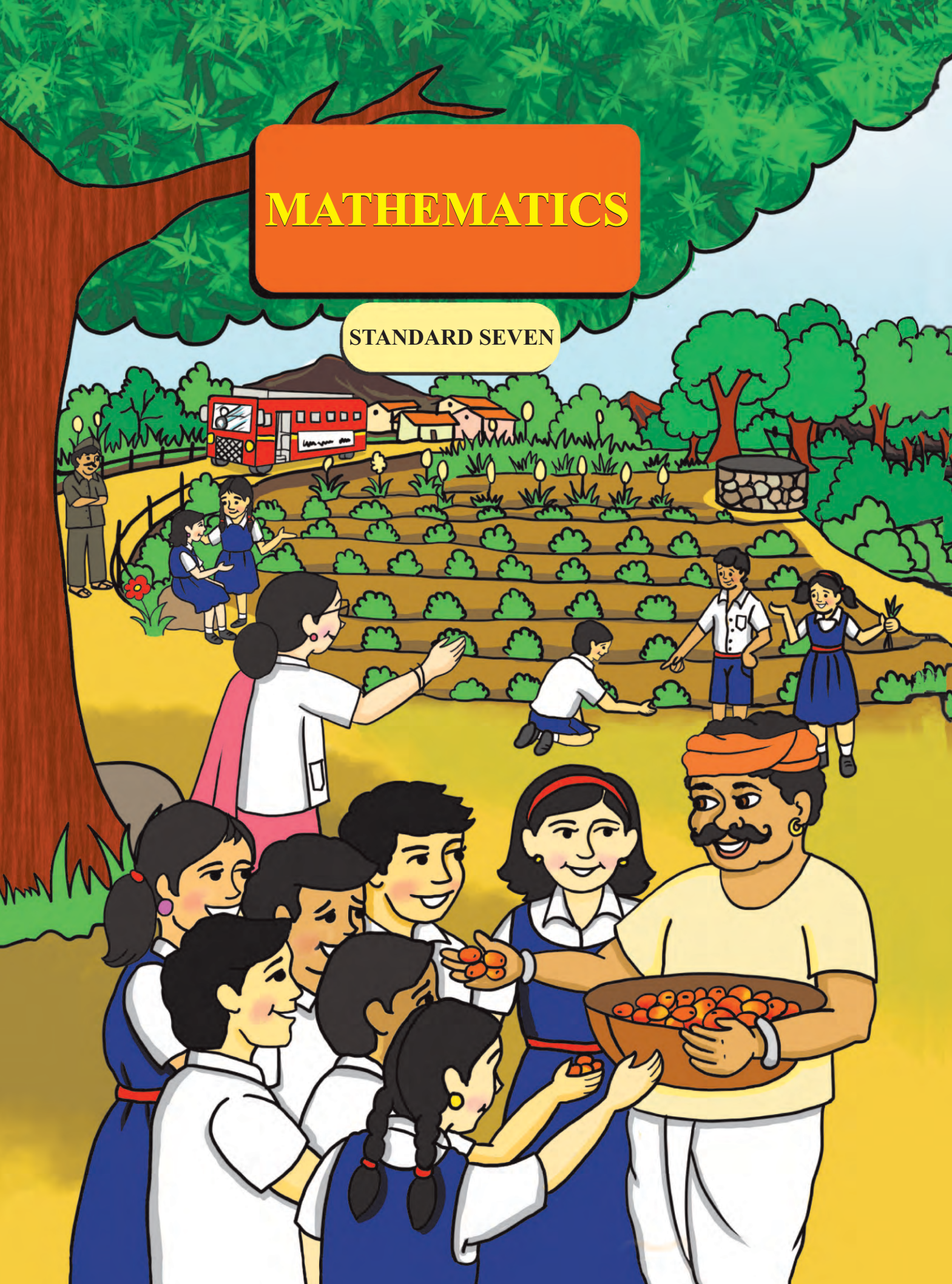


MATHEMATICS

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The Constitution of India

Chapter IV A

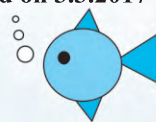
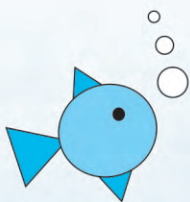
Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India—

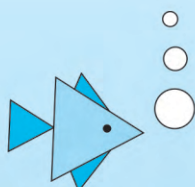
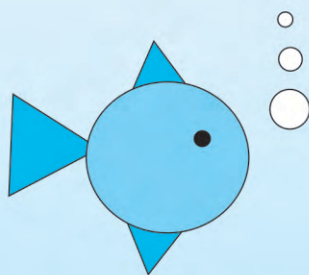
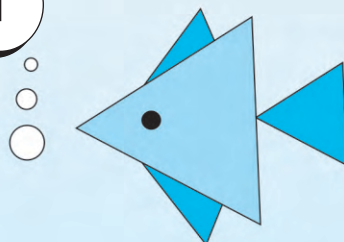
- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

The Coordination Committee formed by GR No. Abhyas - 2116/(Pra.Kra.43/16) SD - 4
Dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on 3.3.2017



MATHEMATICS

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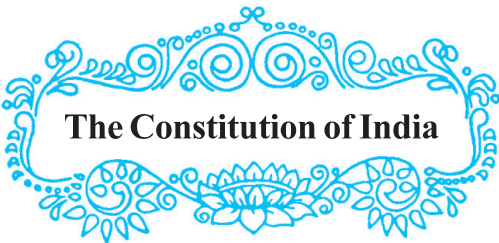
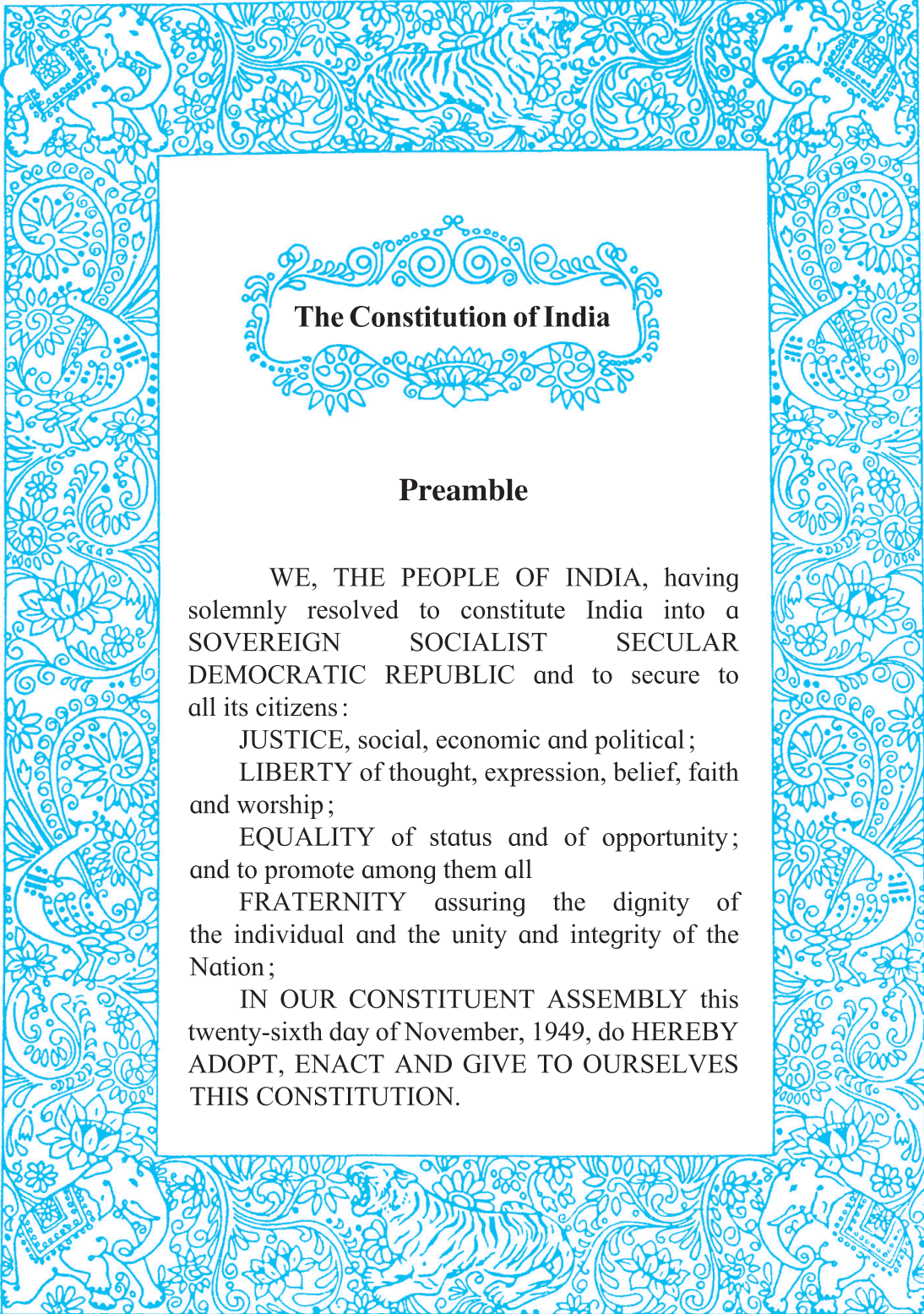
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The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens :

JUSTICE, social, economic and political ;

LIBERTY of thought, expression, belief, faith and worship ;

EQUALITY of status and of opportunity ; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation ;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians
are my brothers and sisters.

I love my country, and I am proud
of its rich and varied heritage. I shall
always strive to be worthy of it.

I shall give my parents, teachers
and all elders respect, and treat
everyone with courtesy.

To my country and my people,
I pledge my devotion. In their
well-being and prosperity alone lies
my happiness.

PREFACE

Dear Students,

A warm welcome to all of you in Std VII! You have studied your maths textbooks of Stds I to VI. We are now happy to offer you the Std VII maths textbook.

We want you to understand maths well and also find it interesting. We want you to experience the joy of learning new things and finding answers to new questions. So do carry out all the activities and constructions given in the book for this very purpose. By doing so, you may just find out something interesting or some new mathematical properties! Discussing amongst yourselves helps to understand new concepts well. Pictures, Venn diagrams, the Internet, all help to understand mathematical concepts better. And if you understand the basic concepts, maths is not difficult at all. We expect that you will yourself read every chapter carefully. If you find something difficult, ask for help from your teachers or parents or other students in order to understand that part. The method of solving problems is given in the book along with the explanation of how and why a particular formula is obtained. Practise solving the problems by the given methods. This is very important. Design more problems of your own like the ones given in the Practice Sets. In this book, the more challenging problems have been marked with a star. The matter in the boxes will be of use to you for the maths studies that will follow. All the maths you have learnt since Std I, you will find useful in the future too. For example, you can hardly afford to forget addition, subtraction, multiplication and division! Practice these operations till you are really good at them. You have to use them all many times while solving problems later.

Many basic concepts have been introduced in this Std VII book. If you gain a good understanding of them all, you will find maths easy in the following years.

Come then, this book is looking forward to be your companion and friend as you make your efforts to understand and learn mathematics.

Pune

Date : 28 March 2017

Indian Solar Year:

7 Chaitra 1939



(Dr Sunil Magar)

Director

Maharashtra State Bureau of Textbook
Production and Curriculum Research, Pune.

English Mathematics - Standard VII

Learning Outcomes

Suggested Pedagogical Processes	Learning Outcomes
The learner may be provided opportunities in pairs/groups/ individually and encouraged to — - provide contexts for exploring the rules of multiplication and division of integers. This can be done through number-line or number patterns. For example : $3 \times 2 = 6$ $3 \times 1 = 3$ $3 \times 0 = 0$ $3 \times (-1) = -3$ $3 \times (-2) = -6$ Same number reduced by one number number reduced by 3 So $3 \times (-3) = -9$ Means a positive integer multiplied by a negative integer given a negative integer For example: (a) $\frac{1}{4} \times \frac{1}{2}$ is $\frac{1}{4}$ of $\frac{1}{2}$ is $\frac{1}{8}$ (b) $\frac{1}{2} \div \frac{1}{4}$ means number of $\frac{1}{4}$ in $\frac{1}{2}$ are two  - explore the multiplication/ division of fractions/ decimals through pictures/paper folding activities of daily life examples. - discuss the situations that require the use of fractional numbers in opposite direction, such as moving $10\frac{1}{2}$ m to the right of a tree and $15\frac{2}{3}$ m to its left etc. - involve children in exploring how repeated multiplication of numbers can be expressed in short form. For example, $2 \times 2 \times 2 \times 2 \times 2 \times 2 =$ can be expressed as 2^6. - explore the possible combinations of variables and constants using different operations to form algebraic expressions in various contexts. - provide situations from daily life that lead to setting up of equations and choosing the appropriate value of the variable that equate both sides. - conduct activity of adding /subtracting number of objects of same category from daily life. For example, number of notebooks obtained when 3 notebooks are added to a group of 5 notebooks. - evolve the understanding of the concepts of ratios and percentage (equality of ratio).	The learner — 07.71.01 multiplies/divides two integers. 07.71.02 interprets the division and multiplication of fractions. For example, interprets $\frac{2}{3} \times \frac{4}{5}$ as $\frac{2}{3}$ of $\frac{4}{5}$. Also $\frac{1}{2} \div \frac{1}{4}$ is interpreted as how many $\frac{1}{4}$ make $\frac{1}{2}$? 07.71.03 uses algorithms to multiply and divide fractions/ decimals. 07.71.04 solves problems related to daily life situations involving rational numbers. 07.71.05 uses exponential form of numbers to simplify problems involving multiplication and division of large numbers. 07.71.06 represents daily life situations in the form of a simple equation and solves it. 07.71.07 adds/subtracts algebraic expressions. 07.71.08 distinguishes quantities that are in proportion. For example, tells that 15, 45, 40, 120 are in proportion as $\frac{15}{45}$ is the same as $\frac{40}{120}$. 07.71.09 solves problems related to conversion of percentage to fraction and decimal and vice versa. 07.71.10 classifies pairs of angles based on their properties as linear, supplementary, complementary, adjacent and vertically opposite and finds value of the one when the other is given. 07.71.11 finds unknown angle of a triangle when its two angles are known. 07.71.12 calculates areas of the regions enclosed in a rectangle and a square. 07.71.13 finds various representative values for simple data from her/his daily life contexts like mean, median and mode. 07.71.14 interprets data using bar graph such as consumption of electricity is more in winters than summer, runs scored by a team in first 10 overs etc. 07.71.15 constructs angle bisector and perpendicular bisector at sides of a triangle and recognises that they are concurrent. 07.71.16 constructs triangle if particular sides and angles are given. 07.71.17 identifies congruence of angles, segments and circles.

• provide daily life situations based on profit/loss and simple interest that show the use of percentage • explore different examples from daily life in which pair of angles are involved with a common vertex, for example, Scissors, Road Junction, Letter X, T, etc • verify the properties of various pairs of angles by drawing diagram (One group can give measure of one angle, the other group needs to give the measure of other angle.) • visualise the relationship between various pairs of angles when a transversal cuts two lines (parallel and non-parallel), angles of triangle and relationship among its sides through diagrams and upper primary Mathematics kit • draw different types of triangles, ask them to measure angles of all triangles and verify. • explore exterior angle property of triangles and Pythagoras theorem. • establish congruence criterion and later on verify the property by superimposing one above the other • construct the simple triangle by using ruler and compasses. • find a representative value of data i.e. mean, mode or median of ungrouped data. Encourage them to arrange it in a tabular form and represent it by bar graphs • draw inferences for future events from the existing data. • understand the property that sum of two sides of a triangle is greater than the third side.	07.71.18 calculate GCD and LCM by using prime factorization. 07.71.19 identifies exterior angles of triangle. 07.71.20 derives the formula for sum of interior angles of polygon. 07.71.21 calculate the square root of number by prime factorization. 07.71.22 draws and reads joint bar graphs from the given information. 07.71.23 uses the properties of proportion in partnership. 07.71.24 derives the formula for circumference and applies. 07.71.25 identifies the minor and major arc and finds measure of them. 07.71.26 derives the formula for area of triangle. 07.71.27 finds surface area of cube and cuboid. 07.71.28 uses the Pythagoras theorem for finding one side of right angled triangle. 07.71.29 uses formula for expansion of square. 07.71.30 writes the squares of any binomial. 07.71.31 finds the factors of binominal.
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Guidelines for Teachers

The Std VII textbook needs to be used for question-answers, activities and conversations with students in the class. Hence, it should be read very thoroughly. The textbook relates mathematics with all other subjects such as our environment, geography, science, economics. Teachers should show the students how mathematics is used in all these various subjects. This will impress upon them the usefulness of mathematics in daily affairs and will convince them of the importance of studying the subject. Explanations of the mathematical concepts have been given in simple language. Teachers should frame more problems based on those included in the practice sets and encourage students also to do the same.

Some challenging problems have been provided for the students. Those problems are marked with a star. Some extra information is given under the title 'Something more'. Students may find it useful for their further studies. We hope and believe that you will like the new Std VII maths textbook.

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