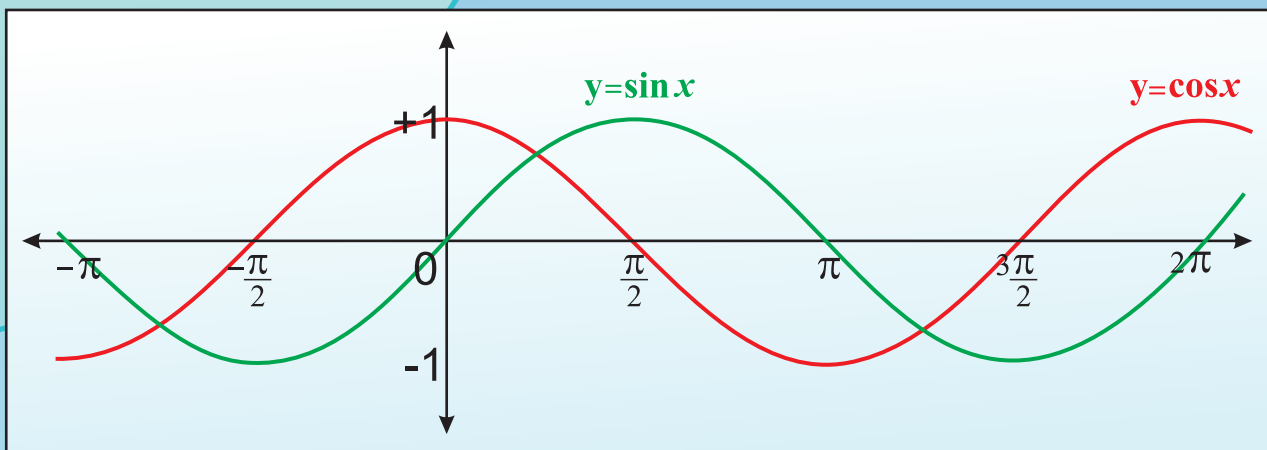
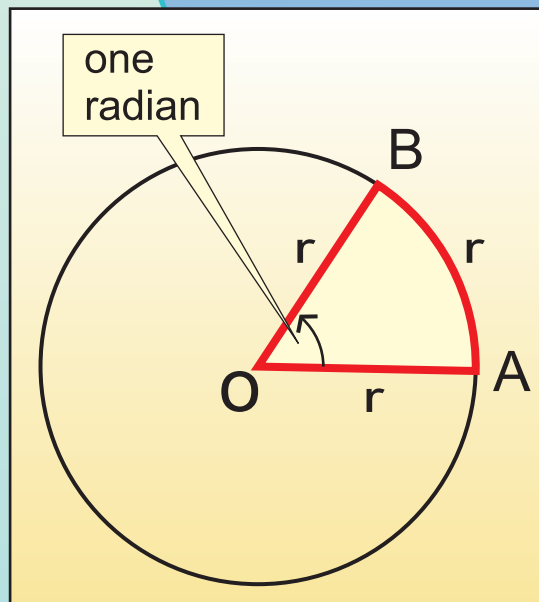


Standard XI



Mathematics & Statistics

(Arts & Science) Part 1



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 20.06.2019 and it has been decided to implement it from the educational year 2019-20.

Mathematics and Statistics

(Arts and Science)

Part - I

STANDARD - XI



2019

**Maharashtra State Bureau of Textbook Production and Curriculum Research,
Pune - 411 004**



T5X2F1

Download DIKSHA App on your smartphone. If you scan the Q.R.Code on this page of your textbook, you will be able to access full text and the audio-visual study material relevant to each lesson provided as teaching and learning aids.

First Edition : 2019 © Maharashtra State Bureau of Textbook Production
Second Reprint : 2021 and Curriculum Research, Pune- 411 004.

Maharashtra State Bureau of Textbook Production and Curriculum Research reserves all rights relating to the book. No part of this book should be reproduced without the written permission of the Director, Maharashtra State Bureau of Textbook Production and curriculum Research, Pune.

Mathematics - I (Science and Arts) Committee Members

Dr. Mangala Narlikar	(Chairman)
Dr. Sharad Gore	(Member)
Shri. Prahallad Chippalagatti	(Member)
Shri. Prasad Kunte	(Member)
Shri. Sujit Shinde	(Member)
Smt. Prajakti Gokhale	(Member)
Shri. Sandeep Panchbhair	(Member)
Shri. Ramakant Sarode	(Member)
Smt. Pooja Jadhav	(Member)
Smt. Ujjwala Godbole	(Member-Secretary)

Mathematics - I (Science and Arts) Study Group Members

Dr. Ishwar Patil	Dr. Pradeep Mugale
Dr. Pradnyankumar Bhojankar	Shri. Milind Patil.
Shri. Pradipkumar Bhavsar	Shri. Balkrishna Mapari
Shri. Prafullchandra Pawar	Shri. Uday Mahindrakar
Shri. Devanand Bagul	Smt. Swati Powar
Shri. Swapnil Shinde	Smt. Mahadevi Mane
Shri. Sachin Batwal	Smt. Nileema Khaldkar
Smt. Deepti Kharas	Shri. Amit Totade
Shri. Pramod Deshpande	Smt. Gauri Prachand
Shri. Sharadchandra Walagade	Smt. Supriya Abhyankar
Shri. Dhananjay Panhalkar	Shri. Dilip Panchamia
Shri. Vinayak Godbole	

Cover, Illustrations and Computer Drawings

Shri. Sandip Koli,
Artist

Typesetter

Baladev Computers

Co-ordinator

Ujjwala Shrikant Godbole
I/C Special Officer for Mathematics

Production

Sachchidanand Aphale
Chief Production Officer

Sanjay Kamble
Production Officer

Prashant Harne
Asst. Production Officer

Paper

70 GSM Cream wove

Print Order No.

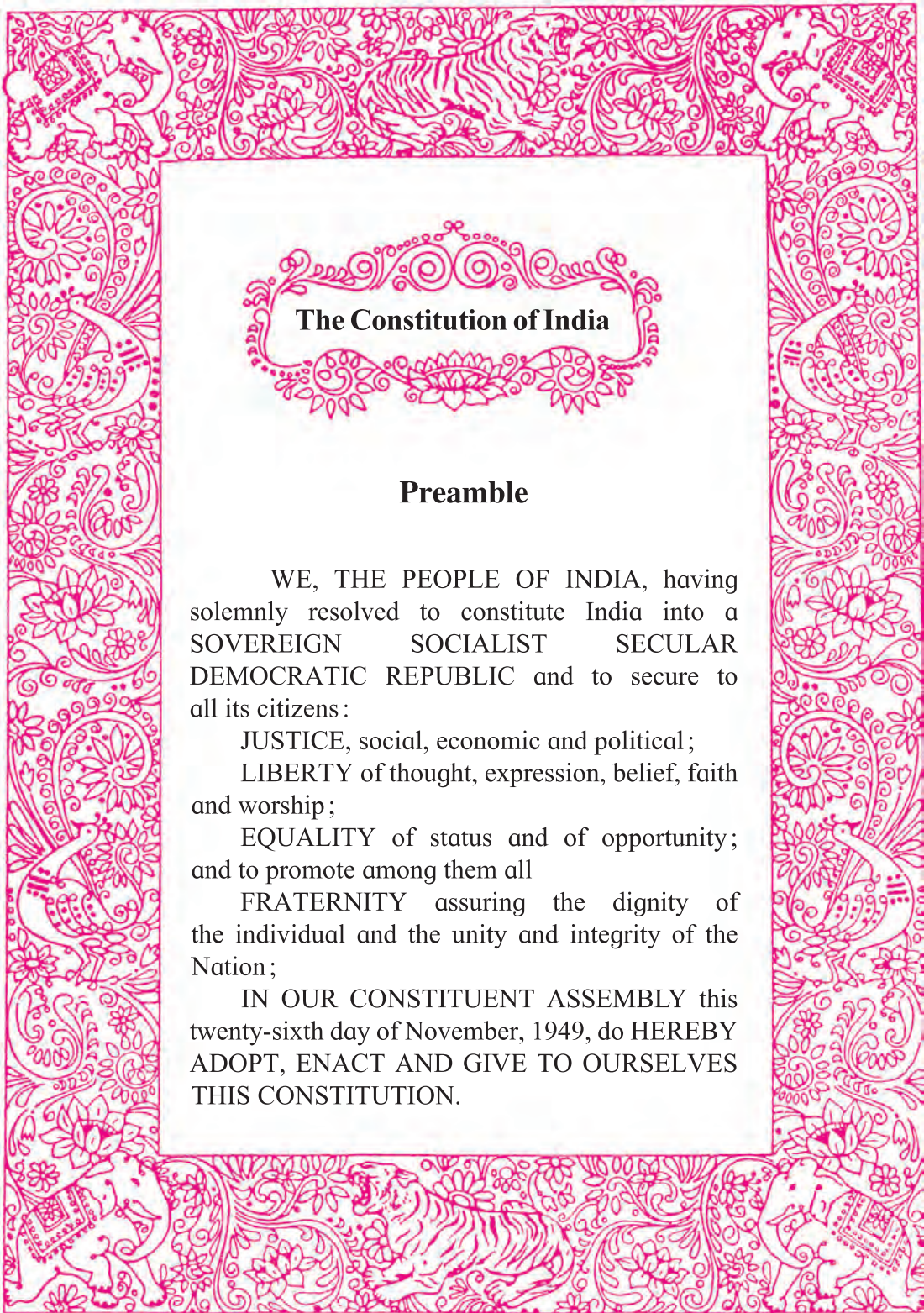
N/PB/2021-22/1,00,000

Printer

SHRI GANRAJ PRINTING AND BINDING
WORKS, KOLHAPUR

Publisher

Vivek Uttam Gosavi, Controller
Maharashtra State Textbook Bureau,
Prabhadevi Mumbai- 400 025



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,

Welcome to the eleventh standard!

You have successfully completed your secondary education and have entered the higher secondary level. You will now need to learn certain mathematical concepts and acquire some statistical skills to add more applicability to your work. Maharashtra State Bureau of Textbook Production and Curriculum Research has modified and restructured the curriculum in Mathematics in accordance with changing needs.

The curriculum of Mathematics is divided in two parts. Part 1 covers topics in Trigonometry, Algebra, Co-ordinate Geometry and Statistics. Part 2 covers Complex Numbers, Sets and Relations, Calculus and Combinatorics. There is a special emphasis on applications. Activities are added in every chapter for creative thinking.

Some material will be made available on E-balbharati website (ealbharati.in). It contains a list of specimen practical problems on each chapter. Students should complete the practical exercises under the guidance of their teachers. Maintain a journal and take teacher's signature on every completed practical.

You are encouraged to use modern technology in your studies. Explore the Internet for more recent information and problems on topics in the curriculum. You will enjoy learning if you study the textbook thoroughly and manage to solve problems.

On the title page Q.R. code is given. It will help you to get more knowledge and clarity about the contents.

This textbook is prepared by Mathematics Subject Committee and members of study group. This book has also been reviewed by senior teachers and subject experts. The Bureau is grateful to all of them and would like to thank for their contribution in the form of creative writing, constructive criticism and valuable suggestions in making this book useful to you and helpful to your teachers.

The Bureau hopes that the textbook will be received well by all stakeholders in the right spirit.

You are now ready to study. Best wishes for a happy learning experience.

Pune

Date : 20 June 2019

Indian Solar Date : 30 Jyeshtha 1941



(Dr. Sunil Magar)
Director

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

XI Mathematics and Statistics (Part I) for Arts and Science

Sr. No	Area	Topic	Competency Statement
1	Angle and Its measurement	Angle	The student will be able to - - understand angle of any measure. - understand different systems of measurement of angle and relations between them. - convert an angle from one system to the other.
2	Trigonometric Functions	Trigonometric Functions	- understand definitions of trigonometric functions of angle of any measure. - find the values of trigonometric functions of certain angles. - draw graphs of trigonometric functions.
3	Trigonometric Functions of compound angles and factorization formulae	Trigonometric Functions of compound angles	- find the trigonometric functions of sum or difference of the angles. - find the trigonometric functions of multiple and sub-multiple angles. - express the sum or difference of two trigonometric functions as product - learn some rules of trigonometric ratios of angles of a triangle.
4	Determinants and Matrices	Determinant	- find value of a determinant. - reduce determinant to simple form. - solve linear equations in 2 or 3 variables - find area of triangle using determinants.
		Matrices	- understand types of matrices. - Perform algebraic operations of the matrices.

5	Straight Line	Straight Line	- understand locus and its equation. - find equation of a straight line in different forms. - find angle between given two straight lines and the distance of a point from given line.
6	Circle	Circle	- find equation of circle satisfying given conditions. - learn and use the properties of circle. - find the equation of tangent to the circle.
7	Conic Section	Parabola, Ellipse, Hyperbola	- find the equations of conic sections satisfying given conditions. - learn and use the properties of conics. - find the equation of tangent to the conic.
8	Measures of dispersion	Measures of dispersion	calculate range, standard deviation and variance from given data.
9	Probability	Probability	- calculate probability of an event and learn conditional probability - learn and use Baye's theorem and its applications

Note :- Extra examples for competitive section and practice are given on e-balbharti. The activities which can be conducted as a part of practicals are also mentioned in pdf form on our website.

INDEX

Sr. No.	Chapter	Page No.
1	Angle and its Measurement	1
2	Trigonometry - I	14
3	Trigonometry - II	35
4	Determinants and Matrices	59
5	Straight Line	103
6	Circle	127
7	Conic Sections	140
8	Measures of Dispersion	179
9	Probability	193
	Answers	216