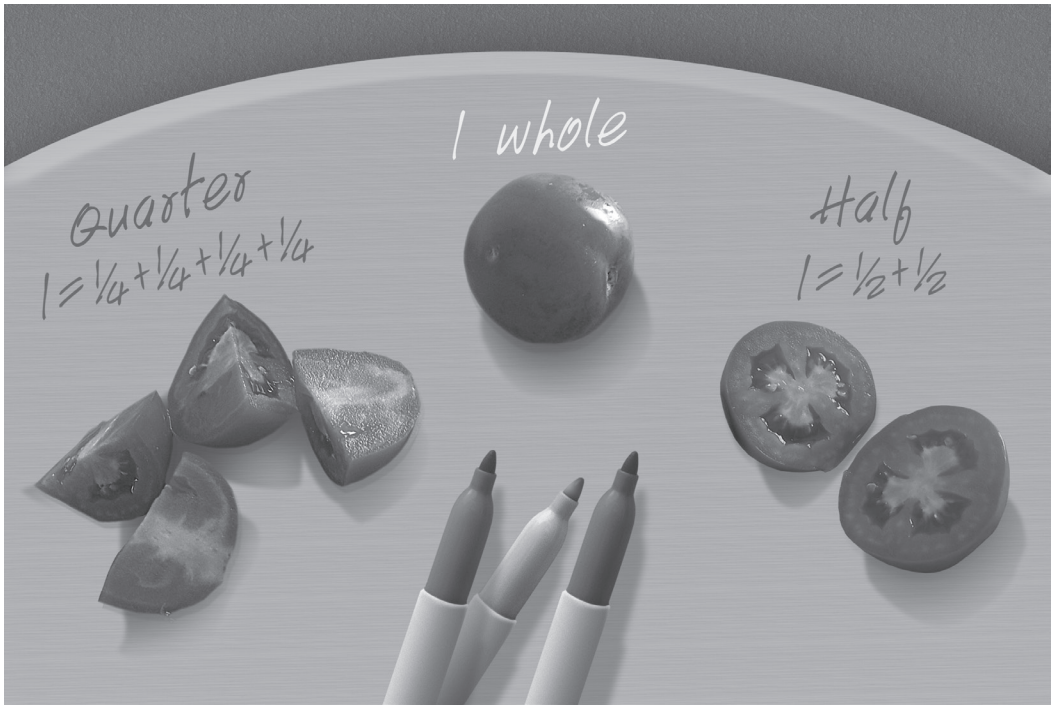
Teaching Guide
Second Edition with lesson plans

3

MATHS WISE



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INTRODUCTION

A. Introduction

Mathematics has always been one of the best food for the enquiring mind, of a growing child. In today's world of changing lifestyles, where IT, electronic gadgetry, and finding logical solutions to problems in daily life have become the needs of the day, employers are increasingly looking for thinking minds. It has become imperative that mathematics plays a significant role in education, right from the very beginning.

Teachers of pre-primary levels and classes 1, 2 and 3 have already laid a foundation for open and active minds. *Maths Wise* continues to use similar informal teaching methods in order to imbue in children, keener mathematical skills. The transition from a 'child' to a 'pupil' becomes easy and smooth.

It is recommended that pupils (up to class 5) are not put through rigid examinations. The teacher should be able to assess the progress of pupils with the help of a regular, weekly record of their work.

IMPORTANT

The ideal pupil-to-teacher ratio is around 8 children to 1 teacher. This is rarely possible. In a situation where a teacher may have a large class, there are 2 strategies, which may help:

1. Willing mothers may be invited to help during lessons, as 'Buddy Teachers' (instead of assistant teachers). Many mothers will be willing to help, as they enjoy this activity. Some may wish to remain with the class, even after their children have moved on. It will require a week's orientation before a mother is able to come in as a 'buddy teacher.'
2. Divide students into small groups so that they can work cooperatively; they will not require constant teacher attention.

   The class starts with a review of the previous day's lesson using a fun activity. It could be a short quiz or a round of mental maths. It is useful to revise tables every day. A game involving the use of hands to find answers makes tables interesting! Teachers of *Maths Wise* Introductory Books 1, 2, and 3 may also find this useful.

B. Teaching Guide for Maths Wise 3

Maths Wise 3, has been written fully in line with the requirements of the National Mathematics Curriculum and children's levels of understanding and capability.

As they grow older, children must be encouraged to think independently, explore their surroundings more boldly, and ask questions. *Maths Wise* 3 provides children with opportunities to explore, relate numbers to daily life situations and letters of the alphabet, use arithmetic operations (+, –, × and ÷), look for patterns in numbers and number

formations, and other objects in their environment, and find answers for themselves whenever possible.

New vocabulary, new topics, and new concepts are introduced by means of pre-topic discussions (or story-telling) and practical activities. At every step concepts are developed using examples that smoothly flow into a series of relevant exercises. Hands-on work, in addition to exercises in the books, further consolidates these concepts and encourages independent thinking.

The books provide a range of activities including puzzles, crosswords, coded message, brainteasers, and fun pages to guarantee the retention of interest and involvement of every child. There is sufficient drill for the students and challenging sums at the end of each topic and sub topic to extend the students. Samples of maze paths and blank cross number grids are given, which a child may use to create a puzzle for class fellows to solve.

One of the great needs for a teacher, as children grow older, is to recognize differing abilities, and to address them separately in each class. The minds of some children need to be stretched and their capabilities exercised to the full, often independently of the teacher. The less mathematically-able children need greater direction and support to ensure that they do not feel left out. The activities and problems in these books are of varied levels of difficulty to meet these requirements.

The Teaching Guide for *Maths Wise* book 3, contains lot of suggestions for activities which lead to lateral thinking within the confines of a school syllabus. The activities and challenges are exciting for children who have learnt to enjoy maths. It is still not too late to develop in most children a liking for the subject by encouraging them to think just a little outside the textbooks. This can be great fun both for the teacher and pupils.

1. Skills acquired by children

The activities undertaken in Classes 1, 2, and 3 will help children to achieve higher levels of comprehension and higher standards of work in Classes 4, and 5.

1. Concentration becomes automatic when children participate in practical work using objects from daily life. This helps them to relate their school work to the world around them.
2. Memory is honed and new concepts are stored into quick-recall memory through work such as tables and sequences. Mnemonics have been suggested to help memorize sequences of objects/activities. For example: BODMAS and work with 5– or 6–digit numbers which draw on recall of work done with 2– and 3–digit numbers.
3. Recognition increases as children are exposed to more ideas, such as number patterns, fractions, factors, and shapes (including animals and cartoons). Later, there are situations where they need to recall these.

4. Association occurs when children apply knowledge gained in earlier years to newer concepts. Memory and recognition are used to associate one object with another through a common characteristic. For example: a hexagon has 6 sides, a beehive has hexagonal cells.
5. The study of mathematics depends upon logic and it comes from concentration, memory, recognition, and association.
    a. Bees use hexagonal cells and not circular ones to make a hive, because in hexagonal tessellate, there is no wastage of space.
    b. Use of comparative language such as long, longer, longest, comes from logic.

    As mathematics becomes more formal, it is mandatory that the interest of the children is kept alive by continuing with outdoor / indoor activities, colourful charts, making up a story to introduce a new topic, and practical demonstrations whenever possible.

If the interest is kept alive, success will follow. Not only does learning become fun for children, the teachers will enjoy their teaching as well.

Three painful 'Ps' which should not exist in a teacher's vocabulary are:

1. Partiality to one child kills initiative in 10. So, please no partiality to any child.
2. Pointing out mistakes in front of others is a definite *no*. It is best to look out for the best traits using positive language. Coming up from Class 2, children are still very sensitive as they settle into a more formal style of schooling.
3. Punishment is ruled out. There are no children who are beyond gentle cajoling, a smile or a hug of a teacher. Punishment, like a 'slap on the hand,' only makes matters worse, and children tend to become stubborn. Milder punishment like standing outside the classroom may become necessary for the unruly student and can be very effective.

The positive 'Ps' which must exist in a teacher's vocabulary are:

1. Praise is positive: employ a 'yes' attitude as often as possible. Praising good work and good behaviour will encourage other children to follow suit.
2. Patience: there is no virtue like patience, especially in a teacher. This means not losing one's temper.
3. Parent-like attitude is very reassuring. Teachers should know when to respond to attention-seeking behaviour and when to ignore it; the bottom line is the underlying sense of security a child feels.

The heights of tables and chairs must be correct for the students. Emphasis needs to be laid on correct posture when children write. If attention is not paid to this now, it can lead to a bad posture permanently and back problems.

A little exercise to relax those load-carrying shoulders helps muscles relax, and motor control improves.

With straight backs, hands on hips, forward and backward bending is helpful.

Then, the same posture, children put both hands straight ahead and start writing numbers 0 to 9 with their hands in the air, first both hands going in the same direction and then the two hands going in opposite directions, one clockwise and the other anticlockwise. (Here is an excellent opportunity to introduce these new words into their vocabulary. Does the tap open in a clockwise or an anticlockwise direction? The screwdriver and the lock on the door are further examples.)

2. Maths Lab

A maths lab must contain some of the items included in the earlier classes. Some extra items are suggested here:

- some soft-drink bottle caps, strings of 10 bottle caps strung together and a group of 10 strings knotted together to represent one hundred. Sets of such strings can be used for explaining numbers, addition, and subtraction.
- strings for measuring lengths of objects or a child's height
- weighing scales of 4 different types: a spring scale, an ordinary balance, a regular scale with a vertical circular dial, and a step-on weighing scale on which children can weigh themselves. Children can be taken on a field trip to the station to observe the weighing scales on which cars and other heavy objects are weighed.
- tape measures and rulers of different sizes
- a trundle wheel
- shells, small stones, beads in groups of 10s, 100s, and 1000s, 10000s wrapped securely in cloth bags
- Several sets of 4 almost identical objects, one with a very slight difference, to improve observation skills
- colourful pictures or charts of shops displaying fruit and vegetables, toys, and a rack of clothes, all with price tags
- sudoku puzzles of differing levels
- fabrics or strong paper to make different objects
- solid shapes in the form of wooden blocks, balls (spheres), egg-shapes, dice (cubes), boxes (cuboids), cans (cylinders) and cones
- cubes, cuboids, cylinders, and cones made from thick card which can be opened out and laid flat
- flat shapes cut out from thick card or wood, such as circles, squares, and triangles, so the students can feel the flat surface and count the corners and the edges. It will be useful to have flat shapes which are equal to the sides of the solids, so that children can explore the relationship between solids and their faces.

- rolls of cord and ribbon
- plastic or steel tins, jars, bowls of different sizes for comparing capacity. Bowls made of halves of dried coconut shells or bamboo segments split in halves may be used.
- pencils and crayons of different colours and lengths
- charts illustrating different concepts studied
- solids made from play dough which have 2 (or more) lines of symmetry, so that they can be cut into halves along 2 axes
- squares of reflecting plastic surfaces (avoid using glass mirrors)
- 3-piece jigsaw cards with a number and corresponding multiplication and division sums; e.g. $\frac{24}{3}$ and 4 x 2, dominoes and flashcards
- a giant number square 1 to 100 on the wall and several sheets with blank squares for children to work on
- a horizontal wooden rod with several pegs, wooden numbers hang from these
- number tabs, up to 4-, 5-, 6-, and 7-digit figures
- analogue and digital clocks
- abacus and calculators
- 12 pages to make up a calendar; sunshine, rain and cold weather to be depicted by symbols on each day. Reinforces counting, association between weather and appropriate symbols, clothes which people wear and food that people eat during these seasons
- plastic baskets or trays to store various objects
- a fraction wall, with fractions such as $\frac{1}{2}$s, $\frac{1}{3}$s, $\frac{2}{3}$s, and $\frac{1}{5}$s
- plastic cakes / pizzas / fruits / jars of water to demonstrate fractions and percentages
- gem clips, rubber bands
- a stopwatch
- a set of geometrical instruments
- waste bins marked PLASTICS, GLASS, and PAPER
- attractive charts and other child-friendly displays on walls for use as learning aids
- a soft board covered with chamois leather on which children can stick numbers or pictures
- to make learning enjoyable, a patch of garden in the school yard, with different shrubs and pets such as rabbits, white mice, and tortoises, a fish aquarium and an aviary, would be useful. These also help create awareness of the environment.

Each *Maths Wise* book begins with a detailed review of the previous year's work. It is important to check that each child has mastered concepts learnt in the previous year and is handling these independently, with confidence.

An interesting way to do it may be to conduct a quiz following the pattern of questions in the review exercises.

C. Maths Wise **3**

Numbers

Step-by-step, numbers up to hundreds of thousands are introduced. The concept has been introduced based on the students' prior knowledge. The comparison of place values has been done pictorially to aid the visual learning.

It must be emphasized here that if a student is working well with 3-digit numbers, going further to 5-, 6-, or 7-digit numbers should be easy. The language used, the methodology, and the techniques are the same for carrying over and grouping or borrowing.

The concept of 4-, 5-, and 6-digit numbers is best explained by using the terms 'house of thousands' and 'house of tens'.

Less than (<), greater than (>)

A crocodile's mouth drawn on the board, always ready to grab the bigger number, can be used. Similarly, the left hand with the thumb held horizontally and the forefinger held straight up, makes an angle to show less than. Similarly, the right hand can be used to show greater than.

D. Lessons

It is suggested that the teachers spend 40 minutes per lesson. However the time spent on each lesson is entirely at the teacher's discretion and the ability of the students to grasp the concept.

UNIT 1

ASSESS AND REVIEW

Teaching objectives

- to revisit concepts and skills learnt in the previous year
- to revise addition, subtraction, multiplication, and division of numbers
- to work with basic concepts of fractions
- to solve time-related problems in daily life

Learning outcomes

Students should be able to:

- recall the concepts learnt during the previous year
- recognize 2D and 3D shapes
- work out every-day problems based on the concepts of addition, subtraction, multiplication, and division
- tell the time
- work with simple fractions

Teaching materials:

- Additional worksheets

Learning activity

Lesson 1: 40 minutes

The beginning of the year is the time when it is essential to revisit the concepts that were covered in the previous year. This not only helps the students reconfirm the concepts but also helps a great deal in the settling-down process. Students get to know their new classmates thorough group work, too. They start to bond better with the teacher if the work done is familiar and they have a good grasp of it. It is also a very useful tool for you to use to judge the level of each student. You can assess the progress of each student through fun activities in a friendly ambience. Also, this will help you plan all future lessons and activities to facilitate the teaching/learning process.

It should be mentioned here that some students do not have such retentive memories as others, so go slowly with them until their work is of the required level.

For this purpose the worksheets, used as revision sheets at the beginning of the year, are useful and fun to work with. The students should enjoy doing them as a team as well as individually. The sheets need to be thought-provoking for this age group, rather than mathematically taxing. Students should be able to demonstrate their thinking and analysis skills, and at the same time recall concepts previously learnt.

Task: Students attempt pages 2 to 8.

Additional resources:

At the end of the guide are additional worksheets 1–4. Use them for reinforcement.

UNIT 2

NUMBERS

Teaching objectives

- to recognize and write Roman numerals
- to identify odd and even numbers within a sequence
- to identify place value up to 6-digit numbers (100,000)
- to introduce number names, expanded forms, and place value up to 6 digits
- to compare and sequence numbers

Learning outcomes

The students should able to:

- identify commonly-used Roman numerals
- recognise even and odd numbers up to 99 in a given sequence
- demonstrate understanding of place value in numbers of up to 6 digits
- use the < , >, and = symbols correctly to compare 2 numbers
- order and sequence numbers

Teaching materials:

- computer cut-outs of Roman numerals
- beads, wooden cubes
- board
- house board and counters of various colours

Learning activity

Lesson 1: 40 minutes

Look at the value of Roman numerals, which were used over 2000 years ago. Seven letters are used represent 7 different values:

Roman Numeral	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

Today, the decimal system, which was motivated by the discovery of 0 and counting on the10 fingers of the hands, is used universally. But the students will be interested to work with Roman numbers too, because they do appear on old coins, the construction dates of old buildings, and the titles of royalty, such as King George V.

Have a stock of Roman numeral cut-outs. Use these as the lesson goes on.

Talk about the Roman numerals in a story telling session. These numerals were used in ancient Rome, many centuries ago, using 7 letters of the Latin alphabet. Different letters represent different numbers. The reason for the origin of each is still debated.

Using fingers, Roman numbers can be represented like this:

I is one finger up …. Hold up cut-out for Roman I

II is two fingers up … Hold up cut-outs for Roman II

III is three fingers up … and so on

V is the shape formed between the thumb and forefinger

X is crossing of two thumbs

Numbers are formed by placing 2 or more symbols next to each other, then adding the individual values. III (3), VI (6) and CCXVI (216)

I can be placed before V and X to signify '1 less than' V (5) and X (10)

IV = 4; IX = 9

C can be placed before D and M to signify '100 less than' 500 (D) and 1000 (M)

CD = 400 and CM = 900

Some people still write dates with the year written in Roman numerals:

20.12.2014 as 20.12. XXIV

Lower case letters are also used, e.g. i, ii, iv, v, ix, x, and c.

The reason for Roman numbers going out of use was that there was no 0, and therefore big numbers could not be written easily, and number operations were difficult to perform. Their use has reduced considerably in today's world.

However, Roman numerals are still used for special numbering: for example, to number additional pages in a book, to show numbers on old-style clock faces and watches, to number parts of a question, naming the Olympic Games (XXX Olympiad) and in the names of rulers, King George V, Queen Elizabeth II.

Basic combinations

1	2	3	4	5	6	7	8	9
I	II	III	IV	V	VI	VII	VIII	IX
10	20	30	40	50	60	70	80	90
X	XX	XXX	XL	L	LX	LXX	LXXX	XC
100	200	300	400	500	600	700	800	900
C	CC	CCC	CD	D	DC	DCC	DCCC	CM

Here is a method for writing big numbers:

$\overline{V}$ (for 5,000), $\overline{X}$ for (10,000), and $\overline{L}$ (50,000)

$\overline{\overline{ICI}}$ (for 50,000), $\overline{\overline{IDI}}$ (for 500,000) and $\overline{\overline{IMI}}$ for (1,000,000)

5,000	10,000	50,000	100,000	500,000	1,000,000
$\overline{V}$	$\overline{X}$	$\overline{L}$	$\overline{C}$	$\overline{D}$	$\overline{M}$

Numbers are written horizontally, left to right.

ALL ROMAN NUMERALS ARE ADDED IN THESE NUMBERS

II I + I = 2

VI V + I = 6,

XII X + I + I = 12

To write 1236, break 1236 into 1000, 200, 30 and 6

MCCXXXVI M + C + C + X + X + X + V + I =1236

To write 1974, break 1974 into 1000, 900, 70 and 4

- 1000 = M
- 900 = CM
- 70 = LXX
- 4 = IV

So 1974 = MCMLXXVI Here is a mnemonic to remember the order of Roman numerals:

Look at the value of Roman numerals below:

M	e	D	i	C	a	L		X	a	V	l	e	r
1000		500		100		50		10		5	1		

EXCEPTIONS:

IX, represents I less than X, i.e. 9;

XL represents X less than L, i.e. 40

IV = V – I = 4
IX = X – I = 9
XL = L – X = 40
XC = C – X = 90
CD = D – C = 400
CM = M – C = 900

Sometimes in the past one number may have been written in two ways:

18 was written as IIXX OR XVIII
50 was written as XXXXX OR L
40 was written as XXXX OR XL
But this does not happen any longer; the format used in the text-book (the second one) is the commonly accepted format.

The year 2014 is written as MMXIV (Addition all the way, except V – I = 4).

Take the students outside and arrange them in 2 groups. One group holds up fingers IN ORDER to represent a Roman numeral and the other team guesses which number it is.

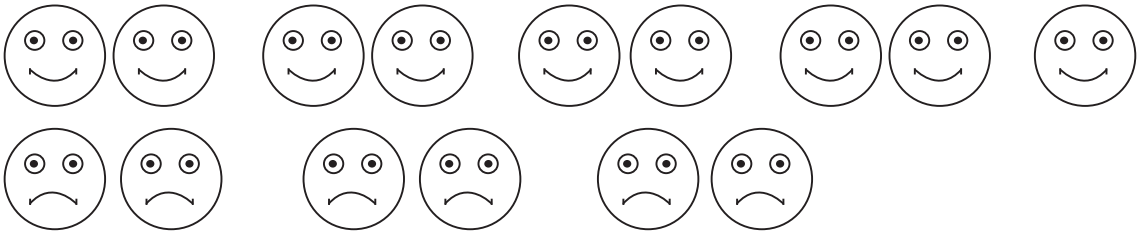
Task: Students attempt pages 11 to 15.

Lesson 2: 40 minutes

Give each student some beads or wooden cubes. Ask them to group them in pairs. Numbers which can be grouped in 'pairs' with none left over are called even numbers.

Numbers which, after being grouped in pairs, have a bead left over are called odd numbers.

odd number



even number

After doing a couple of examples with the beads, ask the students to observe the features of even numbers. Lead them towards the fact that an EVEN number will have the unit digit 0, 2, 4, 6, or 8. For example, 112, 398, 312, 274, 1996, and so on.

Odd numbers will have the unit digits 1,3,5,7, or 9. Numbers such as 223, 4449, 687 and 421 are odd numbers

There are some norms which apply when working with addition, subtraction, multiplication, and division of even and odd numbers. The numbers in consideration are whole numbers.

ADDITION AND SUBTRACTION

even ± even = even
even ± odd = odd
odd ± odd = even

MULTIPLICATION

(REMEMBER: multiplier × multiplicand = product)
even × even = even
odd × even = even
odd × odd = odd

3	×	5	=	15
Factor (multiplier)		Factor (multiplicand)		Product

DIVISION:

(REMEMBER: Dividend / Divisor = Quotient)
Odd/odd = odd (IF the dividend is a multiple of the divisor)
Even/odd = even (IF the dividend is a multiple of the divisor)
Odd/even will give a fraction.

Work with skip-counting with the class. Draw a number line on the board. Give each student a counter. Call each student to the board and ask him/her to place one counter

on any number. Then, ask the student to skip count by 2's (Or repeated addition). Observe the numbers the counter lands on. Work in the same manner with division (as repeated subtraction).

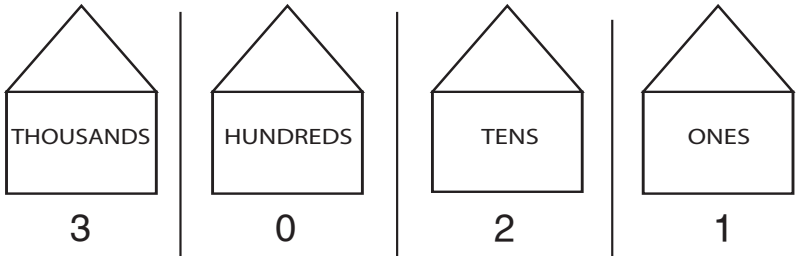
IMPORTANT: Each group of alternate numbers on a number line, going up to infinity, will comprise of either ONLY odd numbers or ONLY even numbers.

The students do skip counting with other numbers.

Task: Students attempt page 16.

Lesson 3: 40 minutes

Introduce the concept of place value using houses, as shown below.



Assign a house each to ones, tens, hundreds, thousands, and tens of thousands; explain that each house can hold only 9 members. When the 10th member comes in, it forms a group of 10, and must move on to the next house, as ONE member of the new house. Now give out the counters and ask the students to form numbers by placing the counters in the correct houses.

In a practical display, if there are 9 toothpicks in the ones house, and a 10th one is added, then take the 10 away in a bundle and place it the tens house, as one 'bundle of ten'.

It is useful to have bundles of toothpicks already tied in bundles of 10's or 100's in a box. Alternatively, you could use single squares, strips of 10 squares and large squares of 100 small squares

As the students fill in the houses with toothpicks or paper squares, ask them to call out the numbers represented.

For example: 43 = four tens and 3 ones;

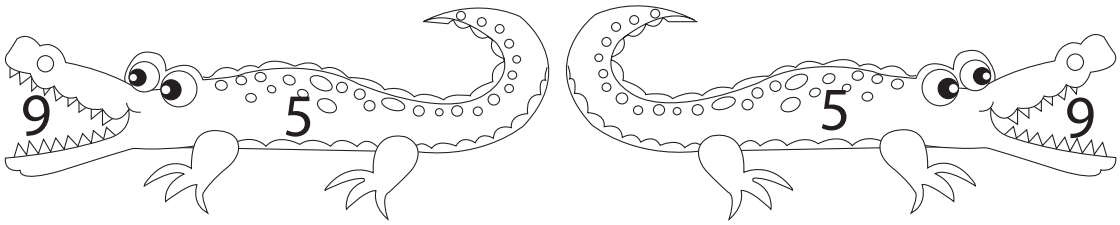
3021 = 3 thousands, 0 hundreds, 2 tens, and 1 one.

Once the concept is clear, the students will find it easy to extend to 5 or 6-digit numbers.

Task: Students attempt pages 22–27.

Lesson 4: 40 minutes

The concept of > and < is best illustrated with the mouth of a greedy crocodile.



9>5 5<9

Compare numbers 5 and 9. Which is the bigger number or, which is the smaller number?

The crocodile has already eaten the smaller number (5 is in its stomach). But it is greedy animal, and wants to eat the bigger number too (9 is in the mouth).

9 > 5 5 < 9

9 is GREATER than 5 5 is LESS than 9

As the students do this activity, point out that the higher the value of a numeral in a particular house, the higher the value of the entire number. Also, numbers in houses to the left represent bigger numbers than those on the right. Hence introduce the students to the idea of ordering numbers by value.

213 > 199 and 579 < 821

Sequencing of numbers may be done using the same activity.

Task: Students attempt pages 29 and 30.

Additional resources:

At the end of the guide are additional worksheets 5 and 6. Use them for reinforcement.

UNIT 3

NUMBER OPERATIONS

Teaching objectives

- to practice horizontal and vertical addition
- to reinforce addition with and without carrying over
- to revise subtraction with and without borrowing
- to introduce multiplication tables from 6 to 9
- to introduce multiplication of 2 digit number by a single digit number
- to introduce short and long division
- to introduce word problems involving all 4 operations

Learning outcomes

Students should be able to:

- perform horizontal and vertical addition
- add numbers with carrying over
- perform subtraction with/without borrowing
- use multiplication tables up to 10
- perform long and short division
- solve word problems involving real life situations using all 4 number operations

Teaching materials:

- Additional worksheets

Learning activity

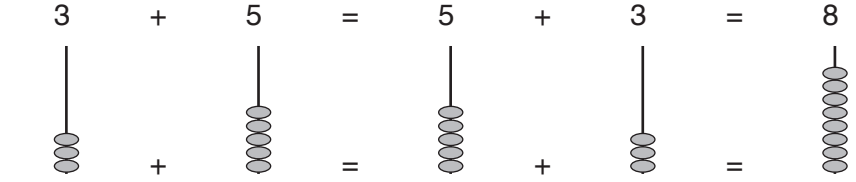
Lesson 1: 40 minutes

The students used the 4 number operations +, – ,×, and ÷ in the previous year. They have handled 3 digit numbers. Handling larger numbers should not be difficult, as the concepts of number operations are the same. It may be a good idea to go over the concept of houses and groups of 10 again, before starting with larger numbers. Also, review number names and expanded forms of notation. Discuss the relevant phrases 'addition' and 'sum of two or more numbers'; 'subtraction' and 'the difference between two numbers'; 'multiplication' and 'product of numbers'; and 'division' and 'the quotient' .

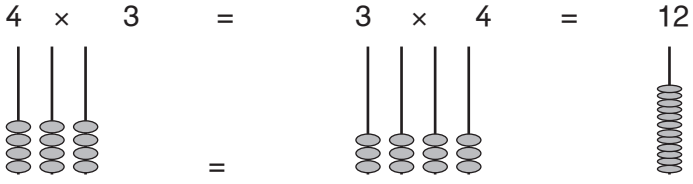
At this stage, introduce some general properties of the number operations.

Establish the following facts through practical exercise:

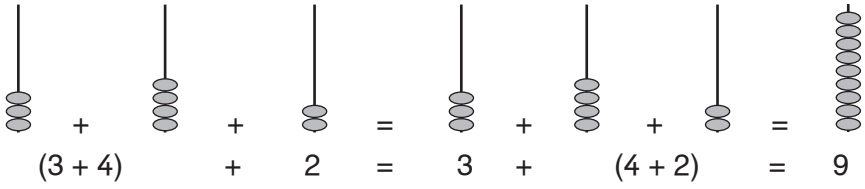
1. Commutative Law for Addition



2. Commutative Law for Multiplication



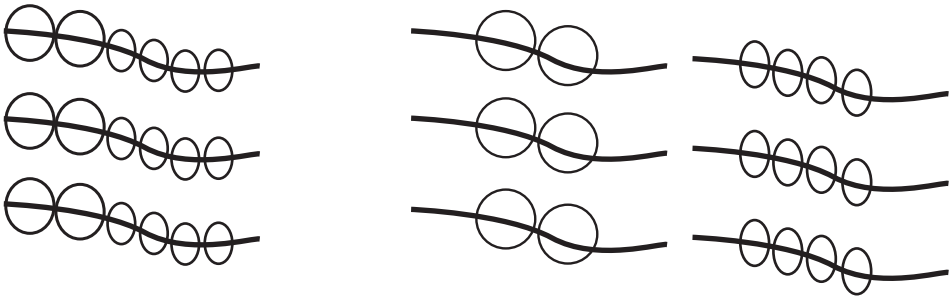
3. Associative Law for Addition:



4. Associative Law for Multiplication

$(2 \times 3) \times 4 = 2 \times (3 \times 4) = 24$

5. Distributive Law



= 18

Reasons for using commutative and associative properties:

Solve the following:

1. $24 + 16 + 37 = (24 + 16) + 37 = 40 + 37 = 77$
2. $29 + 42 + 8 = 29 + (42 + 8) = 28 + 50 = 79$
3. $4 \times 5 \times 13 = (4 \times 5) \times 13 = 20 \times 13 = 260$
4. $2 \times 12 \times 5 = (2 \times 5) \times 12 = 10 \times 12 = 120$

For perfection, number operations require a lot of practice, both written and practical. Emphasis must be placed on setting out the sums in neat, straight columns. Use exercise books with squared paper for this purpose.

Some students have difficulty in setting out sums involving large numbers. They may set out the digits the wrong columns if not guided properly.

Set out horizontally a number of addition, subtraction, multiplication, and division problems. Ask the students to arrange these vertically and work out the answers. Ensure that each student is able to arrange these in vertical columns correctly. Generally, if exercise books with squared paper are used, the students have no problems at all. But sometimes you may want to use colour-coding for the digits.

Task: Students attempt pages 34–45.

Lesson 2: 40 minutes

For multiplication, let the students work in groups of 8. Make circular discs of a convenient size, with concentric circles drawn on each of the discs. Use a protractor to divide the disc in 10 equal parts. These rings can be used for addition or multiplication.

This exercise helps the students to revise and memorize the tables through a fun activity. The middle ring is filled in with suitable numbers. The students find the answers (additions or multiplication) and write these in the outermost ring. Refer to worksheet 20.

Multiplication and division by 10 and 100 are explained with the help of a few examples. The students work out the answers to multiplication and division problems by 10 and 100. They often discover the pattern themselves, after a few examples. With your guidance, they come to the conclusion that adding one 0 or 00 on the right side of the ones digit gives the correct answers.

Multiplication by 0 is explained by examples such as:

1. Shamim adds 10 on her calculator 3 times; she gets 30. She adds 0 on her calculator 3 times; what answer does she get?
2. Raqib puts 20 sweets in a jar 10 times. He has 200 sweets. But, if he puts 20 sweets in the jar 0 times, how many sweets are in the jar?

Task: Students attempt pages 54–57.

Lesson 3: **40 minutes**

The students work with some bracelets (say 15). Tara gives 5 bracelets to each of her friends; how many friends will get 5 bracelets each?

gives 5 to Najma. $15 - 5 = 10$

gives 5 to Waheeda $10 - 5 = 5$

gives 5 to Sharmila $5 - 5 = 0$

So, $15 \div 5 = 3$

3 friends get 5 bracelets each.

Salman needs to share 24 marbles amongst a group of 6. How many does each friend get?

Salman takes 6 marbles and gives 1 to each friend. $24 - 6 = 18$

Salman takes 6 more, and gives 1 marble to each friend. $18 - 6 = 12$

Salman takes 6 more, and gives 1 marble to each friend. $12 - 6 = 6$

Salman takes 6 more, and gives 1 marble to each friend. $6 - 6 = 0$

Salman's 6 friends, each have 4 marbles. $24 \div 6 = 4$

In the process, they discover the method of division. Even division with a remainder becomes clear when they are left with some bracelets or marbles after they have distributed them equally and no more distribution is possible.

Long division becomes clear and easily mastered when the students record each step of their operation carefully. Start the process with known multiplication tables, and then move on to harder problems with remainders.

IMPORTANT: It is important to remember ….

1. $5 \times 3 = 15$, therefore $15 \div 5 = 3$; also $15 \div 3 = 5$
2. $24 \div 6 = 4$, therefore $4 \times 6 = 24$; also $6 \times 4 = 24$

Task: Students attempt pages 58–64.

Additional resources:

At the end of the guide are additional worksheets 7 and 8. Use them for reinforcement.

UNIT 4

FRACTIONS

Teaching objectives

- to introduce common fractions and match them with related figures
- to solve equivalent fractions
- to work with proper and improper fractions
- to compare fractions
- to add fractions with a common denominator

Learning outcomes

Students should be able to:

- work with different types of fractions and relate them to everyday objects and situations
- compare different fractions
- add and subtract fractions with the same denominator

Teaching materials:

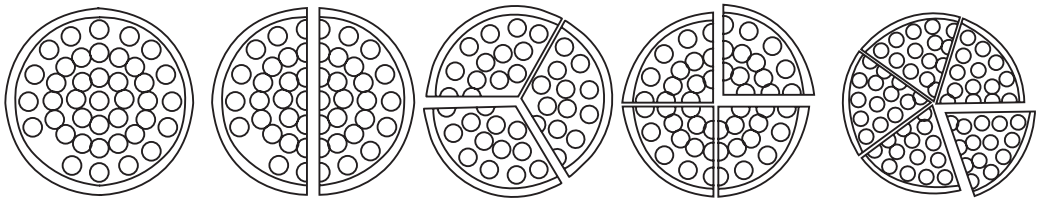
- fraction chart
- paper cups and some sand

Learning activity

Lesson 1: 40 minutes

Students worked with simple fractions in the previous year. A fraction chart is a useful tool to explain various aspects of fractions, especially to review concepts such as finding parts of a whole, and equal fractions.

For example: Using a pizza, the chart shows that 2 halves make a whole, 3 thirds make a whole, 4 quarters make a whole, and so on.



1 whole Two $\frac{1}{2}$s Three $\frac{1}{3}$s Four $\frac{1}{4}$ s Five $\frac{1}{5}$s

Choice of language is also important for the introduction of numerator and denominator:

$\frac{1}{2}$ one part Numerator indicates number of parts taken from a whole.

total parts Denominator indicates number of parts in the whole.

A fraction wall is an interesting practical demonstration. Start on the floor, or in sand, and then on a chart.

1 Whole															
$\frac{1}{2}$							$\frac{1}{2}$								
$\frac{1}{3}$				$\frac{1}{3}$					$\frac{1}{3}$						
$\frac{1}{4}$				$\frac{1}{4}$				$\frac{1}{4}$				$\frac{1}{4}$			
$\frac{1}{5}$				$\frac{1}{5}$				$\frac{1}{5}$				$\frac{1}{5}$			
$\frac{1}{8}$				$\frac{1}{8}$				$\frac{1}{8}$				$\frac{1}{8}$			
$\frac{1}{10}$				$\frac{1}{10}$				$\frac{1}{10}$				$\frac{1}{10}$			
$\frac{1}{15}$				$\frac{1}{15}$				$\frac{1}{15}$				$\frac{1}{15}$			
$\frac{1}{16}$				$\frac{1}{16}$				$\frac{1}{16}$				$\frac{1}{16}$			

Students make this chart by cutting strips of coloured paper into halves, thirds, and fifths.

Emphasis must be laid on the correct use of fraction terms such as one fifth as opposed to one over five or 99 hundredths instead of 99 over 100

Later, for fractions such as $\frac{3}{2000}$, it is acceptable to say 3 over 2000.

Task: Students attempt pages 66–71.

Lesson 2: 40 minutes

Give each student a square piece of paper (or a strip of paper) divided into 4 equal parts.

Ask the students to colour $\frac{1}{4}$ of the shape.

Then, divide the square or the strip into 8 parts and ask them to colour one quarter. Then, give them a square or a strip divided into 16 parts. And ask them to colour one quarter.

The students should observe that the coloured parts are all equal. They should come to the conclusion that $\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$.

Repeat the exercise with several shapes and different equivalent fractions.

Ladoos cut into $\frac{1}{2}$s and $\frac{1}{4}$s, chocolate bars (with already marked out fractions) and parathas cut into fractional portions are useful for showing equivalent fractions.

Task: Students attempt pages 71–74.

Lesson 3: **40 minutes**

Introduction to fractions with sand or water is better done as an outdoor activity.

Introduction to improper fractions: Give each student two equal-sized paper cups and some sand, one and half times the capacity of the cup. Ask the students to use the cup to measure the amount of sand. Encourage them to think for themselves and come up with the idea that there is one full cup and the second cup is half full. (For later use, also discuss the fact that each of the two cups can be three-quarters full or 3 cups can be half full.)

Then, give them three paper cups, each with exactly half the capacity of the first cup. Discuss the capacity of each cup, by pouring sand from one large cup into two smaller cups. Elicit that the capacity of the smaller cup is exactly half that of the larger cup.

Ask them to measure the same amount of sand, using the new cups. Ask them to think about the implication of the result. Elicit that the 3 small cups held exactly the same amount of sand as one-and-a-half large cups, or the capacity of three small cups together is equivalent to the capacity of one whole cup and a half. Repeat the exercise with different quantities of sand (or coloured water) and various beach buckets with different capacities, and bigger bottles for liquids.

Introduce and explain the terms proper fraction, improper fraction, and mixed fraction.

PROPER FRACTIONS

A fraction which is less than one whole is a proper fraction: Examples: $\frac{1}{2}$, $\frac{3}{5}$, $\frac{6}{7}$ and so on. (The cup is never full.)

$\frac{2}{3} < 1$ OR $1 > \frac{2}{3}$

$\frac{5}{7} < 1$ OR $1 > \frac{5}{7}$

IMPROPER FRACTIONS

A fraction which is more than one whole is an improper fraction: Examples: $\frac{3}{2}$, $\frac{6}{5}$, $\frac{9}{7}$ and so on. (The cup is full, and there is some left over.)

$\frac{3}{2} > 1$ OR $1 < \frac{3}{2}$

$\frac{6}{5} > 1$ OR $1 < \frac{6}{5}$

$\frac{9}{7} > 1$ OR $1 < \frac{9}{7}$

MIXED FRACTION

In the experiment with sand in cups, the students observed that 3 half-sized cups held the same amount of sand as one full cup and one half cup.

So, $\frac{3}{2} = 1\ \frac{1}{2}$

$1\frac{1}{2}$ is a mixed fraction. Liked an improper fraction, a mixed fraction is always more than one whole.

$\frac{3}{2} = 1\ \frac{1}{2}$ AND $1\ \frac{1}{2} > 1$ or, $1 < 1\ \frac{1}{2}$

The students can come to these conclusions through observation during their activity. They now learn the method of converting improper fractions to mixed fractions and back.

This is easily done with a few practical experiments with paper cups, beach buckets, and jars. Then, the method of conversion needs to be clearly explained.

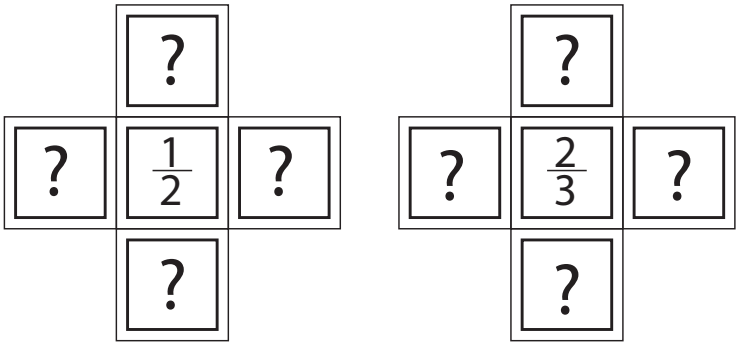
Task: Students attempt pages 75 and 76.

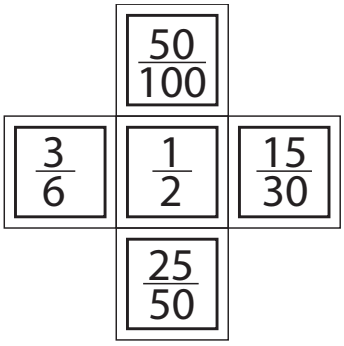
Lesson 4: 40 minutes

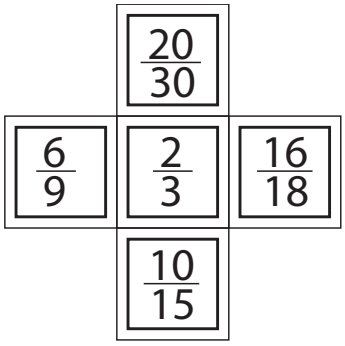
Start with addition and subtraction of fractions with same denominator during an outdoor activity session. Ask questions such as, 'What fraction of the chocolate did your group eat?' The students discuss among themselves and add up the equivalent fractions representing the bars of chocolate. The answer may 5 whole bars of chocolate and 7 out of the 10 squares of the 6th bar (6 and $\frac{7}{10}$) 'What fraction of the juice cartons are left?' They work the figure out in a similar manner.

Discuss the reason for adding and subtracting fractions only when the denominators are the same (common). Discuss some common errors which might occur if we add fractions with different denominators.

Fractions in a cross will also be useful in finding equivalent fractions. In the centre square, put a fraction such as $\frac{1}{2}$ or $\frac{2}{3}$. The students find fractions equivalent to these and write them down in the empty crosses.







You may teach the rhyme below to help students remember addition/subtraction of fractions:

If adding or subtracting is your aim
The bottom numbers must be the same!

Changing bottom with multiply or divide,
The same to top must be applied,

And don't forget to simplify,
Before its time to say good bye

Task: Students attempt pages 77–80**.**

Additional resources:

At the end of the guide are additional worksheets 9 and 10. Use them for reinforcement.

UNIT 5

MEASUREMENTS

Teaching objectives

- to introduce metric measurements and their units
- to compare, add, and subtract units of length, weight, and capacity

Learning outcomes

Students should be able to

- use units of length, weight, and capacity
- add and subtract units of length, weight, and capacity

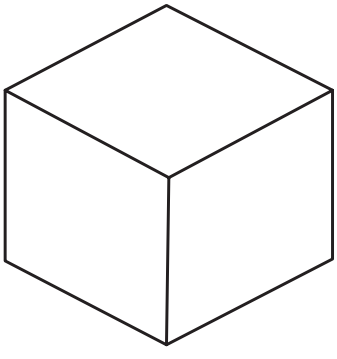
Teaching materials:

- computer
- measuring tape
- weighing scale
- measuring cylinder/cup
- articles to be measured

Learning activity

Lesson 1: 40 minutes

Metric system for measurement of physical quantities, such as length, weight, and capacity (except time) is the most commonly used system.
Length is measured in metres.
Weight is measured in grams.
Capacity is measured in litres.



The three measurements are related to one another.

The length of each edge of this cube is 10 cm.
The volume of this cube is 10 cm × 10 cm × 10 cm = 1000 cm^3
The capacity of this cube is 1 litre, which means that it can contain 1 litre of water.
The weight of this 1 litre of water will be 1 kilogram.

'kilo' as a prefix to any unit indicates 1000 such units.
One kilogram (1 kilo) is 1000 grams = 1 kg
One kilometre is 1000 metres = 1 km
One kilolitre is 1000 litres = 1 kl
One kilobyte is 1024 bytes (for memory in computers) = 1 KB
One kilocalorie is 1000 calories (unit of energy) = 1 kcal

In the following table, the units have the values shown below the line:

kilo	hecta	deca	unit	deci	centi	milli
× 1000	×100	×10	1	1/10	1/100	1/1000

Discuss the conversions and the conversion factors along with the meanings of the prefixes even before starting the concept of measurement. Let them be conversant and confident with conversions.

Concepts of length, weight, and capacity are introduced at 3 decimal places at this stage. The chapters have been designed in such a way that there is plenty of scope to relate this work to practical situations. A lot of field and group work is useful.

Length: Divide the students into groups. Give them rulers of different lengths: 1 m, 25 cm and 10 cm, a fabric tape measure, and a metal roller tape. Ask them to measure the following:

- the length and the width of the classroom
- the height of a desk, a chair, a cupboard, and the teacher's desk
- the length and width of the display board
- the length and the width of the Maths Wise text book
- the length of a pen
- the length of an eraser.

At the end, each team should presents the list of their measurements. Encourage them to talk about the units they chose to use, the different measuring rods or tapes that were used, and the reasons for their choices. Was there any argument about which equipment to choose? How did they reach the final decision?

Such activities help develop skills for team-work, problem solving, resolving differences among group members, and public speaking.

Ask questions such as:

1. Do you know the length of your bedroom? If you do not know, can you guess it? (The students get the actual measurements of their individual bedrooms the following day.)
2. Is the centimetre a good unit for measuring your bedroom? Why? Why not?
3. What fraction of its length is the width of the display board? (First, find the length of the display board, and then the width.)

4. What should be the dimensions of a new cupboard be if it has to be 40 cm higher than the current one?
5. Can a pen and an eraser be measured using the same measuring tool?
6. The new edition of Maths Wise 3 is 3 cm shorter than this edition, but has the same width. What are its dimensions?
7. If there are 4 rooms similar to this room along one side of the corridor, how long is the corridor?
8. Represent the above length in kilometres.
9. How much longer is the teacher's desk than a student's desk?

Task: Students attempt pages 83–90.

Lesson 2: 40 minutes

Take the class outside. Divide them into 2 groups. Give each group a weighing scale use different kinds: a spring balance, a double-pan balance, and a modern digital balance. If possible, show them a jeweller's weighing scales and the weights used. Discuss the reason for the size.

Let students hold different sizes of stones in one hand and guess the weight. Then, each stone is put on the scales to check who was right. Which is the balance they would use in the kitchen to bake a cake, in the warehouse to weigh a sack of rice, and in a jeweller's store to weigh gold and silver?

Discuss the reason why everything has weight…. The gravity of the Earth. Why does an apple fall down from the tree? Why does a ball thrown in the air, fall to the ground?

Newton and the apple story is very valid. Why do objects always fall down? Why does every object have weight? For example, 10 g of gold, 200 g of flour to bake a cake, or 50 kg of potatoes.

Why do astronauts find it hard to walk on the Moon? It is interesting to note that the weight of a person may somewhat reduce when the Moon is exactly above the Earth. The reason? The Moon's gravity pulls the person in a direction opposite to the gravity of the Earth.

Task: Students attempt pages 92–97.

Lesson 3: **40 minutes**

Carry out activities similar to those used for length and weight using measuring cups or cylinders. The students should form clear ideas about a litre, kilolitre, and millilitre. Talk about practical situations, and discuss the unit which would be suitable for the situation. The students use calibrated cups and cylinders of different sizes to find the sum of two cups full of liquid or the difference between the two.

Show them how to find the sum and difference by adding liquids in a measuring cylinder.

Carry out 2 interesting experiments.

1. Pour 1 litre of water into a measuring cylinder. Now put a large stone into it. Observe the new water level. What does the rise of level signify?
2. Take 4 similar measuring cylinders. Pour a litre each of water, oil, kerosene, and glycerin in the various cyclinders.

Now weigh each cylinder. What do you observe?

The weight of 1 litre of water should be 1 kg. The volume will be approximately 1 cubic metre. That is the basis of the entire metric system.

If you were to weigh the water with 10 tablespoonfuls of salt (or sugar) dissolved in it, will the weight of the solution be more? Will the level of water rise?

Task: Students attempt pages 98–100.

Additional resources:

At the end of the guide are additional worksheets 11 and 12. Use them for reinforcement.

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UNIT 6

TIME

Teaching objectives

- to explain how to tell the time using a.m./p.m.
- to explain the midnight, midday, midnight sequence
- to introduce digital and analogue clocks
- to practise adding and subtracting hours
- to read and write dates from a calendar

Learning outcomes

Students should be able to:

- differentiate between a.m. and p.m. time
- calculate time before and after a given hour
- remember the calendar sequence correctly and read and write dates

Teaching materials:

- wooden clock face
- stopwatch
- calendar for current year

Learning activity

Lesson 1: 40 minutes

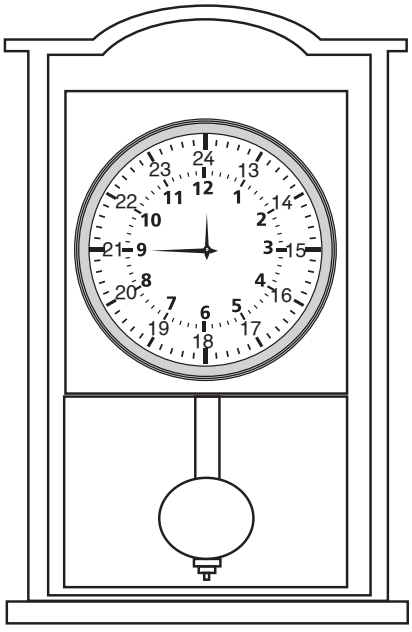
Time is the only form of measurement, be it years, months, days, minutes, or seconds, which cannot be measured using the decimal system. The number of days taken by the Earth to go around the Sun is 365 and $\frac{1}{4}$ days. This not a multiple of 10, and cannot be converted into tenths and hundredths. Because of the $\frac{1}{4}$, there are 365 days in a year for 3 consecutive years, and the four $\frac{1}{4}$ s make one day, which is accounted for as an extra day, giving 366 days in a leap year.

It is interesting to introduce more complex means of telling time; examples: pendulum clock, time-ball, stopwatch, etc.

A day is further divided into 24 hours, each hour into 60 minutes, and each minute into 60 seconds.

The students already know how to make a clock face by dividing the circular face of a clock into 4 parts and then dividing each quarter into 3 smaller units. (This can be done by paper-folding or with the help of a protractor.) Each unit represents 5 minutes. Time is read in jumps of 5. This has been done in Maths Wise 1 and Maths Wise 2 on a number line as well as on a clock face.

So, exact time can be told on an analogue watch by calculating the position of the minute hand.



The 24-hour clock can be introduced now. Make a special clock face with the usual 12 hours in the inner circle and 13 to 24-hour time in the outer circle, or vice versa. It is still possible to get a 24-hour face on clocks and wrist-watches. (please fill in all the numbers). Revise a.m. and p.m.

The concept of time is directly related to real life; problems can be easily developed to facilitate the student's perception and understanding of time. The students have heard about time management and the school timetable. Based on that, ask them to prepare a timetable of their daily activities at home.

The next day in class, compare these timetables for each student and discuss the amount of time spent per day on various activities. Also compare the time spent by different students doing the same activity. You may arrive at very interesting conclusions. They will discover the amount of time each one spends doing homework, watching TV, sleeping, doing household chores, and other activities. Involve them in a discussion on the optimal utilization of time.

Ask them to create a similar time-table for each parent and share these with the class. Point out the differences in the utilization of time by adults and students, under headings such as time spent in:

Prayer – before bedtime or after waking up
Sleeping

Changing clothes

In the kitchen

At the dining table

Swimming

In the office
In school
Learning music or art
Eating a family meal
Watching TV or playing games
Chatting
Playing games
Travelling to school
Watching a film
The longest innings any batsman has played
T20 cricket match

It is good exercise to discuss issues like excessive TV viewing or playing games, as a result of which actual responsibilities may be neglected.

Task: Students attempt pages 102–105.

Lesson 2: 40 minutes

At this stage, it is important for students to understand the concept of an hour, a minute and a second. They should form an idea about the actual sense of the units of time. 'Clap to a second', 'Clap every 5-seconds', 'Clap every 10 seconds', and so on. A stopwatch is useful in this case.

Divide the class into small groups. Give each group a stopwatch. One group challenges the other group to perform an activity (for example: run around the playground twice). As the other team tries to complete the activity in the allotted time one member of each team keeps track of the time using the stopwatch. Repeat this activity several times keeping in mind the fact that each student gets to keep the time at least once and perform an activity at least once. This helps them develop a sense of time. At the end of the session ask them to make a list of tasks that can be done in a second, a minute, 5 minutes, 15 minutes, half an hour, an hour, more than an hour.

For example, how long does each of the following activities take?
Drinking a glass of milk
Eating a snack
A quick shower
Helping in the kitchen (or any other work)
A telephone call to a friend
An ad on the TV
Travelling from home to school and from school back home

Task: Students attempt pages 106–108.

Lesson 3: **40 minutes**

The students have learnt about the calendar in previous years.

What is a year? A year is not only from 1st January to 31st December; from Christmas to the next Christmas, or from Boxing Day to the next Boxing Day is one year; from this birthday to your next birthday is one year.

Revise the months of the year. Ask them to find the dates from the current calendar. Talk about important events; ask the students the dates and months in which they take place.

It will be interesting for the students to learn a little about the Roman calendar.

What is the reason behind September (Septagon …7 sided figure) being the 9th month, October (Octopus … 8) being the 10th month, November (Novem ….9) being the 11th month and December (Decade …10) being the 12th month?

Task: Students attempt pages 109–112**.**

Additional resources:

At the end of the guide is an additional worksheet 13. Use it for reinforcement.

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UNIT 7

GEOMETRY

Teaching objectives

- to introduce of the concept of lines and rays
- to demonstrate how to draw triangles and quadrilaterals
- to introduce the circle and identify its components
- to introduce the concept of perimeter

Learning outcomes

Students will be able to:

- differentiate between a line and a line segment
- define a point
- draw triangles and quadrilaterals using a ruler and a pencil
- recognize circles in nature and work with components of circles
- draw a circle of a given radius
- measure perimeters

Teaching materials:

- geo boards
- a long piece of rope
- cardboard and scissors
- computer

Learning activity:

Lesson 1: 40 minutes

Geometry is an important concept that students become familiar with at an early age, beginning with objects such as the spherical ball, the rectangular rim of a cot, the oval of the mother's eye, the circle of a moon, the rim of a glass or a bowl and mother's bangles. The concept of geometrical shapes and their properties is best introduced and explained with real life objects and hands-on activities in the classroom.

Read pages 114, 115, and 116. Give the students plenty of practice in drawing the various shapes and understanding the terms introduced.

Task: Students attempt pages 117–118.

Lesson 2: 40 minutes

Tangrams, excellent for recreational mathematics, are an excellent tool to help students familiarize themselves with the different shapes and their physical properties. They also help build the student's neuro-motor skills.

Take to class a tray of Tangram pieces or cardboard cut-outs of various triangles and quadrilaterals, as per the original Tangram square. Display a chart showing the various possible combinations.

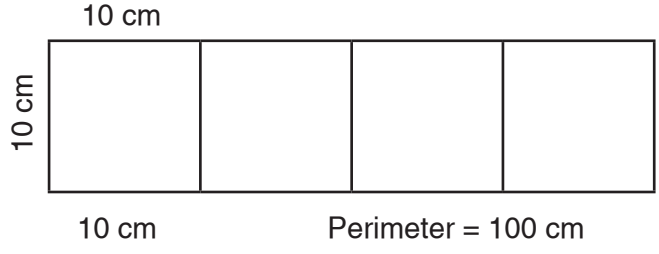
Ask the students to use rulers, protractors, and compasses to draw the various quadrilaterals and triangles. The shapes can be cut out, measured, folded, compared, and even written upon. Practical work can be quite useful in teaching all sorts of concepts related to quadrilaterals and triangles.

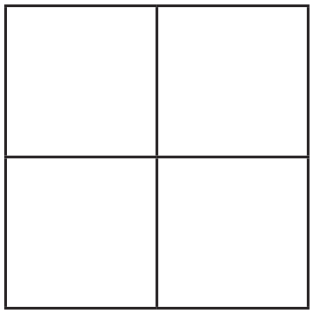
Task: Students attempt pages 119–120.

Lesson 3: 40 minutes

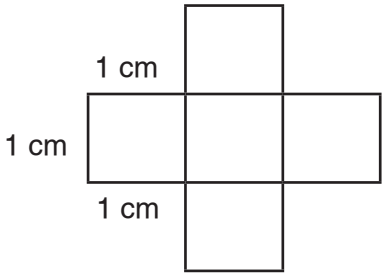
What is a perimeter? Tie a rope tightly around the top edge of your desk. Make a knot, and remove the rope from the table. The length of this rope, measured in metres and centimetres, gives you the perimeter of the table. Make a few loops of the same size. Help 3 or 4 students hold the loops and stretch them to make different shapes such as a triangle, a square, a rectangle, or even a circle. Place these loops on a tiled floor. Count how many squares each shape occupies. It will be obvious that shapes with the same perimeter have different areas.

In a reverse manner, take 4 identical square cut-outs with each side, say 10 cm. Put the squares in a line. What is the perimeter? 100 cm. Put them in a square form; what is the perimeter? 80 cm.

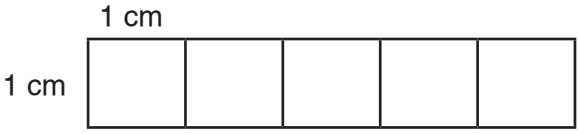




Perimeter = 80 cm

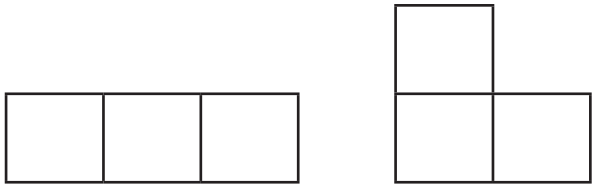


Perimeters = 12 cm

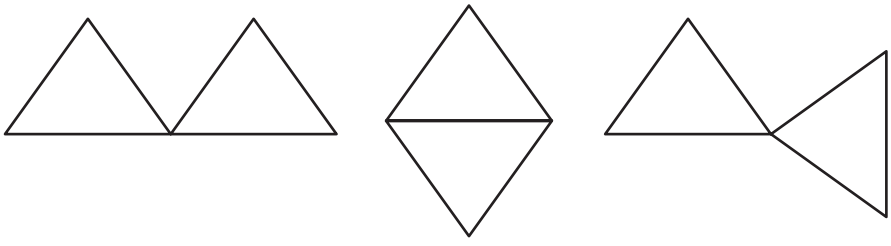


Perimeters = 12 cm

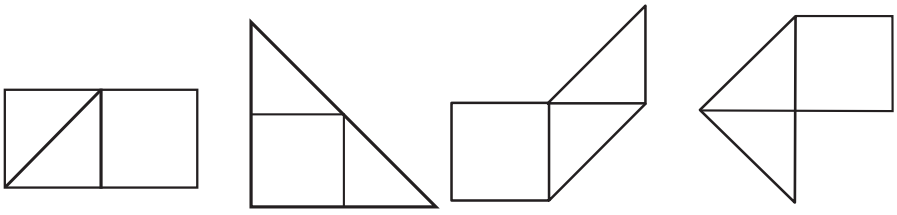
Work with 3 squares … put them in a row and in an L shape. Are the perimeters different in each case?



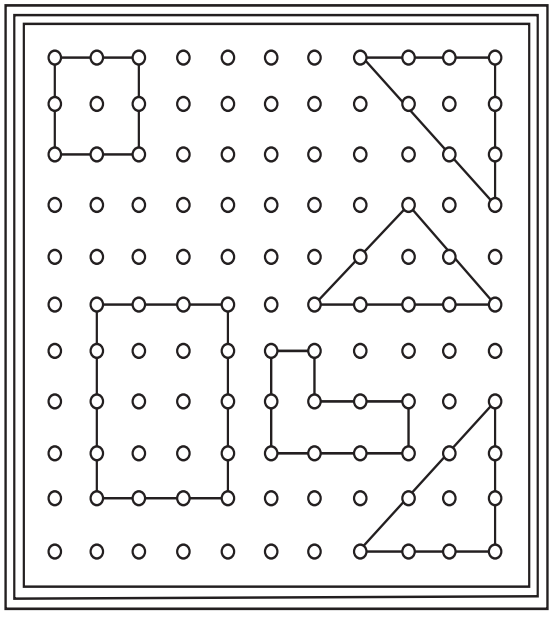
Work with equilateral triangles in a similar manner. The object of the exercise is to enable the students to discover the fact that different shapes with the same area can have different perimeters.



As the students work on the Tangrams, talk about the importance of these shapes, that they have the same area (as they are parts of the square from which the parts have been cut out) but they all have different shapes and hence different perimeters. You may also ask them to think about different shapes which have the same perimeter.



Different shapes can also be formed on a geoboard with non-stretch string.



You could conduct several activities for teaching about properties of shapes and perimeter using the geo board. Divide the class into groups of 3 or 4 and give each group a geo board and some elastic bands. Ask the students to make shapes such as any quadrilateral, a triangle, a shape like a circle, an arrow shape, or an L shape on the geo board. They calculate the perimeter of any shape by counting the number of squares the rubber band has gone around. (Sometimes the rubber band stretches diagonally across a square, in which case the length is more than a side. Similarly, be aware of the fact that the areas of different shapes vary.)

Take the students outside. With chalk dust, create a geo board on the ground. Divide the students into 2 groups. One group will stand on the dots holding a rope between them to form a shape. The second group has to name the shape, state 3 of its properties and find the perimeter of the shape. Repeat this exercise several times ensuring that every student gets a chance to make a shape as well as state its properties.

Task: Students attempt pages 121–124**.**

Additional resources:

At the end of the guide are additional worksheets 14 and 15. Use them for reinforcement.

UNIT 8

GRAPHS

Teaching objectives:

- to introduce graphs
- to introduce pictograms using symbols

Learning outcomes:

Students should be able to:

- explain the idea of graphical representation
- collect data
- devise a scale and a key
- display data in a pictogram
- interpret a pictogram

Teaching materials:

- chart paper and coloured pencils
- newspaper clippings of graphs
- computer

Learning activity

Lesson 1: **40 minutes**

A graph is a representation of a set of data on paper. Display an assortment of graphs (enlarged) on charts.

This is the students' first introduction to graphs, a concept they will refer to throughout their lives, so it is very important that they gain a good understanding at this stage.

Work with the graphs which relate to everyday topics such as runs scored by various cricketers, temperatures during various seasons, favourite sports of the students, and so on.

Show them clippings of graphs being used in every sector of life, be it sports, science, newspapers, advertisements, banks or even in their school. Show the advantage of representing information on a graph as opposed to in written form. The information on a graph is immediately visible.

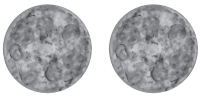
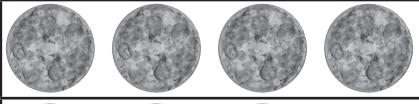
Talk about the various forms of graphical representations the students can see around them: a bar graph, histogram, pie chart, scatter graph, and a line graph. Introduce the basic requirements to be shown on any graph: a set of axes to be labelled according to

the type of data, and a scale or a legend. Even a map can be considered to be a graph … instead of the two axes, a map has direction: N to S, and E to W.

Divide the class into groups. Give each group a topic and ask them to conduct a survey in class and gather raw data. Explain how to sort out and arrange the data. Then, show them the steps for deciding a scale and a set of axes. Help them plot the data into a pictogram. Once the pictograms are ready, ask the groups to come up and present their graphs. During the presentation, ask them questions which have to be answered by referring to the graph

Pets	
Dogs	
Cat	
Rabbits	
Others	

This pictogram shows the number of pizzas eaten by four friends in the past month:

Zain	
Ali	
Sara	
Nida	

Key:  = 4

The Key tells you that one pizza on the pictogram represents 4 pizzas eaten so Zain ate 4 + 2 = 6 pizzas.

Task: Students attempt pages 126–128.

Additional resources:

At the end of the guide is an additional worksheet 16. Use it for reinforcement.

UNIT 9

ASSESS AND REVIEW 2

Teaching objectives:

- to revise concepts learnt throughout the year

Learning outcomes:

Students should be able to:

- demonstrate understanding of the concepts learnt through the year

Teaching materials:

- Additional worksheets

Learning activity:

Simple magic squares, for this age group, will be an interesting fun activity to be introduced. A magic square has numbers arranged inside a square (one number used once only) in such a manner that the sum of each row and each column is constant.

In the Magic Square given below, numbers from 1 to 9 have been used in such a manner that each row, each column and each diagonal has a sum of 15.

Introduce this concept. Draw the Magic Squares on the board, with a couple of numbers missing. Ask the class to fill in the numbers. Work out a couple of such squares before the class is asked to complete them. A few examples have been given below.

Each Magic Square below has been formed with consecutive numbers.

2	7	6
9	5	1
4	3	8
15	**15**	**15**

4	9	2
3	5	7
8	1	6

7	12	1	14
2	13	8	11
16	3	10	5
9	6	15	4

23	28	21
22	24	26
27	20	25

Do the work sheets with the students to review the concepts taught this year. You may add values to each of the problems on these sheets and use them according to your students' requirements. Repeated use is also possible.

Task: Students attempt pages 130–137.

Additional resources:

At the end of the guide are additional worksheets 17–23. Use them for reinforcement.

Worksheet 1

Add and subtract to find the secret message.

	43 + 24	52 + 37	27 + 21	46 + 43	40 + 18
Answer					
Code					

	35 + 32	34 + 22	43 + 32
Answer			
Code			

	68 − 25	78 − 46	79 − 31
Answer			
Code			

	87 − 31	75 − 23	96 − 40	76 − 52
Answer				
Code				

24	32	43	48	52	56	58	67	75	89
Y	O	G	T	W	A	R	P	N	E

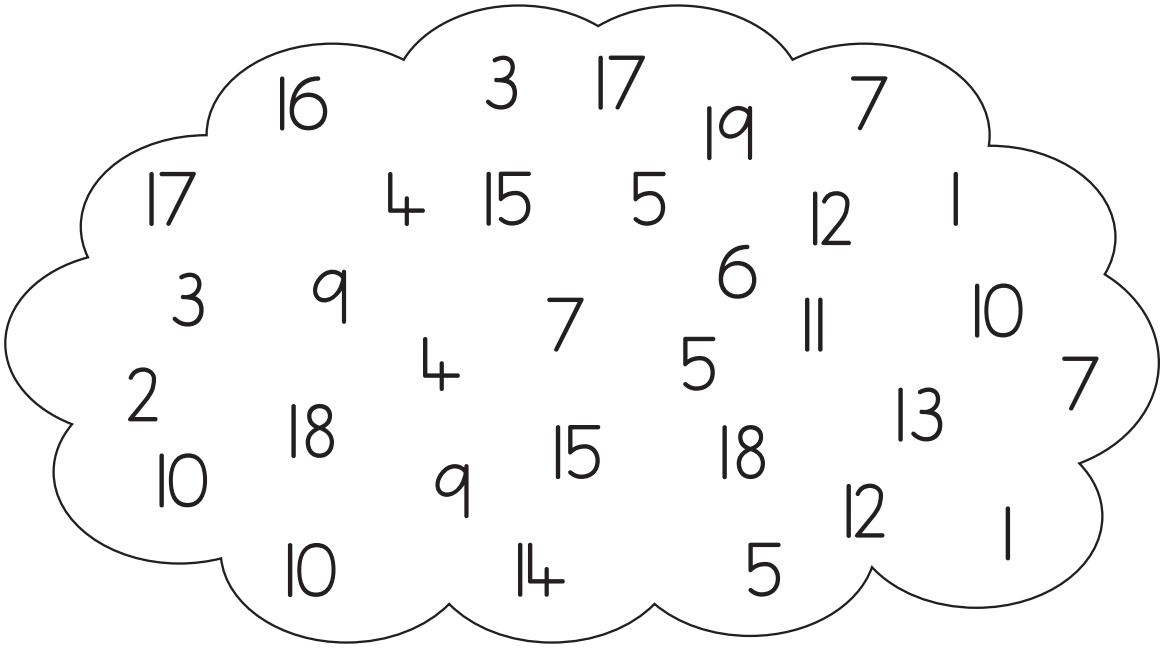
Worksheet 2

Complete the addition table.

+	0	4	1	5	7	6
3						
6		10				
0						
2					9	
10						
8						
1						

Worksheet 3

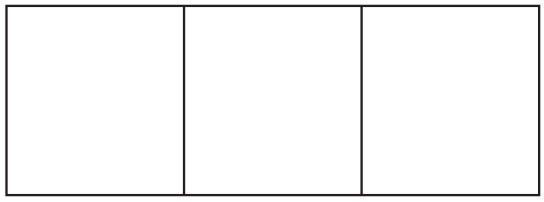
Circle the pairs which make 20.



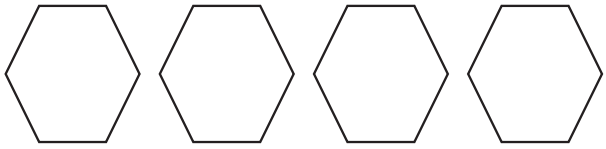
Worksheet 4

Shade each figure according to the fraction given.

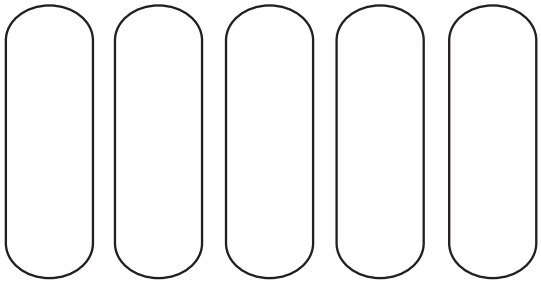
$\frac{3}{3}$



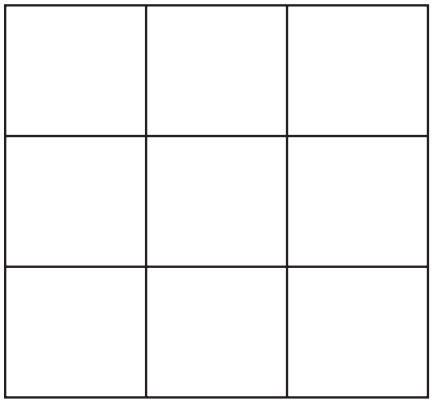
$\frac{2}{4}$



$\frac{2}{5}$



$\frac{3}{9}$



Worksheet 5

Ancient Romans used numbers that looked different from the numbers we use now (Arabic numerals).

Roman numerals	I	V	X
Arabic numerals	1	5	10

To convert Roman numerals to Arabic numerals, you add.

XII = 10 + 1 + 1, or 12

Whenever there is a 4 or 9 in Roman numerals, you will subtract.

IV = 5 – 1, or 4

IX = 10 – 1, or 9

Now look at the number below. You need to add and subtract.

XIV = 10 + 5 – 1, or 14

1. Write as Arabic numerals.

a. XI = _____

b. IX = _____

c. XXXV = _____

d. XX = _____

e. XXII = _____

2. Write as Roman numerals.

a. 6 = _____

b. 12 = _____

c. 21 = _____

d. 4 = _____

e. 25 = _____

Worksheet 6

1. Write the value of the underlined digit.

a. 178,5<u>4</u>2 _____

b. 659,<u>2</u>36 _____

c. 675,29<u>1</u> _____

d. <u>7</u>98,206 _____

e. 68<u>3</u>,671 _____

f. 60<u>3</u>,096 _____

g. 896,2<u>3</u>1 _____

h. 30,<u>5</u>86 _____

2. Look at the number below.

786,906

a. Which digit has the greatest value?

_____

b. What is the value of the digit in the thousands place of the number? _____

c. What is the value of the digit in the hundreds place of the number? _____

d. Which digit has the least value?

_____

Worksheet 7

Complete the following.

a. $7 \times 12 =$ _____

b. $7 \times 8 =$ _____

c. $8 \times 6 =$ _____

d. $7 \times 9 =$ _____

e. $8 \times 10 =$ _____

f. $9 \times 9 =$ _____

g. $9 \times 3 =$ _____

h. $7 \times 10 =$ _____

i. $9 \times 6 =$ _____

j. $7 \times 4 =$ _____

Worksheet 8

Complete the following.

a. 72 ÷ 12 = _____

b. 27 ÷ 3 = _____

c. 9 ÷ 3 = _____

d. 72 ÷ 8 = _____

e. 56 ÷ 8 = _____

f. 24 ÷ 2 = _____

g. 40 ÷ 5 = _____

h. 54 ÷ 9 = _____

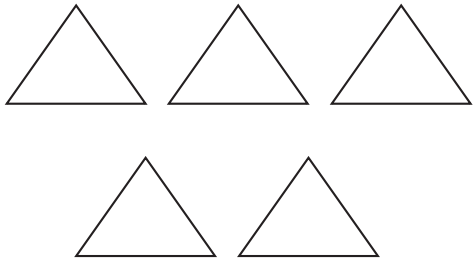
i. 44 ÷ 4 = _____

j. 11 ÷ 11 = _____

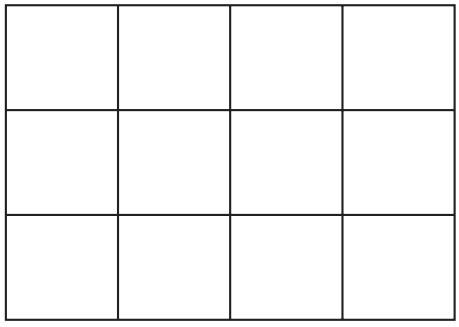
Worksheet 9

Shade the figures according to the fraction given.

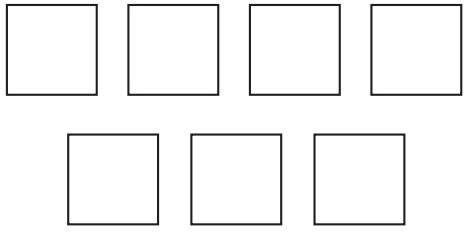
$\frac{4}{5}$



$\frac{10}{12}$



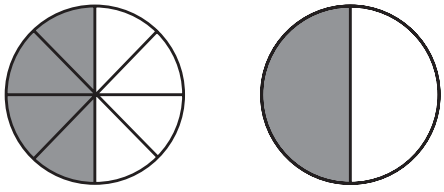
$\frac{5}{7}$



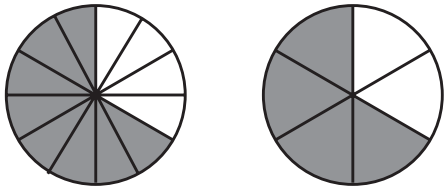
$\frac{2}{4}$

Worksheet 10

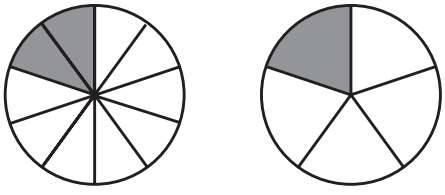
Write the equivalent fractions.

a. 

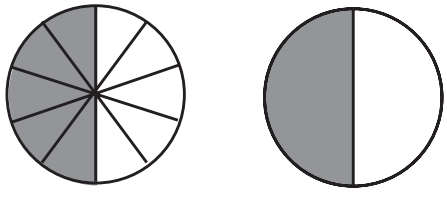
_____ = _____

b. 

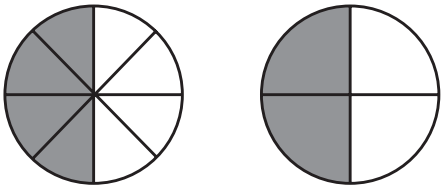
_____ = _____

c. 

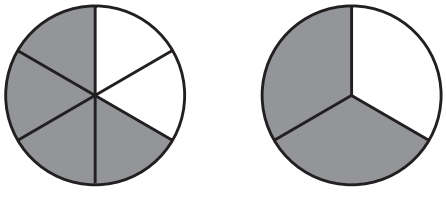
_____ = _____

d. 

_____ = _____

e. 

_____ = _____

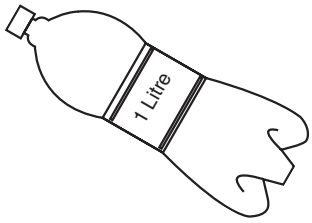
f. 

_____ = _____

Worksheet 11

Millilitres and litres

A litre (l) and millitre (ml) are two units for measuring capacity in the metric system.



This bottle holds 1 liter of water.

A millilitre is about 20 drops of water.

a. Mr Asad filled a bucket with water to clean a floor. Does the bucket hold 5 litres or 9 millilitres of water?

b. Nadia adds half of a teaspoon of vanilla to her cake recipe. Did she use 2.5 l or 2.5 ml of vanilla?

c. Zaid bought a cup of hot chocolate. Does the cup hold 500 litres or 500 millilitres of hot chocolate?

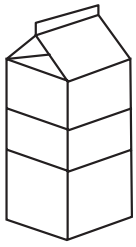
d. Sana bought juice for the friends to drink at her birthday party. Did she buy 6 l of juice or 6 ml?

e. Sonia has a large fish tank in her house. Does the fish tank hold 100 litres or 100 ml of water?

Worksheet 12

Estimating grams and kilograms

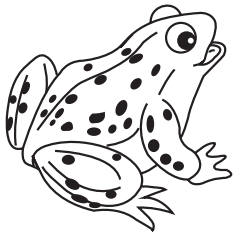
A gram (g) is used to measure the weight or mass of very light objects.
A small paperclip weighs about a gram
A kilogram (kg) is used to measure the weight of heavier objects.
A one-liter bottle of water weighs about a kilogram.



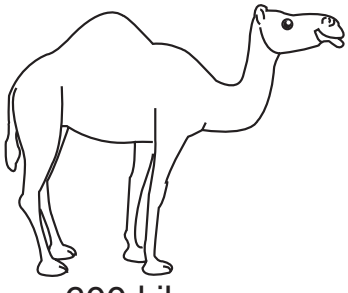
1 litre
100 grams
4 kilograms

10 grams
2 kilograms
5 kilograms

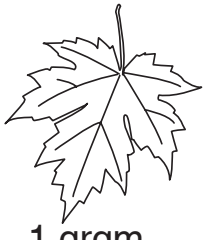
18 grams
4 kilograms
8 kilograms



3 grams
300 grams
3 kilograms



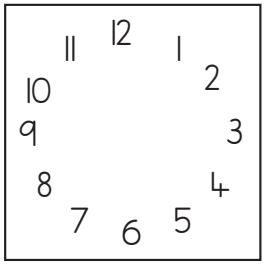
600 kilograms
60,000 kilograms
6000 kilograms



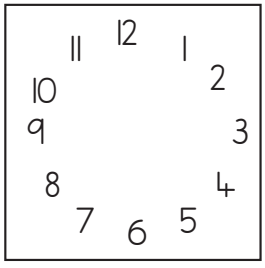
1 gram
50 grams
1 kilogram

Worksheet 13

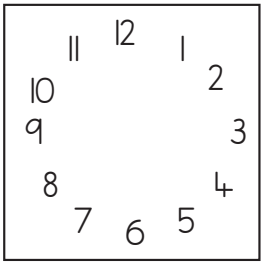
Draw hands on each clock to show the given time.



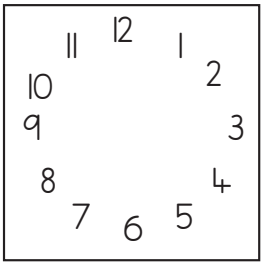
1:35



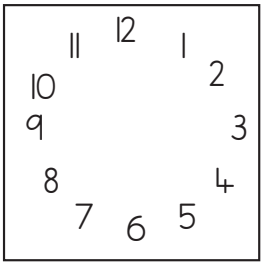
10:20



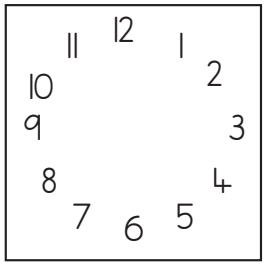
9:00



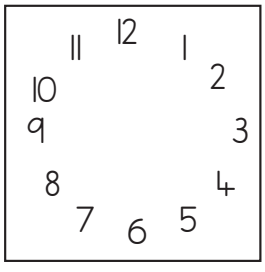
7:50



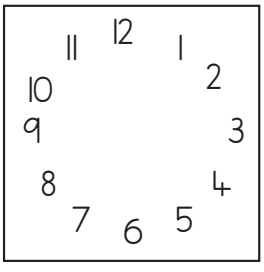
4:35



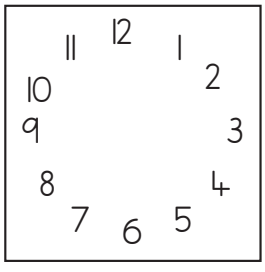
8:10



7:00



2:20



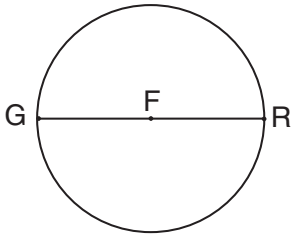
2:50

Worksheet 14

Circles

A circle is named by the point in center.
A radius is a line segment from the center of the circle to the edge.
A diameter is a line segment that passes through the center of a circle. It has two points on the outside edge of the circle.
Write the name of each radius and diameter.

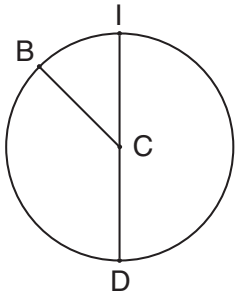
1.



radius: _____

diameter: _____

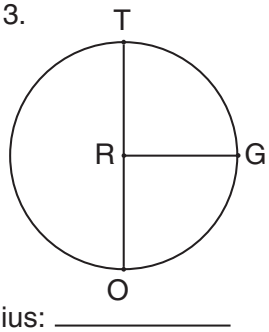
2.



radius: _____

diameter: _____

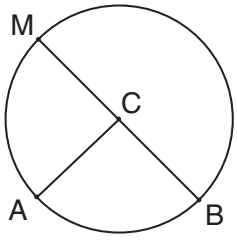
3.



radius: _____

diameter: _____

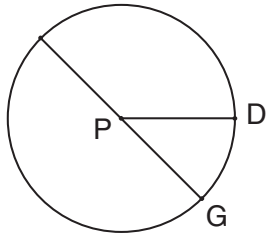
4.



radius: _____

diameter: _____

5.



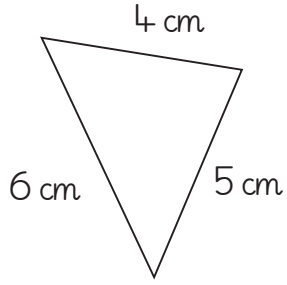
radius: _____

diameter: _____

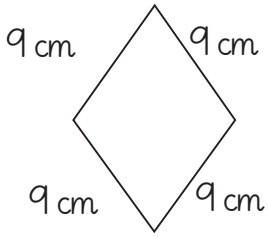
Worksheet 15

Perimeter of a Polygon

Find the perimeter of each shape by adding the length of each side. Be sure to include the units in your answer.



_____



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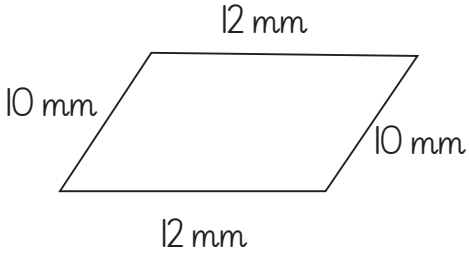

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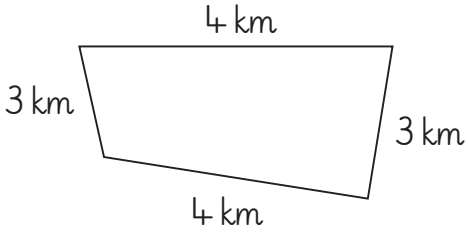

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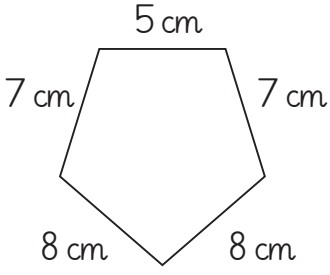

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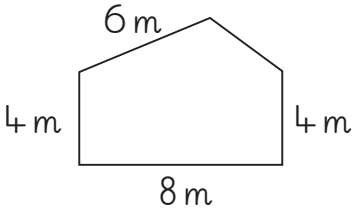

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Worksheet 16

Cookies Sales pictograph

Four friends baked some cookies for one month. The list below shows how many cookies they made.

Sana: 40 boxes **Zoya**: 35 boxes

Mehreen: 15 boxes **Saima**: 50 boxes

Use the information from the list to complete the pictograph below and answer the questions.

Name	**Cookie sales**
Sana	
Mehreen	
Zoya	
Saima	

KEY
Each  = 5 boxes

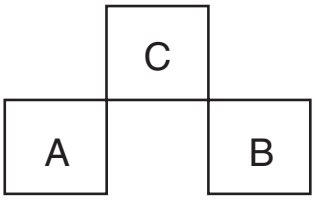
1. How many boxes of cookies did the girls make in all? _____

2. How many more boxes of cookies did Sana make than Zoya? _____

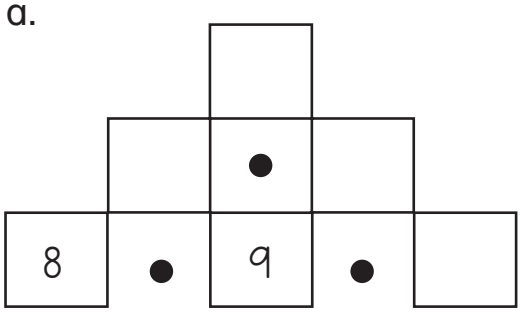
3. Which two girls made a total of 75 boxes of cookies? _____

Worksheet 17

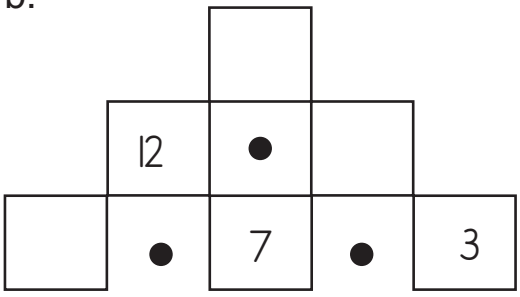
Complete each of the number pyramid using C = A + B



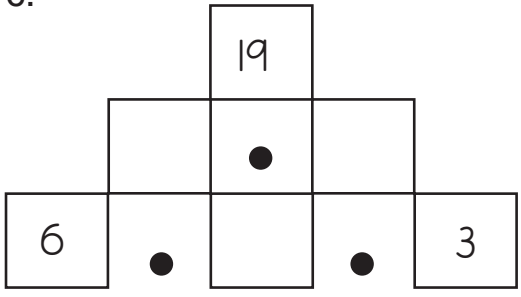
a.



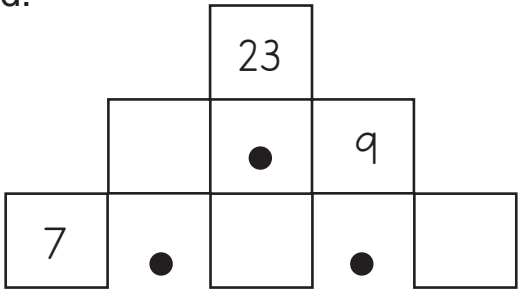
b.



c.

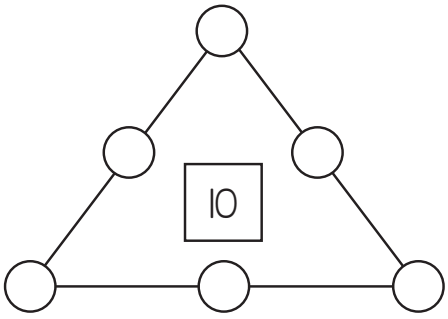


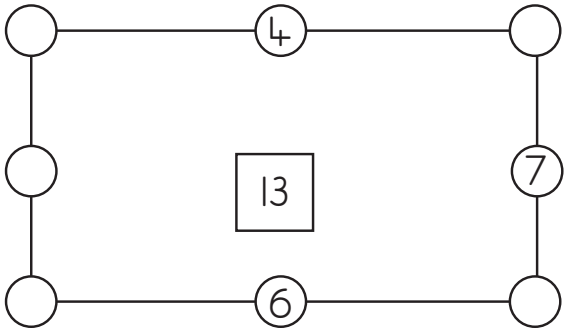
d.

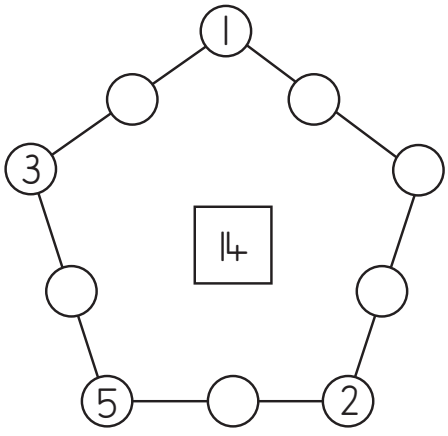


Worksheet 18

1. Complete the polygons by putting numbers that total along each side to the number given at the center.







2. Magic Square.

   The total of each row/column should equal 20.

11	3	

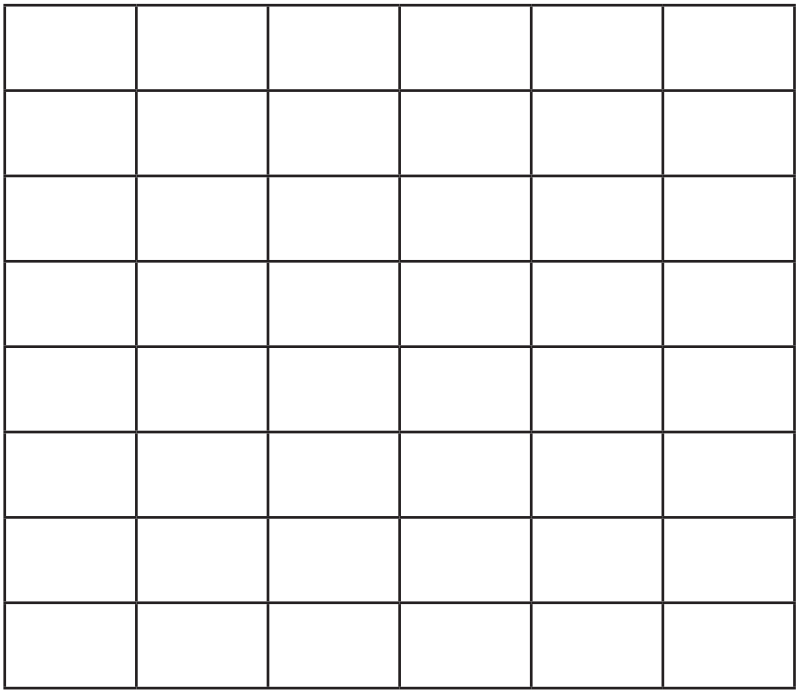
Worksheet 19

Fractions

1. Colour $\frac{1}{2}$ of the boxes red.

2. Colour $\frac{1}{4}$ of the remaing boxes green.

3. Colour $\frac{1}{3}$ of the remaining boxes yellow.



a. How many boxes are red? _____

b. How many boxes are green? _____

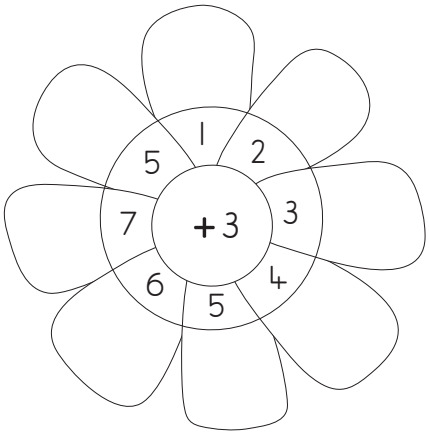
c. How many boxes are yellow? _____

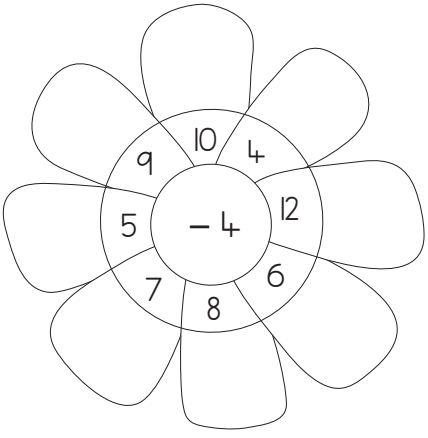
d. How many boxes are not coloured? _____

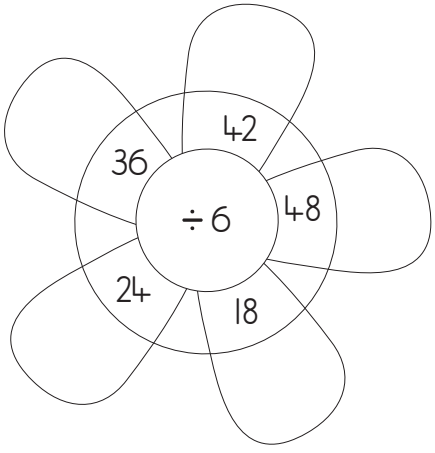
e. Write the uncolured boxes as a fraction of the total numbers of boxes. _____

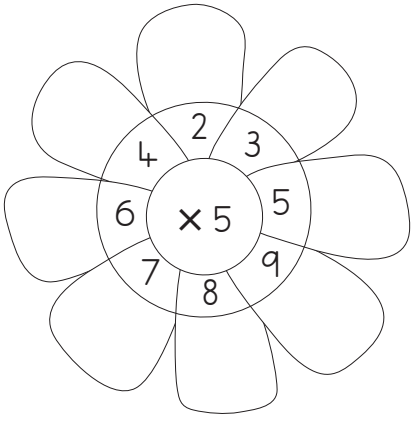
Worksheet 20

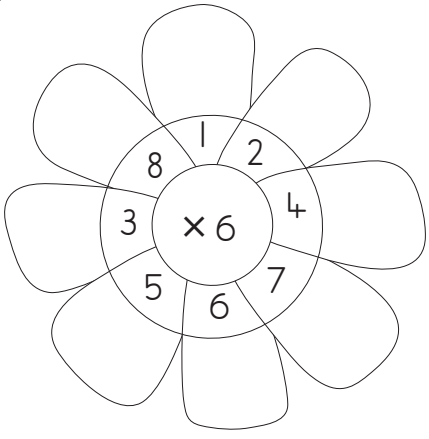
Complete the flowers.











Worksheet 21

Complete the patterns.

$\frac{1}{2} = \frac{2}{4} = \frac{\quad}{2} = \frac{5}{\quad} = \frac{\quad}{8} = \frac{7}{\quad}$

$\frac{2}{3} = \frac{4}{6} = \frac{8}{\quad} = \frac{\quad}{18} = \frac{10}{\quad} = \frac{\quad}{42}$

$\frac{1}{5} = \frac{2}{10} = \frac{4}{\quad} = \frac{\quad}{25} = \frac{6}{\quad} = \frac{\quad}{50}$

$\frac{3}{10} = \frac{6}{20} = \frac{\quad}{30} = \frac{12}{\quad} = \frac{\quad}{90} = \frac{21}{\quad}$

$\frac{2}{5} = \frac{4}{10} = \frac{\quad}{20} = \frac{16}{\quad} = \frac{\quad}{60} = \frac{8}{\quad}$

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Worksheet 22

Word problems.

1. In a large school there are 750 children of these 300 are boys, how many are girls?
2. A factory made 950 bicycles in 2013 and 1000 in 2014. How many cycles were produced in the two years together? How many fewer cycles were built in 2013 than in 2014?
3. Mohsin wrote a story with 500 words. He then added another plot with 50 words. He also changed the introduction by reducing 20 words. How many words does the story have now?
4. In an office, there are 5 printers. Each printer prints 20 pages in a working day. How many pages are printed in all?
5. A confectionary produces 50 cupcakes in a day. These are equally distributed in 5 cartons for packaging. How many cupcakes are there in each carton?

Worksheet 23

Solve these.

1. In an office, there are 110 printers. Each printer prints 110 pages in a working day. How many pages are printed in all?
2. A confectionary produces 11,200 cupcakes in a day. Only 100 boxes are available to pack them. How many cupcakes will go into each box?
3. A vending machine can fill 130 cups of lemon tea, 110 cups of coffee and 60 cups of cardamom tea in an hour. How many cups can the vending machine fill altogether?
4. A tailor found that he had tailored 25 shalwar suits over a period of 5 days. If the tailors on stitched an equal number of suits per day, how many did he make each day?
5. A volunteer collected Rs 1500.00 from each member of a 500 member club and distributed the money equally amongst 5 needy families. How much did each family get?
6. A bicycle was sold off for Rs 3000.00 after a discount of Rs 1500.00. What was its original price?

Answers to Book 3

Unit 1: Assess and Review 1

Exercise 1

1.	ones	2.	tens	3.	tens	4.	hundreds
5.	ones	6.	ones	7.	ones	8.	tens
9.	hundreds	10.	ones				

Exercise 2

1.	36	2.	235	3.	519	4.	40	5.	176
6.	904	7.	21	8.	100	9.	998	10.	20
11.	508	12.	976	13.	710				

Exercise 3

1. 264, 265, 266, 267, 268, 269, 270
2. 599, 699, 799, 899
3. 37, 47, 57, 67, 77, 87, 97, 107
4. 62, 82
5. 152, 162,172, 182,192

Exercise 4

1. 07, 23, 61, 75, 82, 94 and 94, 82, 75, 61, 23, 07
2. 128, 287, 348, 475, 711 and 711, 475, 348, 287, 128
3. 504, 524, 554, 564, 594 and 594, 564, 554, 524, 504
4. 600, 601, 603, 606, 609 and 609, 606, 603, 601, 600
5. 227, 337, 777, 887, 997 and 997, 887, 777, 337, 227

Exercise 5

1. 247, two hundred and forty-seven
2. 617, six hundred and seventeen
3. 689, six hundred and eighty-nine
4. 495, four hundred and ninety-five
5. 944, nine hundred and forty-four
6. 160, one hundred and sixty
7. 926, nine hundred and twenty-six
8. 116, one hundred and sixteen
9. 600, six hundred
10. 1400, one thousand four hundred

Exercise 6

1. 12, twelve
2. 84, eighty-four

3. 393, three hundred and ninety-three
4. 432, four hundred and thirty-two
5. 386, three hundred and eight-six
6. 666, six hundred and sixty-six
7. 32, thirty-two
8. 106, one hundred and six
9. 47, forty-seven
10. 610, six hundred and ten

Exercise 7

1. 8	2. 21	3. 30	4. 60	5. 18
6. 20	7. 130	8. 60	9. 102	10. 120

Exercise 8

1. 2 cars each	2. 5 sweets each	3. 4 pencils each
4. 5 teddies each	5. 3 coins each	

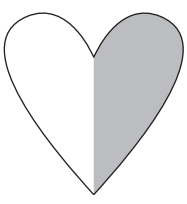
Exercise 9

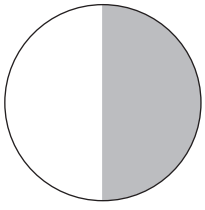
circle, square, triangle, rectangle

Exercise 10

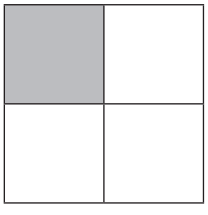
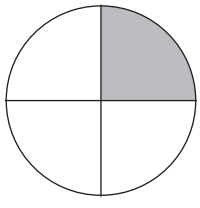
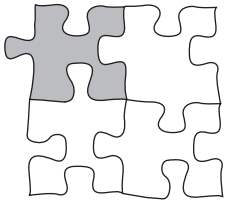
cube, sphere, cuboid, cylinder, pyramid,

Exercise 11





Exercise 12

Exercise 13

1. 6.1 cm	2. 3.4 cm	3. 5.1 cm	4. 8 cm	5. 5.2 cm

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Exercise 14

1. 5 minutes past 2
2. 20 minutes past 3
3. 7 o'clock
4. half past 9
5. 12 o'clock
6. quarter past 11

Exercise 15

1. 841 books
2. Rs 24
3. 182 days
4. Rs 18
5. answers will vary
6. 56 kg
7. 8 m
8. 3 hrs, evening
9. 4
10. 12 cans of juice, 30 sandwiches

Puzzle

There can be many combinations:
2 + 8, 5 +5, 6 + 4, 3 + 7, 7 + 3, 20 ÷ 2 etc.
Similarly, combinations can be made for other numbers.

Unit 2: Numbers

Exercise 1

1. Children draw three flowers.
2. 2 marks
3. 5 marks

Exercise 2

2. III
3. V
4. IV
5. VIII

Exercise 3

1, 7, 4, 9
5, 2, 6, 10

Exercise 4

Roman					Words
X	+	I	=	XI	eleven
X	+	II	=	XII	twelve
X	+	III	=	XIII	thirteen
X	+	IV	=	XIV	fourteen
X	+	V	=	XV	fifteen
X	+	VI	=	XVI	sixteen
X	+	VII	=	XVII	seventeen
X	+	VIII	=	XVIII	eighteen
X	+	IX	=	XIX	nineteen

Exercise 5

1. XVI, 16 2. XX, 20

Exercise 6

1. VII seven
2. IX nine
3. C 100
4. XX twenty
5. XI eleven
6. IV four

Activity

- LID, MILD, DILL, MILL, CIVIC, CIVIL, etc.
- Cross out LONG, VI will be left.
- XI (It becomes eleven.)

Exercise 7

Students colour the grid as instructed.

Exercise 8

1. 56√, 57×, 58√, 59×, 60√
2. 87×, 88√, 89×, 90√, 91×
3. 201×, 202√, 203×, 204√, 205√
4. 444√, 445×, 446√, 447×, 448√
5. 1234√, 1235×, 1236√, 1237×, 1238√

Exercise 9

	HTh	TTh	Th	H	T	O	number names
1.			3,	1	7	4	three thousand, one hundred and seventy-four
2.			2,	0	5	8	two thousand and fifty-eight
3.		5	6,	3	6	7	fifty six thousand, three hundred and sixty-seven
4.	2	4	3,	0	9	8	two hundred and forty-three thousand and ninety-eight
5.	8	7	0,	4	9	6	eight hundred and seventy thousand, four hundred and ninety-six

Exercise 10

2. 2 ones 3 tens 7 hundred 8 thousand 0 ten thousand 6 hundred thousand
   600,000 + 8000 + 700 + 30 + 2
3. 8 one 4 ten 9 hundred 5 thousand
   5,000 + 900 + 40 + 8

4. 2 one 8 ten 9 hundred 8 thousand 0 ten thousand 6 hundred thousand
   600,000 + 8000 + 900 + 80 + 2
5. 8 one 7 ten 2 hundred 6 thousand 7 ten thousand
   70,000 + 6000 + 200 + 70 + 8
6. 7 one 3 ten 4 hundred 8 thousand 6 ten thousand 9 hundred thousand
   900,000 + 60,000 + 8000 + 400 + 30 + 7

Exercise 11

	HTh	TTh	Th	H	T	O	number names
2.			7	6	4	3	seven thousand six hundred and forty-three
3.		9	1	5	9	0	nine one thousand five hundred and ninety
4.	1	8	1	2	0	7	one hundred eight-one thousand, two hundred and seven

Exercise 12

1. H
2. TTh
3. Th, T
4. HTh
5. O
6. T

Exercise 13

Answers will vary.

Exercise 14

2. 3108; 3208; 3308; 3408; 3508; 3608
3. 13,009; 13,019; 13,029; 13,039; 13,049; 13,059
4. 210,345; 220,345; 230,345; 240,345; 250,345; 260,345
5. 980,819; 980,820; 980,821; 980,822; 980,823; 980,824
6. 35,909; 36,909; 37,909; 38,909; 39,909; 40,909

Exercise 15

4678	5678	6678	7678	8678	9678	
21	121	221	321	421	521	
18,101	19,101	20,101	21,101	22,101	23,101	24,101
709,543	710,543	711,543	712,543	713,543	714,543	
79,677	179,677	279,677	379,667	479,667		
134,257	134,357	134,457	134,557	134,657	134,757	134,857

Activity

Across

1. 53,067 4. 123 7. 897,653 9. 64,910
10. 5796 11. 6363

Down

2. 3527 3. 718,329 5. 300,000 6. 980,154 8. 66,666

Exercise 16

1. < 2. > 3. > 4. = 5. > 6. =

Exercise 17

Only the second pair is correct.

Exercise 18

1. ascending; 367, 921; 368,921
2. descending; 77,249; 77,239
3. descending; 214,291; 214,281
4. ascending; 526,344; 627,344
5. ascending; 220,024; 230,025; 240,026

Exercise 19

1. 76,431 largest; 13,467 smallest
2. 98,620 largest; 20689 smallest
3. 984,210 largest; 102,489 smallest
4. 764,321; 123,467 smallest

Exercise 20

1. 1000 2. 999,999 3. 99,999 4. 100,000 5. 10,000

Ascending order: 1000; 10,000; 99,999; 100,000; 999,999

Unit 3: Number operations

Exercise 1

1. 9976 2. 5844 3. 8867 4. 6589
5. 4599 6. 10,983

Exercise 2

1. 9889 2. 3688 3. 8678 4. 3444

Exercise 3

1. 6230 2. 4968

Exercise 4

1. 7467 2. 9459 3. 9319 4. 9444
5. 4489 6. 2213

Exercise 5

1. 8139 2. 6919 3. 7493 4. 1494

Exercise 6

1. 6914 2. 6578 3. 3550 4. 9470 5. 7931

Exercise 7

1. 60 2. 70 3. 80 4. 60
5. 60 6. 65 7. 30 8. 39
9. 58 10. 95

Exercise 8

1. 62 2. 96 3. 76 4. 60 5. 83
6. 29 7. 92 8. 84 9. 40 10. 61

Activity

Hoopla 5 and 25; 10 and 20; 10, 10, 10;

Wheel of fortune 100, 100, 100, 100, 100, 100
100, 150, 250
200, 300
150, 350
100, 400

Darts 50, 150
50, 50, 100
100,100

Exercise 9

1. 4221 2. 2242 3. 8322 4. 4223 5. 4083
6. 6743 7. 5203 8. 2200 9. 3000

Exercise 10

1. 7051 bees 2. 1111 pages 3. 2413 men

Exercise 11

1. 2156 2. 2519 3. 4175 4. 7560 5. 3427 6. 5782

Exercise 12

1. 2744 2. 2950 3. 2881 4. 4203 5. 8775 6. 1652

Exercise 13

1. 882 cards
2. 1498 people
3. Rs 7024
4. 7095 bangles
5. 2486 bottles

Exercise 14

1. 40
2. 40
3. 40
4. 52
5. 25
6. 10
7. 14
8. 38
9. 7
10. 16
11. 38
12. 20
13. 32
14. 50

Exercise 15

1. 35
2. 56
3. 41
4. 48
5. 36

Activity

Spider with 8 legs is the correct choice, since in the first row each animal has legs in the multiples of 2. (snail, 0 legs; kiwi, 2 legs; squirrel, 4 legs; beetle, 6 legs)

Exercise 16

1. 16
2. 54
3. 7
4. 6
5. 11
6. 9
7. 9
8. 56
9. 7
10. 8
11. 6
12. 88
13. 64
14. 9

Exercise 17

1. 170
2. 402
3. 116
4. 712
6. 360
6. 245
7. 396
8. 328

Exercise 18

1. Rs 369
2. 160 legs
3. 72 students
4. 144 dozen
5. 100 crayons
6. 343 days

Exercise 19

1. 70
2. 830
3. 990
4. 340
5. 48
6. 93
7. 99
8. 88
9. 216
10. 108
11. 648
12. 189
13. 32
14. 0

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Activity

5	×	2
×	10	×
2	×	5

4	×	8
×	32	×
8	×	4

5	×	9
×	45	×
9	×	5

6	×	4
×	24	×
4	×	6

7	×	9
×	63	×
9	×	7

10	×	10
×	100	×
10	×	10

Exercise 20

2. $10 \div 5 = 2$
   $5 \times 2 = 10$
3. $12 \div 6 = 2$
   $6 \times 2 = 12$
4. $14 \div 2 = 7$
   $2 \times 7 = 14$

Exercise 21

1. 5
2. 2
3. 4
4. 4
5. 6
6. 4

Exercise 22

2. 4, 6
3. 6, 5
4. 4, 12
5. 6, 8

Exercise 23

1. 18
2. 151
3. 28 R1
4. 492 R1
5. 12 R4
6. 52 R4
7. 8 R3
8. 64 R2

Exercise 24

1. 24
2. 16 R2
3. 60 R4
4. 50 R4
5. 133 R1
6. 46 R7

Exercise 25

1. 6 seeds
2. 7 buttons
3. 16 kg
4. Rs 52
5. 152 students

Exercise 26

1. 21
2. 23
3. 11
4. 31
5. 81
6. 21
7. 20
8. 21
9. 103
10. 500
11. 247 R1
12. 40

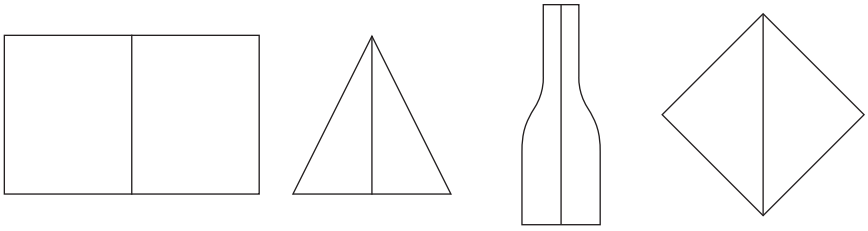
Activity

The secret message is:

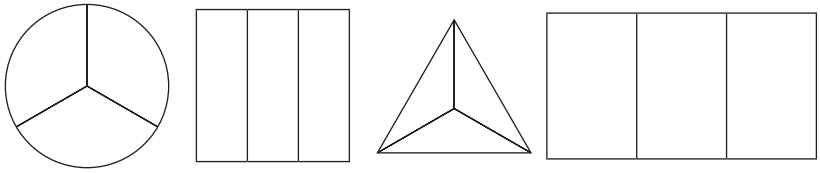
DIVISION IS FUN

Unit 4: Fractions

Exercise 1



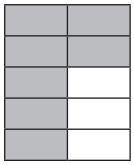
Exercise 2

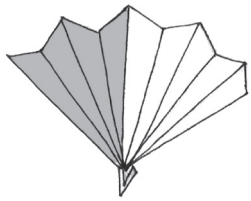
1. 

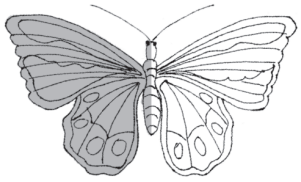
2. $\frac{2}{6} + \frac{2}{6} + \frac{2}{6} = 1$ whole

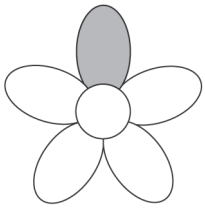
Exercise 3

2. 

3. 

4. 

5. 

6. 

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Exercise 4

1. $\frac{1}{2}$ of 8 = 4
2. $\frac{1}{2}$ of 12 = 6
3. $\frac{1}{2}$ of 6 = 3
4. $\frac{1}{2}$ of 14 = 7
5. $\frac{1}{4}$ of 20 = 5
6. $\frac{1}{4}$ of 8 = 2
7. $\frac{1}{4}$ of 8 = 2
8. $\frac{1}{4}$ of 12 = 3
9. $\frac{2}{5}$ of 10 = 4
10. $\frac{2}{5}$ of 20 = 10
11. $\frac{2}{5}$ of 15 = 6
12. $\frac{2}{5}$ of 30 = 12

Exercise 5

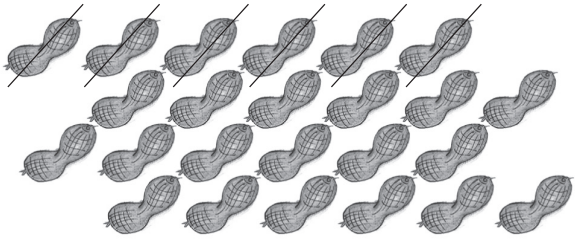
1. $\frac{2}{4}$
2. $\frac{2}{8}$
3. $\frac{3}{6}$
4. $\frac{1}{2}$
5. $\frac{2}{5}$
6. $\frac{5}{10}$

Exercise 6

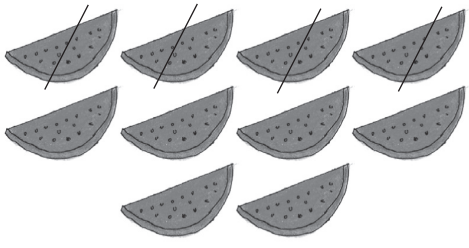
1. $\frac{3}{9} = \frac{1}{3}$
2. $\frac{10}{15} = \frac{2}{3}$
3. $\frac{2}{12} = \frac{1}{6}$
4. $\frac{4}{16} = \frac{1}{6}$

Exercise 7

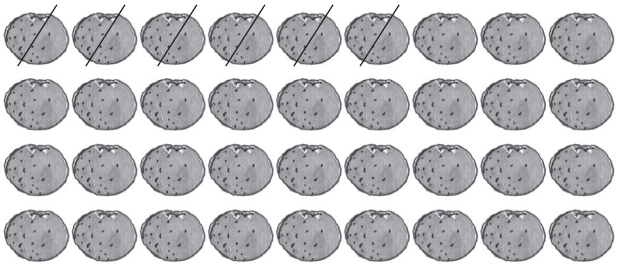
2. 6,



3. 4,



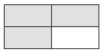
4. 6,



Exercise 8

$\frac{1}{3}$, one-third, ✔ $\frac{2}{3}$,  , 

 , one half, $\frac{4}{8}$,  , ✔ $\frac{1}{2}$

three quaters,  , $\frac{3}{4}$, three-fourths, ✔ $\frac{2}{3}$

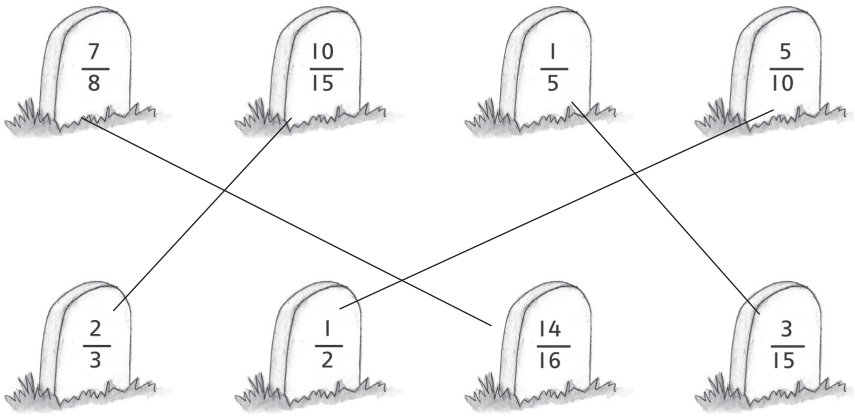
one whole, 1, $\frac{6}{6}$, ✔  , 

$\frac{4}{5}$,  ,  , ✔,  , four-fifths.

Exercise 9

All fractions are equivalent except 2 and 5.

Exercise 10



Exercise 11

1. $\frac{2}{4}$ 2. $\frac{4}{6}$ 3. $\frac{6}{18}$ 4. $\frac{20}{24}$ 5. $\frac{2}{2}$

Exercise 12

Proper: $\frac{3}{8}$, $\frac{2}{66}$, $\frac{5}{67}$, $\frac{1}{56}$, $\frac{7}{68}$

Improper: $\frac{4}{3}$, $\frac{77}{5}$, $\frac{24}{9}$, $\frac{15}{7}$, $\frac{34}{6}$

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Exercise 13

1. $\frac{3}{8} < \frac{5}{7}$ 2. $\frac{2}{9} < \frac{5}{9}$ 3. $\frac{10}{11} > \frac{7}{11}$ 4. $\frac{3}{5} > \frac{1}{5}$ 5. $\frac{2}{15} < \frac{6}{15}$

Exercise 14

1. $\frac{1}{4}, \frac{3}{4}, \frac{4}{4}$ 2. $0, \frac{4}{10}, \frac{5}{10}$ 3. $\frac{1}{5}, \frac{3}{5}, \frac{5}{5}$ 4. $\frac{1}{7}, \frac{4}{7}, \frac{8}{7}$ 5. $, \frac{1}{11}, \frac{4}{11}, \frac{5}{11}$

Exercise 15

1. $\frac{2}{2}$ 2. $\frac{3}{5}$ 3. $\frac{5}{8}$ 4. $\frac{5}{7}$
5. $\frac{6}{8}$ 6. $\frac{5}{10}$ 7. $\frac{4}{3}$ 8. $\frac{10}{11}$
9. $\frac{11}{12}$ 10. $\frac{10}{9}$

Exercise 16

1. $\frac{1}{4}$ 2. $\frac{1}{5}$ 3. $\frac{2}{7}$ 4. $\frac{6}{8}$
5. $\frac{1}{6}$ 6. $\frac{2}{11}$ 7. $\frac{1}{5}$ 8. $\frac{5}{12}$
9. $\frac{7}{13}$ 10. $\frac{3}{9}$

Exercise 17

1. + 2. – 3. – 4. + 5. +

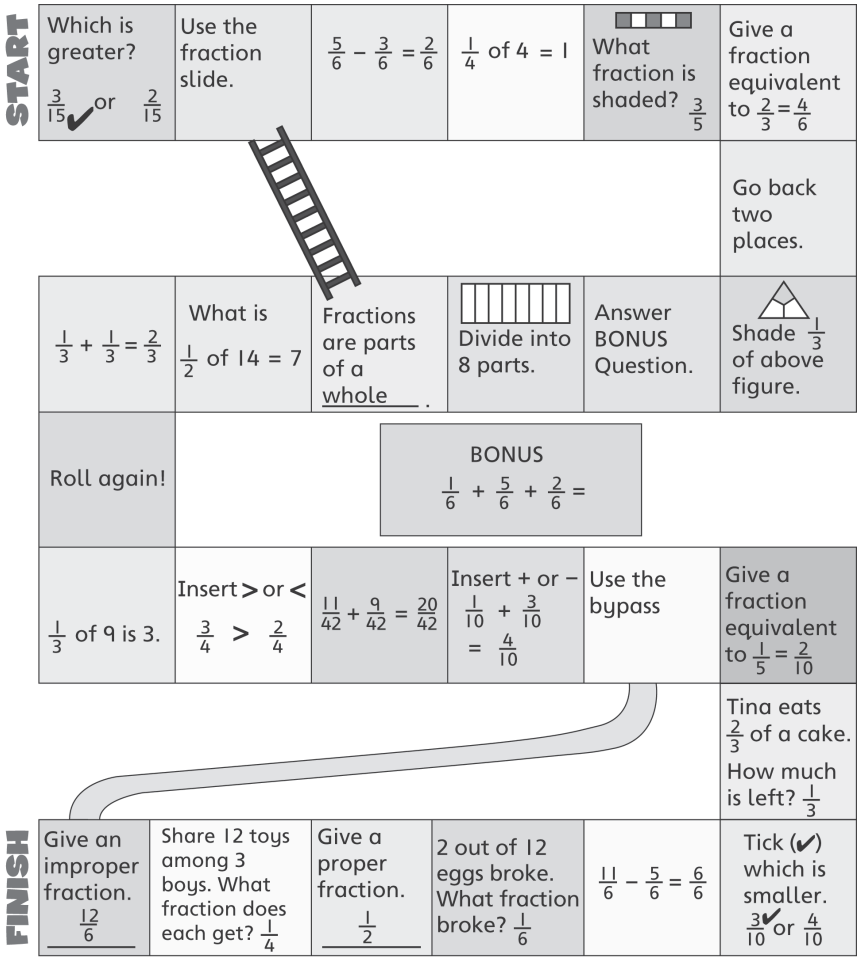
Exercise 18

1. eaten, $\frac{3}{4}$ left 2. $\frac{1}{6}$ eaten, $\frac{5}{6}$ left
3. $\frac{3}{8}$ eaten, $\frac{5}{8}$ left 4. $\frac{1}{3}$ eaten, $\frac{2}{3}$ left

Exercise 19

1. $\frac{3}{4}$ of the pencils remain.
2. Amir ate 4 pieces and 4 pieces are left.
3. 25 apples were unripe; 75 apples were ready to eat.

Game page 80



Unit 5: Measurements

Exercise 1

1. metre
2. kilometre
3. centimetre
4. centimetre
5. centimetre
6. centimetre

Exercise 2

2. 80 cm
3. 9 cm
4. 8 cm
5. kilometre
6. kilometre

Exercise 3

1st section

1. 4.5 cm
2. 3.5 cm
3. 1.5 cm
4. 2.6 cm

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2nd section

1. The example shows a ruler measuring the line as 6 cm, which is not drawn to scale. Allow the children to use their rulers to draw actual measurements as given for the next three exercises.

Exercise 4

1. 18 cm 2. 9 cm 3. 9 cm 4. 17 cm 5. 34 cm

Exercise 5

1. 7 m 2. 38 m 3. 17 m 4. 9 m 5. 13 m

hill, tower, lamp post, house, tree, ladder
ladder, tree, house, lamp post, tower, hill

Exercise 6

home ⟶ superstore ⟶ ice-cream parlour ⟶ school

Exercise 7

2. 355 m 3. 54 km 4. 118 cm 5. 145 m

Exercise 8

2. 217 m 3. 41 km 4. 23 cm 5. 108 m

Exercise 9

16 cm

Exercise 10

12 cm

Exercise 11

Children draw a line 5 cm long.

Exercise 12

2. 7 cm, 16 cm 3. 9 cm, 21cm 4. 79 cm, 171 cm 5. 27 cm, 64 cm

Exercise 13

2. car 3. truck 4. dog 5. can of juice 6. fox

Exercise 14

1. 4 kg 2. 450 g 3. 250 g 4. $3\frac{1}{2}$ kg
5. 25 g 6. 60 kg

Exercise 15

2. mg 3. g 4. kg 5. kg 6. g

Exercise 16

less than 1 kg: teddy, pencil, scissors, photo frame, jar of sweets, CDs
more than 1 kg: laptop, television, fish bowl, books

Exercise 17

The weights that the shopkeeper can use are:

2. 250 g, 10 g
3. 30 g, 20 g, 20 g, 10 g
4. 10 kg, 3 kg
5. 300 g, 25 g
6. 500 g, 250 g, 10 g

Exercise 18

2. 1102 g
3. 68 kg
4. 499 g
5. 178 g

Exercise 19

2. 130 g
3. 120 g
4. 4 kg
5. 39 g
6. 12 kg

Exercise 20

2. 16 kg
3. 462 g
4. 39 kg
5. 67 g

Exercise 21

Total = 201 kg; overweight by 101 kg

Exercise 22

1. jug
2. thermos
3. larger pack
4. bigger bowl
5. bottle
6. can of juice

Exercise 23

1. ml
2. litre
3. ml
4. litre5. litre 6. ml

Exercise 24

1. 2 l
2. 250 ml
3. 25 l
4. 51 l
5. 100 ml
6. 13 l

Exercise 25

2. 443 ml
3. 1330 ml
4. 15212 l
5. 60 l
7. 519 ml
8. 156 ml
9. 52 l
10. 27 l

Exercise 26

1. 27 l
2. 28 l
3. 26 ml, 5 ml
4. 1650 ml.

Unit 6: Time

Exercise 1

1. 2 a.m., 4 a.m., 10 a.m., 12 noon, 3 p.m., 4 p.m., 5 p.m., 7 p.m.
2. a. a.m. b. p.m. c. a.m. d. p.m.
   e. a.m.
3. a. a.m. b. a.m. c. p.m. d. p.m.
   e. p.m.

Exercise 2

2. 5 minutes to 2
3. $\frac{1}{2}$ past 9
4. 15 minutes to 4
5. 15 minutes past 7
6. 10 minutes to 8

Exercise 3

2. eleven thirty
3. two twenty-eight
4. twelve three
5. six one
6. four fifty two

Exercise 4

1.

2.

Exercise 5

1.   7:10

2.   11:50

3.   1:00

4.   2:30

5.   3:10

Exercise 6

1.   2:25

2.   3:45

3.   11:05

4.   8:40

5.   6:20

Exercise 7

2. 154 hours
3. 697 hours
4. 456 hours
5. 1746 hours
7. 43 hours
8. 26 hours
9. 26 hours
10. 105 hours

Exercise 8

1. 6 hours
2. 2 hours
3. 12 noon
4. 3 hours
5. Bilal, Emad, Amir, 8 minutes, 3 min

Exercise 9

1. January, June, July
2. 30
3. April
4. 366
5. Friday
6. 30
7. Friday, Monday, Saturday, Sunday, Thursday, Tuesday, Wednesday
8. 156

Exercise 10 and Exercise 11

The answers to these exercises would be best given using the current year's calendar. The teacher can adapt Exercise 11 to the current year's month of December.

Activity page 111

Similarly for this activity, use dates for the year in which the book is being taught.

Exercise 12

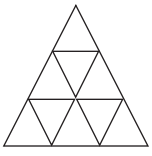
1. Naveen 2. Danish 3. June 4. 3 5. Naveen

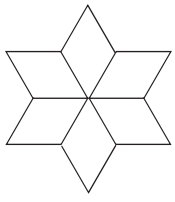
Unit 7: Geometry

Page 115

points: A, B, O, M, N, P, R, S
line segments: MN, RS
ray: PA, OX
straight line: AB

Activity page 117

1. 

2. 

Exercise 1

1. rectangle 2. pyramid 3. circle 4. kite
5. oval 6. cube

Exercise 2

kite 3, square 2, rectangle 1, diamond 1, arrowhead 2, triangle 5

Exercise 3

Help the students draw the picture.

Exercise 4

Students colour as indicated.

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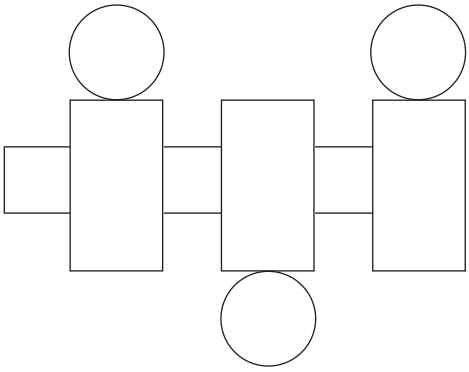
Exercise 5



Exercise 6

2. 5 + 3 + 5 + 3 = 16 cm
3. 5 + 2 + 3 + 2 + 2 + 4 = 18 cm
4. 3 + 2 + 3 + 4 + 6 + 2 = 19 cm

Exercise 7

44 m

Exercise 8

80 m

Exercise 9

24 cm

Exercise 10

1. 170 m 2. 70 m 3. 240 m 4. m

Exercise 11

For exercises 2 to 4, students draw different figures and calculate the perimeters accordingly.

Activity page 124

13.3 cm approximately

Unit 8: Graphs

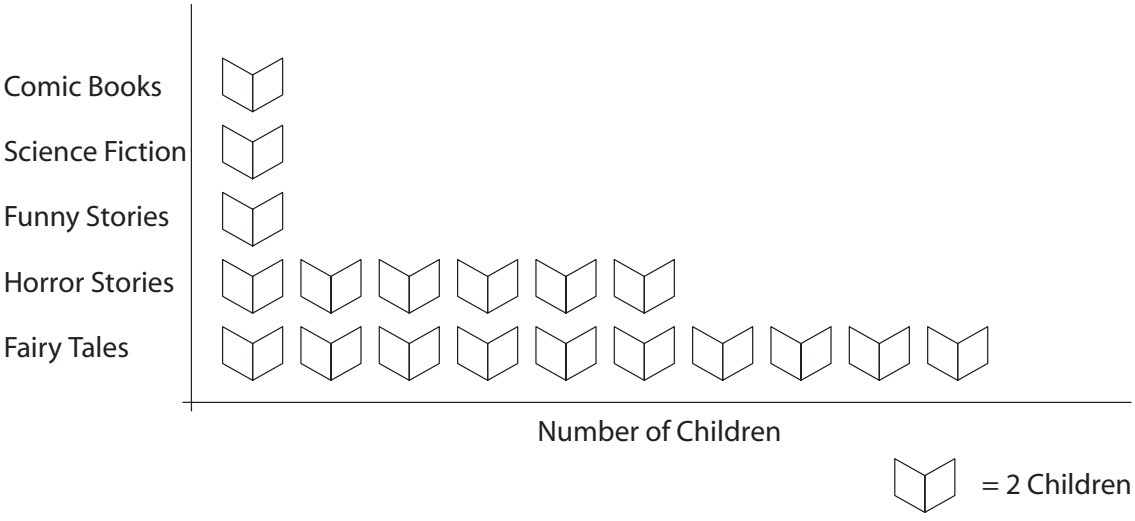
Exercise 1

1. favourite flavours of ice cream
2. an ice cream cone
3. 10 scoops
4. fruity
5. orange
6. six
7. 115

Exercise 2

1. favourite pet
2. a circle dived into quarters
3. 56
4. dog
5. 14
6. spider
7. rat and tortoise

Exercise 3



Unit 9: Assess and Review 2

Exercise 1

HTh	TTh	Th	H	T	O	Expanded Form	Number Names
2	7	0	6	9	2	200,000 + 70,000 + 600 + 90 + 2	two hundred and seventy thousand, six hundred and ninety two
	3	0	2	0	1	30,000 + 200 + 10 + 1	thirty thousand, two hundred and one
3	0	9	0	1	2	300,000 + 9000 + 10 + 2	three hundred and nine thousand and twelve
	4	0	1	9	3	40,000 + 100 + 90 + 3	forty thousand one hundred and three
2	0	4	0	0	7	200,000 + 4000 + 7	two hundred and four thousand and seven
		5	9	8	0	5000 + 900 + 8 + 0	five thousand, nine hundred and eighty
	6	6	4	7	9	60,000 + 6000 + 400 + 70 + 9	sixty-six thousand, four hundred and seventy-nine
9	0	0	0	9	8	900,000 + 90 + 8	nine hundred thousand and ninety-eight
7	4	5	8	3	9	700,000 + 40,000 + 5000 + 800 + 30 + 9	seven hundred and forty-five thousand, eight hundred and thirty-nine

Exercise 2

1. 654,426; 654,522; 654,562; 655,426; 655,466; 655,526
   655,526; 655,466; 655,426; 654,562; 654,522; 654,426

2. 30,039; 30,309; 33,009; 90,303; 93,300; 309,903
   309,903; 93,300; 90,303; 33,009; 30,009; 30,309; 30,039

3. 77,770; 707,070; 707,777; 770,770; 770,777; 777,707;
   777,707; 770,777; 770,770; 707,777; 707,070; 77,770

4. 23; 222; 232; 3323; 23,332; 223,323
   223, 323; 23,332; 3323; 332, 222, 23

5. 10; 100; 999; 1000; 99,999; 999,999
   999,999; 99,999; 1000; 999; 100; 10

Exercise 3

1. 19,104
2. 1858
3. 383
4. 113
5. 76,574
6. 403
7. 180 R = 4
8. 72,994
9. 7555
10. 96
11. 25437
12. 38524
13. 686
14. 56 R = 6

Exercise 4

1. $\frac{6}{9}, \frac{8}{12}, \frac{10}{15}, \frac{12}{18}, \frac{14}{21}$
2. $\frac{8}{14}, \frac{12}{21}, \frac{16}{28}, \frac{20}{35}, \frac{24}{42}$
3. $\frac{22}{24}, \frac{33}{36}, \frac{44}{48}, \frac{55}{60}, \frac{66}{120}$
4. $\frac{12}{26}, \frac{18}{39}, \frac{24}{52}, \frac{30}{65}, \frac{36}{78}$
5. $\frac{24}{40}, \frac{36}{60}, \frac{48}{80}, \frac{60}{100}, \frac{72}{120}$

Exercise 5

1. $\frac{6}{5}$ (I)
2. $\frac{4}{13}$ (P)
3. $\frac{12}{19}$ (P)
4. $\frac{7}{9}$ (P)
5. $\frac{13}{14}$ (P)
6. $\frac{11}{56}$ (P)

Exercise 6

1. $\frac{3}{4}, \frac{5}{6}, \frac{6}{7}, \frac{1}{3}$
2. $\frac{9}{9}, \frac{12}{12}$

Exercise 7

1. length
2. straight line
3. point
4. two
5. triangle
6. sides, corners
7. square
8. opposite
9. curved
10. diameter
11. four

Exercise 8

Check the students' work.

Exercise 9

Check the students' work.

Exercise 10

1. 1289 km
2. Rs 43,508
3. 945 km, 4 p.m.
4. 72 m, 216 m
5. Rs 90
6. 730 kg
7. 115 cartons in each truck, 1035 bottles
8. $\frac{2}{5}$
9. 50 ml
10. 2 June

Exercise 11

1. footfall in the cafeteria
2. days: horizontal axis; number of students: vertical axis
3. Friday
4. Saturday
5. 75
6. 675
7. 125

For questions 8 and 9, help the children to complete the graphs.

Exercise 12

kite, square, rectangle, circle, triangle, rectangle, arrowhead

Notes

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