a) 44 (b) 148 (c) 36 (d) 0.73

(12) (a) 12.7056 (b) 9.09 (c) $5\frac{1}{4}$ (d) 79 (e) 6100

(13) (a) $17.5m^2$ (b) $18m^2$ (c) $28m^2$ (d) $15m^2$

(14) (a) $31.5cm^3$ (b) $150.5cm^3$ (c) $113.85cm^2$

(15) (a) 23464 (b) 495648 (c) 7020

(16) (a) 24 (b) 200 (c) 16170

(17) (a) 28 (b) 9

(18) (a) 19 (b) 74 (c) 23 (d) 459

(19) (a) 420 (b) 1248 (c) 180 (d) 270

(20) (a) 90 (b) 36

(21) (a) $\frac{4}{27}$ (b) $36\frac{32}{35}$ (c) $\frac{1}{45}$ (d) $\frac{1}{16}$ (e) $7\frac{7}{10}$ (d) $\frac{2}{3}$

(22) (a) 48, 480, 4800 (b) 14.7, 147, 1470 (c) 68.7, 687, 6970 (d) 45.35, 453.5, 4535

(23) (a) 0.24 (b) 13.9095 (c) 3 (d) 8 (e) 10.116 (f) 20

(24) (a) 10.7874 (b) 26.3092

(25) (a) 0.45; 0.455 (b) 0.69; 0.692 (c) 0.67; 0.667

(26) (a) 56% (b) 15% (c) 340%

(27) (a) 166.67% (b) 411.11% (c) 383.33%

(28) (a) $\frac{4}{5}$ (b) $2\frac{6}{25}$ (c) $\frac{4}{25}$ (d) $\frac{3}{4}$ (e) $11\frac{11}{20}$ (f) $\frac{11}{25}$

(29) (a) 0.45 (b) 6.72 (c) 0.12 (d) 0.55 (e) 7.52 (f) 0.34

(30) (a) 1.8% (b) 164% (c) 14.3%

(31) (a) Rs 8.15 (b) 18.75% (c) 3920l (d) 31.579%

(32) (a) Rs 180 (b) 1300 (c) Rs 161.50

(34) (a) 60 (b) 80 (c) Scalene (d) 180

(37) (a) Rs 2700.33 (b) 1 hr 40min