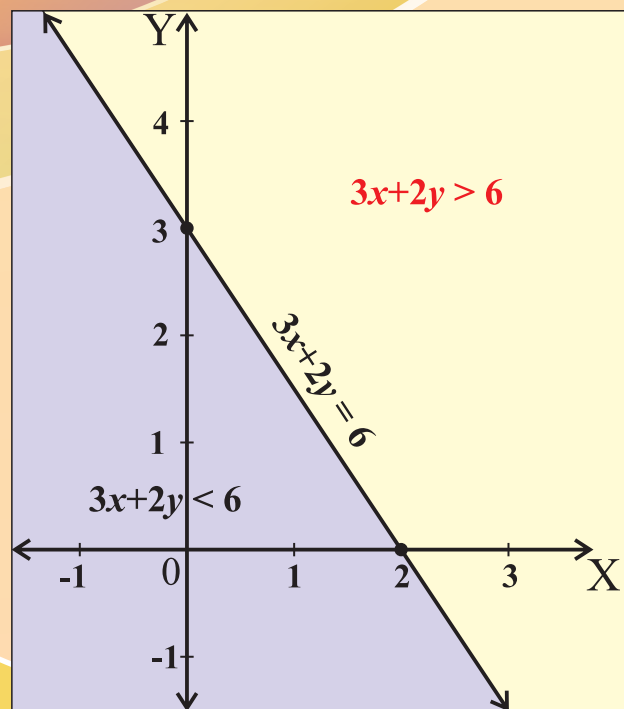
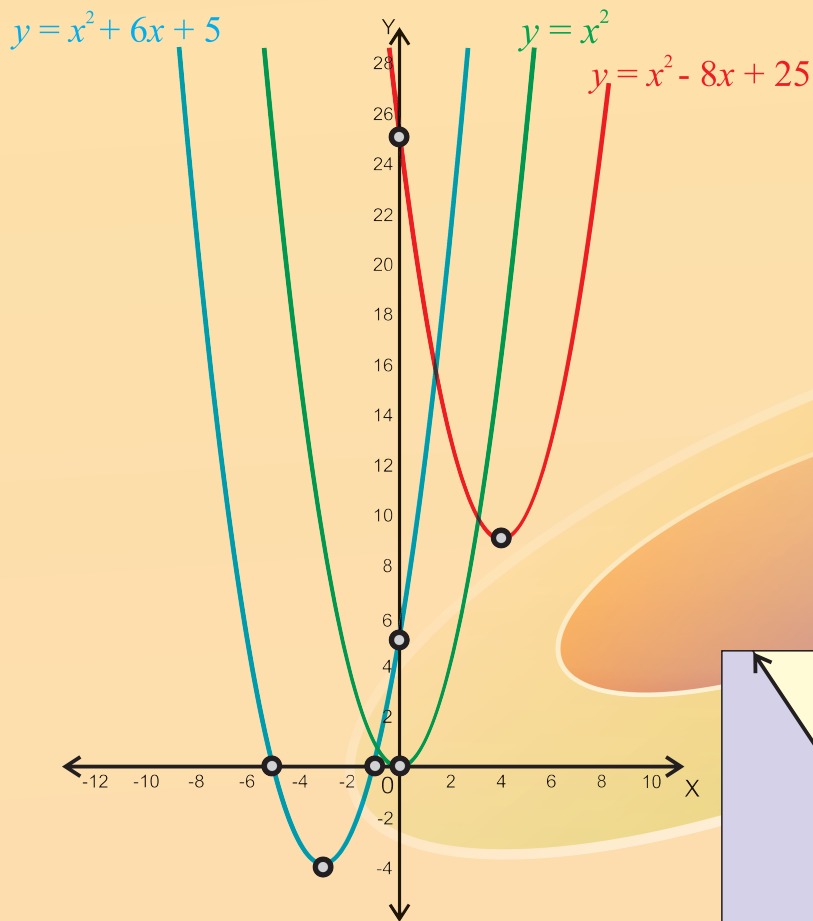




# Mathematics & Statistics

Arts & Science Part 1

**STANDARD XII**



The Coordination Committee formed by GR No.Abhyas - 2116/(Pra.Kra 43/16) SD - 4  
Dated 25.4.2016 has given approved to prescribe this textbook in its meeting held on  
30.01.2020 and it has been decided to implement it from the educational year 2020 - 21.

# Mathematics and Statistics (Arts and Science)

## Part - I

### STANDARD - XII



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



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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,

Welcome to Standard XII, an important milestone in your life.

Standard XII or Higher Secondary School Certificate opens the doors of higher education. Alternatively, you can pursue other career paths like joining the workforce. Either way, you will find that mathematics education helps you considerably. Learning mathematics enables you to think logically, consistently, and rationally. The curriculum for Standard XII Mathematics and Statistics for Science and Arts students has been designed and developed keeping both of these possibilities in mind.

The curriculum of Mathematics and Statistics for Standard XII for Science and Arts students is divided in two parts. Part I deals with topics like Mathematical Logic, Matrices, Vectors and Introduction to three dimensional geometry. Part II deals with Differentiation, Integration and their applications, Introduction to random variables and statistical methods.

The new text books have three types of exercises for focussed and comprehensive practice. First, there are exercises on every important topic. Second, there are comprehensive exercises at the end of all chapters. Third, every chapter includes activities that students must attempt after discussion with classmates and teachers. Additional information has been provided on the E-balbharati website ([www.ebalbharati.in](http://www.ebalbharati.in)).

We are living in the age of Internet. You can make use of modern technology with the help of the Q.R. code given on the title page. The Q.R. code will take you to links that provide additional useful information. Your learning will be fruitful if you balance between reading the text books and solving exercises. Solving more problems will make you more confident and efficient.

The text books are prepared by a subject committee and a study group. The books (Paper I and Paper II) are reviewed by experienced teachers and eminent scholars. The Bureau would like to thank all of them for their valuable contribution in the form of creative writing, constructive and useful suggestions for making the text books valuable. The Bureau hopes and wishes that the text books are very useful and well received by students, teachers and parents.

Students, you are now ready to study. All the best wishes for a happy learning experience and a well deserved success. Enjoy learning and be successful.



(Vivek Gosavi)  
Director

Pune

Date: 21 February 2020

Bharatiya Saur: 2 Phalgun 1941

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

## Mathematics and Statistics Std. XII Part - I

### Competency Statement

Sr.No.	Area	Topic	Competency Statement
1.	Mathematical Logic	Mathematical Logic	<p>The student will be able to</p> <ul style="list-style-type: none"> <li>• Identify statement in logic and truth value of it.</li> <li>• Combine two or more statements</li> <li>• Construct the truth table and examine logical equivalence of statement patterns</li> <li>• Find dual and negation of statement pattern</li> <li>• Study the applications of logic to switching circuits.</li> </ul>
2.	Matrices	Matrices	<ul style="list-style-type: none"> <li>• Identify orders and types of matrices</li> <li>• Perform basic algebraic operations on matrices.</li> <li>• Find the inverse of a matrix using elementary transformation and adjoint method</li> <li>• Solve the system of linear equations using matrices.</li> </ul>
3.	Trigonometric Equations	Trigonometric Equations  Solution of a triangle  Invers trigonometric function	<ul style="list-style-type: none"> <li>• Understand and write trigonometric equation</li> <li>• Find the principal and general solution of a trigonometric equation.</li> <li>• Solve triangle by using sine rule, co-sine rule and projection rule and find area of a triangle.</li> <li>• Understand inverse trigonometric functions with domain and range.</li> </ul>
4.	Pair of straight lines	Pair of straight lines	<ul style="list-style-type: none"> <li>• Write and interpret the combined equation of two straight lines in plane.</li> <li>• Find the point of intersection of two lines and calculate the acute angle between them</li> <li>• Study the general second degree equation in <math>x</math> and <math>y</math> with reference to homogeneous part of it</li> </ul>

5.	Vectors	Vectors	<ul style="list-style-type: none"> <li>• Understand scalars and vectors and algebra of vectors.</li> <li>• Write vectors of 2 or 3 dimensions, understand the scalar and vector products</li> <li>• Study applications of vectors to area of triangle, work done by a force, moment of a force.</li> <li>• Interpret scalar triple product and its applications.</li> </ul>
6.	Line and Plane	Line and Plane	<ul style="list-style-type: none"> <li>• Find different forms of equation of line</li> <li>• Find angle between two intersecting planes</li> <li>• Find the angle between a line and a plane</li> <li>• Find condition for perpendicularity and parallelness of planes</li> <li>• Calculate distance of a point from a plane</li> <li>• Find equation of a plane in different forms</li> <li>• Find angle between two intersecting planes</li> <li>• Find the angle between a line and a plane</li> </ul>
7.	Linear programming Problem	Linear programming Problem	<ul style="list-style-type: none"> <li>• Understand linear equations in one and two variables.</li> <li>• Find graphical solution of linear inequation.</li> <li>• Understand meaning and formulation of L.P.P.</li> <li>• Find solution of L.P.P. by graphical methods.</li> </ul>



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