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CCE (Continuous and Comprehensive Evaluation)

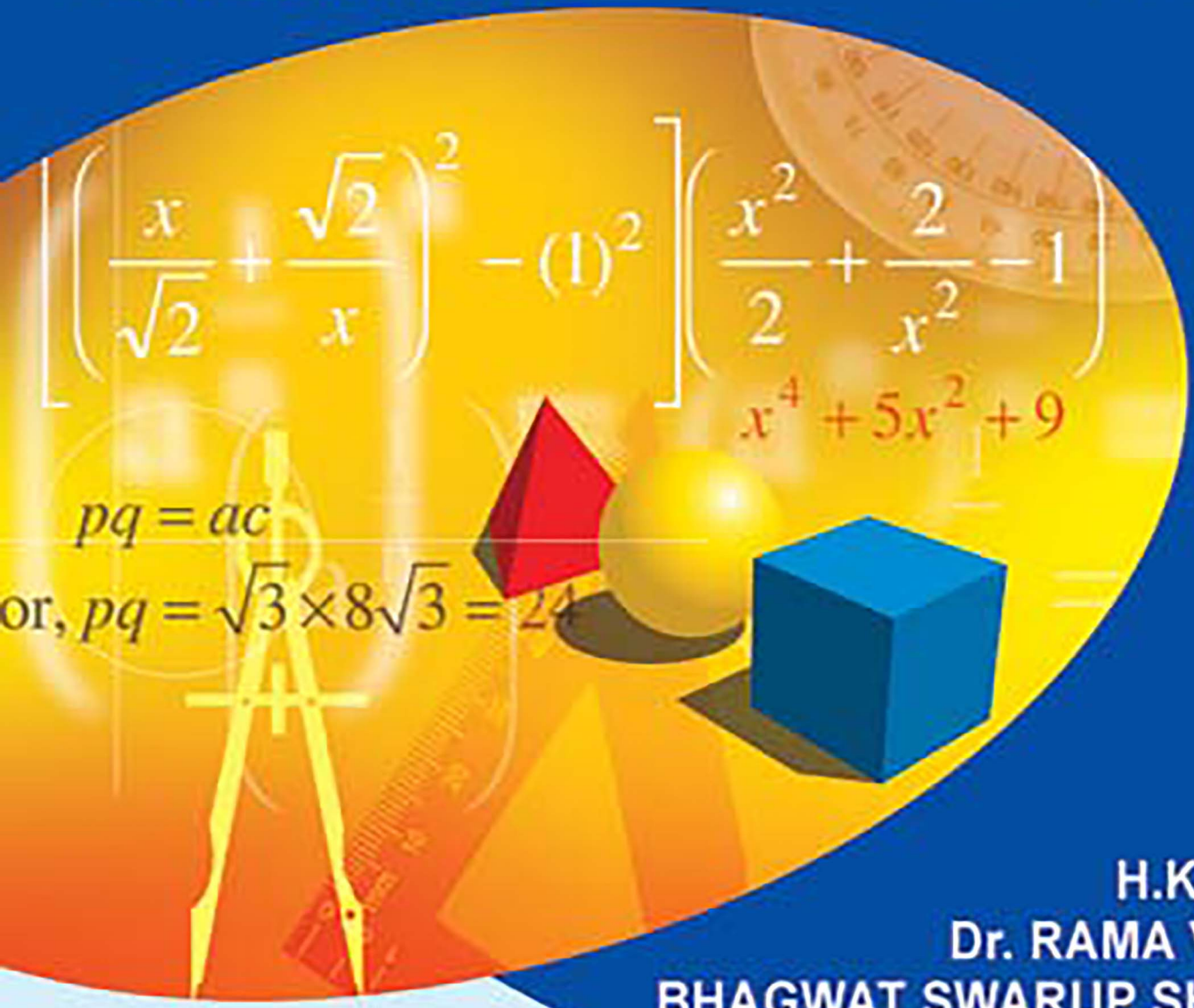
With Latest Pattern of Model Test Papers

S. Chand's

Mathematics

For Class IX

TERM - I



H.K. DASS
Dr. RAMA VERMA
BHAGWAT SWARUP SHARMA

S. CHAND

This book has been written according to the NCERT syllabus prescribed
by the Central Board of Secondary Education (CBSE) for Class–IX
and also according to the new examination pattern
CCE (Continuous and Comprehensive Evaluation)

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MATHEMATICS

FOR CLASS – IX

TERM – I

(Including Formative and Summative Assessments)

With latest pattern of Model Test Papers

H. K. DASS
M.Sc., Diploma in Specialist Studies (Maths)
University of Hull, England

Dr. RAMA VERMA
M.Sc. (Gold Medallist), Ph.D.
Associate Professor, Mata Sundri College
Delhi University

BHAGWAT SWARUP SHARMA
M.Sc., M.Ed. (PGT Maths)
Delhi Public School, Faridabad
Haryana

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Phone: 23672080-81-82, 9899107446, 9911310888 Fax: 91-11-23677446

Shop at: **schandgroup.com;** e-mail: **info@schandgroup.com**

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MUMBAI : Blackie House, IInd Floor, 103/5, Walchand Hirachand Marg, Opp. G.P.O., **Mumbai** - 400 001, Ph: 22690881, 22610885, mumbai@schandgroup.com

NAGPUR : Karnal Bagh, Near Model Mill Chowk, **Nagpur** - 440 032, Ph: 2720523, 2777666 nagpur@schandgroup.com

PATNA : 104, Citicentre Ashok, Mahima Palace , Govind Mitra Road, **Patna** - 800 004, Ph: 2300489, 2302100, patna@schandgroup.com

PUNE : Sadguru Enclave, Ground floor, Survey No. 114/3, Plot no. 8 Alandi Road, Vishrantwadi **Pune** - 411015 Ph: 64017298 pune@schandgroup.com

RAIPUR : Kailash Residency, Plot No. 4B, Bottle House Road, Shankar Nagar, **Raipur** - 492 007, Ph: 2443142,Mb. : 09981200834, raipur@schandgroup.com **(Marketing Office)**

RANCHI : Shanti Deep Tower, Opp. Hotel Maharaja, Radium Road, **Ranchi** - 834001 Mob. 09430246440, ranchi@schandgroup.com

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VISAKHAPATNAM : No. 49-54-15/53/8, Plot No. 7, 1st Floor, Opp. Radhakrishna Towers, Seethammadhara North Extn., **Visakhapatnam** - 530 013, Ph-2782609 (M) 09440100555, visakhapatnam@schandgroup.com **(Marketing Office)**

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Preface to the Revised Edition

It gives us immense pleasure in presenting the revised edition of **S. Chand's Mathematics for Class – IX (Term–I)** as per the latest CCE (continuous and comprehensive evaluation) pattern and guidelines issued by CBSE by circular no. 39/20-09-2009 for term I and term II separately.

A team of dedicated, sincere and hard-working authors have put their sincere efforts in revising this textbook and we hope that this revised edition will be widely accepted by students.

The fundamental theory of each chapter is given in the beginning of each chapter for the ready reference of the students. The classification and order of the chapters in the book is made very systematically and in proper sequence so that students can learn and understand the continuity of topics and subject matter properly.

We are confident that the book in its present form will be complete in itself and prove to be a boon to the students for their preparation as per new pattern of CCE.

UNIQUE FEATURES OF THE BOOK

The book is divided into three parts :

Part – I : Summative Assessment

- In each chapter, detailed theory, examples and exercises are given.
- For quick revision, a revision exercise is given at the end of each chapter.
- To check the performance, chapter tests are given.
- To summarize the concepts, facts are given in the form of chapter's flash back after revision exercise of each chapter.

Part – II : Formative Assessment

This part is divided into two sections :

Section – A : Worksheets for formative assessment:

- True and false
- Fill in the blanks
- MCQs with more than one correct option

Section – B : Activities for lab manual.

Part – III

10 Model test papers based on the latest pattern of CBSE examination w.e.f. 2014.

We are thankful to the management and the editorial team of S. Chand & Company Pvt. Ltd., New Delhi for help and support in publication of this book.

We are also thankful to Shri Kapil Bandhu, Govt. Co-ed. Senior Secondary School, Narela, Dr. Arvind Kumar, Mr. Naseer John, Shri Vishwasanathi School, Shri Manish Sharma (PGT Maths) of Delhi Public School, Panipat (Refinery) for giving feedback to improve the textbook.

We also convey our sincere thanks to our family members for their kind co-operation and valuable support during the time of writing this textbook.

Last but not the least, our valuable thanks to Ms. Parul Bhardwaj, Principal KCM Public School and Shri Anil Bhardwaj (M.D.), KCM Public School for their great motivational and moral support all the time.

Although every effort has been made to keep this book error-free, still some printing errors might be crept in. If you bring to our notice any mistakes, errors or discrepancies, we would be extremely thankful to you. You may send your valuable suggestions, feedback or queries through email at: hk_dass@yahoo.com, bs_sharma30@rediffmail.com and msanyal@schandgroup.com.

Authors

SYLLABUS

TERM–I (APRIL TO SEPTEMBER)

There will be two **Formative Tests** and a **Summative Test**. The weightages and time schedule will be as under:

Type of test	Weightage	Time Schedule
Formative 1	10 %	April – June
Formative 2	10 %	July – September
Summative	90 Marks (30% weightage)	September
Total	**50 %**	

General Instructions :

- As per CCE guidelines, the syllabus of Mathematics for Class-IX has been divided termwise.
- The units specified for each term shall be assessed through both formative and summative assessments.
- In each term, there will be two formative assessments, each carrying 10% weightage.
- The summative assessment in term I will carry 30% weightage and the summative assessment in the term II will carry 30% weightage.
- Listed laboratory activities and projects will necessary be assessed through formative assessments.

Course Structure Class IX

	UNITS	MARKS
I.	Number System	17
II.	Algebra	25
III.	Geometry	37
IV.	Co-ordinate Geometry	06
V.	Mensuration	05
	Total theory	**90**

UNIT I : NUMBER SYSTEM

1. REAL NUMBERS (18) Periods

Review of representation of natural numbers, integers, rational numbers number line. Representation of terminating/ non-terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring/terminating decimals.

Examples of non-recurring/non-terminating decimals such as $\sqrt{2}, \sqrt{3}, \sqrt{5}$, *etc.* Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}, \sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by unique point on the number line and conversely, every point on the number line represents a unique real number.

Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized).
Definition of nth root of a real number.

Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)

Rationalization (with precise meaning) or real numbers of the type (& their combinations) $\frac{1}{a+b\sqrt{x}}$ & $\frac{1}{\sqrt{x}+\sqrt{y}}$ where and x and y are natural numbers and a, b are integers.

UNIT II : ALGEBRA

2. POLYNOMIALS (23) Periods

Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear quadratic, cubic polynomials, monomials, binomials, trinomials. Factors and multiples. Zero/roots of a polynomial/equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorization of $ax^2 + bx + c$, $a \neq 0$ where a, b, c are real numbers and cubic polynomials using the Factor Theorem.

Recall of algebraic expressions and identities. Further identities of the type

$(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$, $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy\,(x \pm y)$.

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)\,(x^2 + y^2 + z^2 - xy - yz - zx)$ and their use in factorization of polynomials. Simple expressions reducible to these polynomials.

**** Note. Chapter – 3 'Co-ordinate Geometry' is in Unit IV as per NCERT Syllabus.***

UNIT III : GEOMETRY

4. INTRODUCTION TO EUCLID'S GEOMETRY (6) Periods

History-Euclid and geometry in India. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/obvious notations, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem.

(*i*) Given two distinct points, there exists one and only one line through them.

(*ii*) (Prove) two distinct lines cannot have more than one point in common.

5. LINES AND ANGLES (10) Periods

(*i*) (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180° and the converse.

(*ii*) (Prove) If two lines intersect, the vertically opposite angles are equal.

(*iii*) (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.

(*iv*) (Motivate) Lines, which are parallel to a given line, are parallel.

(*v*) (Prove) The sum of the angles of a triangle is 180°.

(*vi*) (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.

6. TRIANGLES (20) Periods

(*i*) (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (*SAS* Congruence).

(*ii*) (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (*ASA* Congruence).

(*iii*) (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruence).

(*iv*) (Motivate) Two right triangles are congruent if both hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.

(*v*) (Prove) The angles opposite to equal sides of a triangle are equal.

(*vi*) (Motivate) The sides opposite to equal angles of a triangle are equal.

(*vii*) (Motivate) Triangle inequalities and relation between angle and facing side inequalities in triangles.

UNIT IV : CO-ORDINATE GEOMETRY

3. CO-ORDINATE GEOMETRY (9) Periods

The Cartesian plane, co-ordinates of a point, names and terms associated with the co-ordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $ax + by + c = 0$ by writing it as $y = mx + c$ and linking with the chapter on linear equations in two variables.

UNIT V : MENSURATION

7. HERON'S FORMULA (4) Periods

Area of a triangle using Heron's formula (without proof) and its application in finding the area of a quadrilateral.

QUESTIONS PAPER DESIGNS 2014–15
CLASS–IX

MATHEMATICS **Time–3 Hours** **Marks–90**

S. No.	Typology of Questions	Very Short Answer (VSA) (1 Mark)	Short Answer – I (VSA) (2 Marks)	Short Answer – II (VSA) (3 Marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1	**Remembering – (Knowledge based** Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	23	26%
2	**Understanding – (Comprehension** - to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	1	1	2	14	16%
3	**Application** (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)	1	2	3	2	22	24%
4	**High Order Thinking Skills (Analysis & Synthesis** - Classify, compare, contrast, or differentiate between different pieces of information; Organize and / or integrate unique pieces of information from a variety of sources)	1	1	4	1	19	21%
5	**Creating, Evaluation and Multi-Disciplinary** - (Generating new ideas, product or ways of viewing things Appraise, judge, and / or justify the value or worth of a decision or outcome, or to predict outcomes based on values)				3*	12	13%
	TOTAL	**4 × 1 = 4**	**6 × 2 = 12**	**10 × 3 = 30**	**11 × 4 = 44**	**90**	**100%**

Note : The question paper will include a section on Open Text based assessment (questions of 7 marks each from the syllabus-a total of 14 marks). The case studies will be supplied to students in advance. These case studies are designed to test the analytical and higher order thinking skills of students.

* One of the LSA (4 marks) will to assess the values in herent in the texts.

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- Quadrilaterals
- Area of Parallelograms and Triangles
- Circles
- Constructions
- Surface Areas & Volumes
- Statistics
- Probability

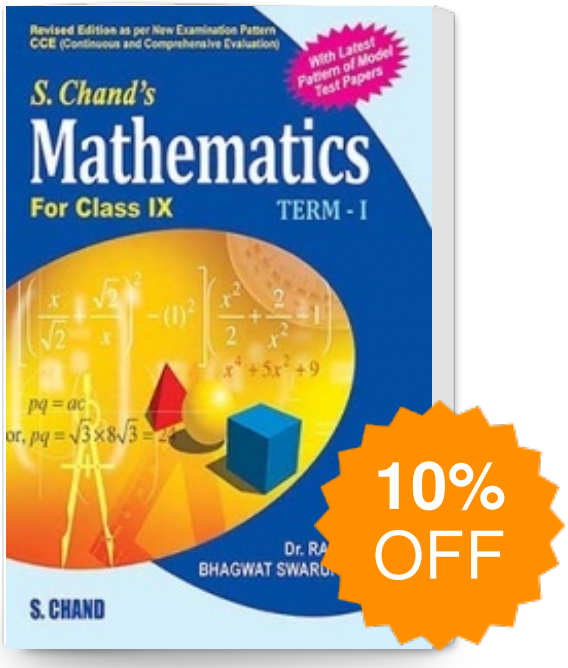
MODEL TEST PAPERS

Part – I

Summative Assessment

- Real Numbers
- Polynomials
- Co-ordinate Geometry
- Introduction to Euclid's Geometry
- Lines and Angles
- Triangles
- Heron's Formula

S.Chand’S Mathematics For Class IX Term-I



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