Revised Edition as per New Examination Pattern
CCE (Continuous and Comprehensive Evaluation)

With Latest Pattern of Model Test Papers

S. Chand's

# Mathematics

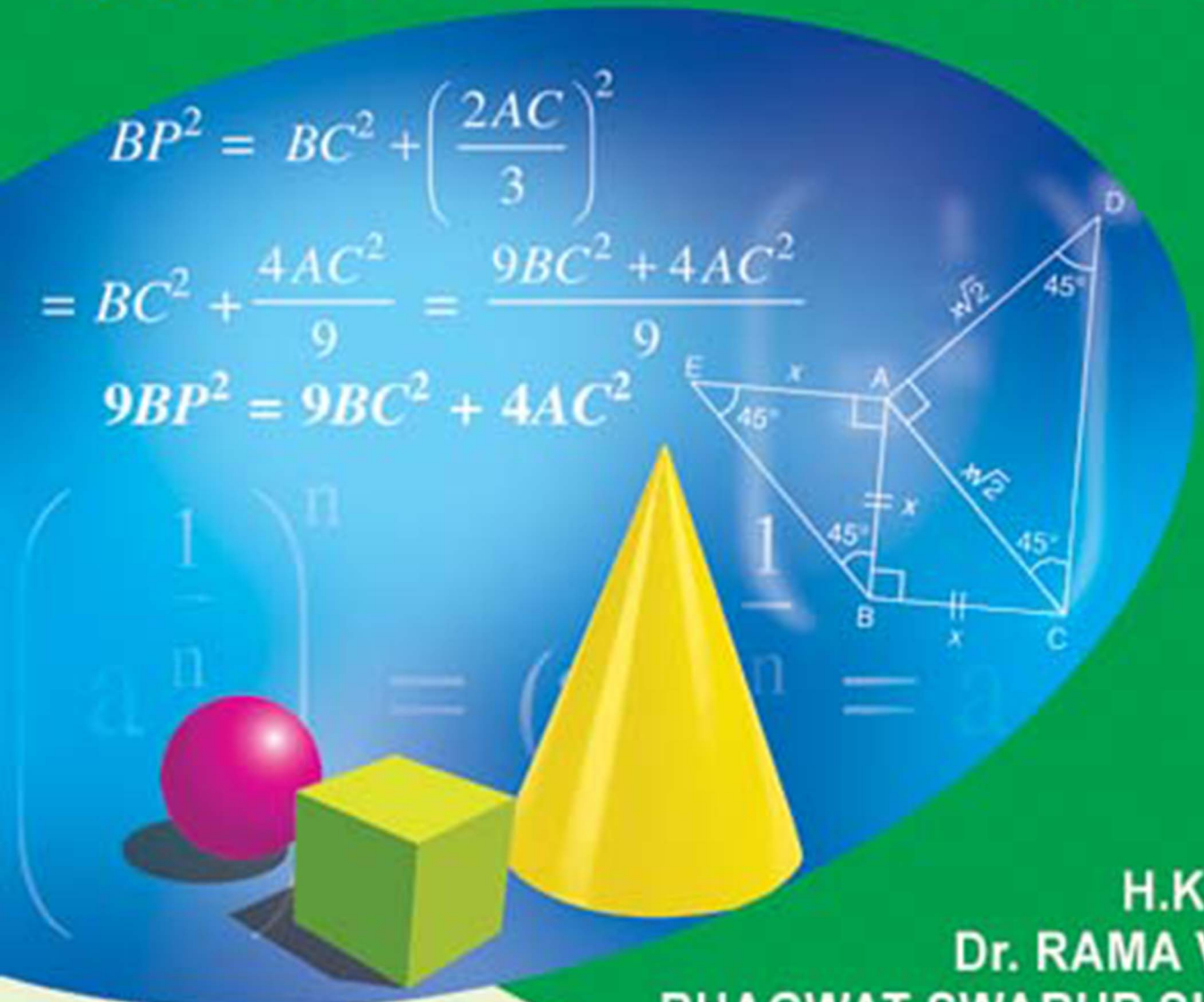
## For Class X

## TERM - I

$$BP^2 = BC^2 + \left(\frac{2AC}{3}\right)^2$$

$$= BC^2 + \frac{4AC^2}{9} = \frac{9BC^2 + 4AC^2}{9}$$

$$9BP^2 = 9BC^2 + 4AC^2$$




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

S. CHAND School

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

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# MATHEMATICS

## FOR CLASS – X

## TERM – I

**Including Formative and Summative Assessments**

**With latest pattern of Model Test Papers**


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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 – X (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**

# Scheme of Examination Reforms and Continuous and Comprehensive Evaluation (CCE)*

## 1. SENIOR SECONDARY SCHOOLS

In Senior Secondary Schools, there will be no Board examination at Class X since the students will be entering Class XI in the same school.

**These students will be assessed through the CCE internally by the school as per the strengthened CCE Scheme in Class X (*for two terms, the first term from April to September and the second from October-March*).**

At the end of the academic year, students will be issued the CCE certificate on the pre-printed stationery to be supplied by the Board. **These CCE certificates, once they are complete in all respects (for both Classes IX and X) will be required to be sent to the Regional Offices for the signatures of the Board official**.

However the Board will provide **flexibility to the following students in Senior Secondary schools** also to appear in Board's external (pen and paper written/online) examination (described separately below):

- The students wanting to terminate their studies in the school for admission in Pre-University, vocational course, *etc.*
- The students wanting to shift to the other schools of other State Boards due to local reasons.

Moreover, those students who wish to assess themselves *vis-à-vis* **their peers or for self-motivation** will be allowed to appear in an **On Demand** (pen and paper/online) **Proficiency test**.

## 2. SECONDARY SCHOOLS

In all schools upto secondary level there will be Board's external (*pen and paper written/online*) Examination at the end of Class X as detailed in *para 3 below* since the students will be moving out of these schools.

**Note :** The students in Classes IX and X in Secondary Schools also will follow the CCE as described above. At the end of the Class X, students will be issued the CCE certificates on the pre-printed stationery supplied by the Board.

## 3. EXTERNAL (PEN AND PAPER WRITTEN/ONLINE) EXAMINATION

- These mainly application oriented external (*pen and paper written/online*) Examinations will be based on the same syllabi as detailed in the Curriculum Document 2011.
- These will be certified by the CBSE.

### • Concessions being given to the Differently Abled

All the relaxation such as use of scribe for visually challenged, choice of optional subjects, use of computers for visually challenged being provided the present Board Examinations of class X to the differently-abled children need to be continued in the School Based Assessment also, at the formative as well as Summative level. Due consideration will also be given to these students in co-scholastic evaluation too.

### • Aptitude Test

1. The Board will offer an aptitude Test (*optional*) which along with other school records and CCE would help the students, parents and teachers in deciding the choice of the subjects at Class XI.
2. The Board proposes to provide an opportunity to students to undertake the Aptitude Test at the end of class IX and then at the end of Class X.

### • Admission in Class XI

1. For the purpose of admission in Class XI the CCE certificate will be relied upon.
2. It is also recommended that some amount of weightage be assigned to the co-scholastic aspects especially Life Skills and excellence in sports for allotting subjects in Class XI. A multi-pronged approach for assigning subjects needs to be adopted. **Aptitude test, Scholastic Performance** and **Co-Scholastic Achievements, all need to be given weightage**.
3. Students of the same school may be given preference over the students coming from any other school for admission in class XI.

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* As per the CBSE Circular No. 39/20-9-2009

## 4. EVALUATION OF SCHOLASTIC AREAS

Each term will have **two Formative assessments** and **one Summative assessment** for evaluation of Scholastic areas.

## 5. FORMATIVE ASSESSMENT

Formative assessment is a tool used by the teacher to continuously monitor student progress in a non-threatening and supportive environment. If used effectively it can improve student performance tremendously while raising the self-esteem of the child and reducing the work load of the teacher. Some of the main features of Formative assessment are that it is diagnostic and remedial, provides effective feedback to students, allows for the active involvement of students in their own learning, enables teachers to adjust teaching to take account of the results of assessment and recognizes the profound influence that assessment has on the motivation and self-esteem of students, both of which are crucial influences in learning.

It is highly recommended that the school should not restrict the formative assessment to only a paper-pencil test. There are other means of testing such as through quizzes, conversation, interviews, oral testing, visual testing, projects, practicals and assignments.

Assessments done periodically will be shown to the students/parents so as to encourage continuous participatory improvement.

## 6. SUMMATIVE ASSESSMENT

The summative assessment is the terminal assessment of performance at the end of instruction. Under the **end term summative assessment,** the students will be tested internally based on the following criteria:

- Curriculum and Syllabus for Class X will be the same as circulated by the Board earlier.
- The summative assessment will be in the form of a pen-paper test conducted by the schools themselves. It will be conducted at the end of each term.
- In order to ensure standardisation, and to ensure uniformity, the Question Banks in different subjects to generate question papers will be forwarded by the Board to schools.
- In order to cater to difference in the pace of responding, the schools will give flexible timing to the students during end term Summative assessment.
- Evaluation of answer scripts will be done by the school teachers themselves on the basis of the Marking Scheme provided by the Board.
- There will be random verification of the assessments procedures carried on by the schools by the Board officials/nominees appointed by the Board.

## GRADING

Grading is an indicator of a student's progress at all levels. It is used in lieu of marks to prevent competition and lack of self-assessment.

The new grading system will be introduced at Secondary School level (for Classes IX and X) effective from 2009–10 Academic Session.

The nine-point grading scale for measuring scholastic achievements is reproduced below :

| Marks range | Grade | Grade point |
|---|---|---|
| 91–100 | **A1** | 10.0 |
| 81–90 | **A2** | 9.0 |
| 71–80 | **B1** | 8.0 |
| 61–70 | **B2** | 7.0 |
| 51–60 | **C1** | 6.0 |
| 41–50 | **C2** | 5.0 |
| 33–40 | **D** | 4.0 |
| 21–32 | **E1** | |
| 00–20 | **E2** | |

# SYLLABUS

## TERM–I (APRIL TO SEPTEMBER)

**General Instructions :**

- As per CCE guidelines, the syllabus of Mathematics for class X has been divided termwise.
- The units specified for each term shall be assessed through both formative and summative assessment.
- 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 II term will carrying 30% weightage.
- Listed laboratory activities and projects will necessarily be assessed through formative assessments.

**Course Structure** **First Term**

| UNITS | | Marks |
|---|---|---|
| I. | NUMBER SYSTEMS | 11 |
| II. | ALGEBRA | 23 |
| III. | GEMOETRY | 17 |
| V. | TRIGONOMETRY | 22 |
| VII. | STATISTICS | 17 |
| | **TOTAL** | **90** |

## GENERAL GUIDELINES

(*i*) All concepts/identities must be illustrated by situational examples.

(*ii*) The language of 'word problems' must be clear, simple and unambiguous.

(*iii*) All proofs to be produced in a non-didactic manner, allowing the learner to see flow of reason. Wherever possible, give more than one proof.

(*iv*) Motivate most results. Prove explicity those where a short and clear argument reinforces, mathematical thinking and reasoning.

(*v*) The reason for doing ruler and compass construction is to motivate and illustrate logical argument and reasoning. All constructions must include an analysis of the construction, and proof for the steps taken to do the required construction must be give.

### UNIT I: NUMBER SYSTEMS

### 1. REAL NUMBERS (15) Periods

Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples. Proofs of results – irrationality of $\sqrt{2}, \sqrt{3}, \sqrt{5}$ decimal expansions of rational numbers in terms of terminating/non-terminating recurring decimals.

### UNIT II: ALGEBRA

### 2. POLYNOMIALS (7) Periods

Zeroes of a polynomial. Relationship between zeroes and coefficients of a polynomial with particular reference to quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.

### 3. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES (15) Periods

Pair of linear equations in two variables. Geometric representation of different possiblities of solutions/inconsistency. Algebraic conditions for number of solutions. Solution of pair of linear equations in two variables algebraically – by substitution, by elimination and by cross multiplication. Simple situational problems must be included. Simple problems on equations reducible to linear equations may be included.

### UNIT III: GEOMETRY

### 4. SIMILAR TRIANGLES (15) Periods

***Definitions, examples, counter examples of similar triangles.***

1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.

4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
5. (Motivate) If one angle of a triangles is equal to one angle of another triangles and the sides including these angles are proportional, the two triangles are similar.
6. (Motivate) If a perpendicular is drawn from the vertex of the right angle to the hypotenuse, the triangles on each side of the perpendicular are similar triangle and to each other.
7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.
8. (Prove) In a triangle, if the square on one side is equal to sum of the squares on the other two sides.
9. (Prove) In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angles opposite two the first side is a right triangle.

## UNIT V: TRIGONOMETRY

### 5. (*a*) TRIGONOMETRIC RATIOS (10) Periods

Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios, whichever are defined at 0° and 90°. Values (with proofs) of the trigonometric ratios of 30°, 45° and 60°. Relationships between the ratios.

### 5. (*b*) TRIGONOMETRIC IDENTITIES (15) Periods

Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given. Trigonometric ratios of complementary angles.

## UNIT VII: STATISTICS

### 6. STATISTICS (18) Periods

Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph.

**QUESTIONS PAPER DESIGNS 2014–15**
**CLASS–X**

**MATHEMATICS CODE NO. 041** **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.

# CONTENTS

## PART – I : SUMMATIVE ASSESSMENT



## PART – II : FORMATIVE ASSESSMENT



## PART – III





### SYLLABUS (TERM–II)

**(OCTOBER TO MARCH)**

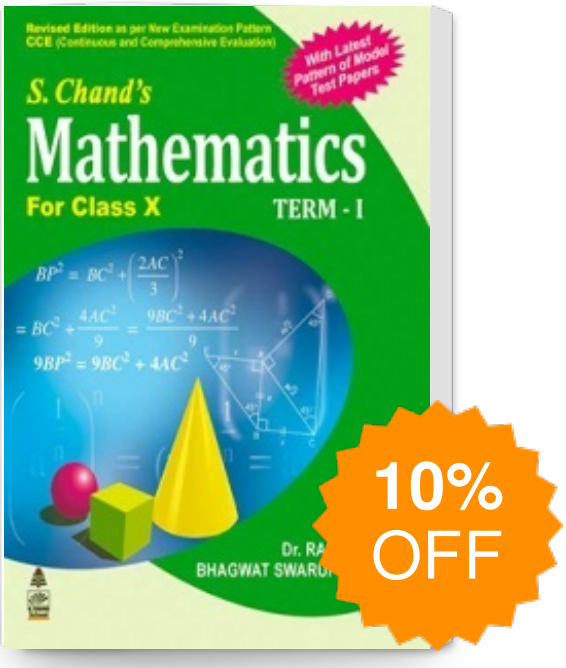
- Quadratic Equations
- Arithmetic Progressions
- Circles
- Constructions
- Area Related to Circles
- Surface Areas and Volumes
- Heights and Distances
- Co-ordinate Geometry
- Probability
- MODEL TEST PAPERS

# Part – I

## Summative Assessment

- Real Numbers
- Polynomials
- Pair of Linear Equations in Two Variables
- Similar Triangles
- Trigonometry
- Statistics

# S.Chand'S Mathematics For Class X Term-I

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