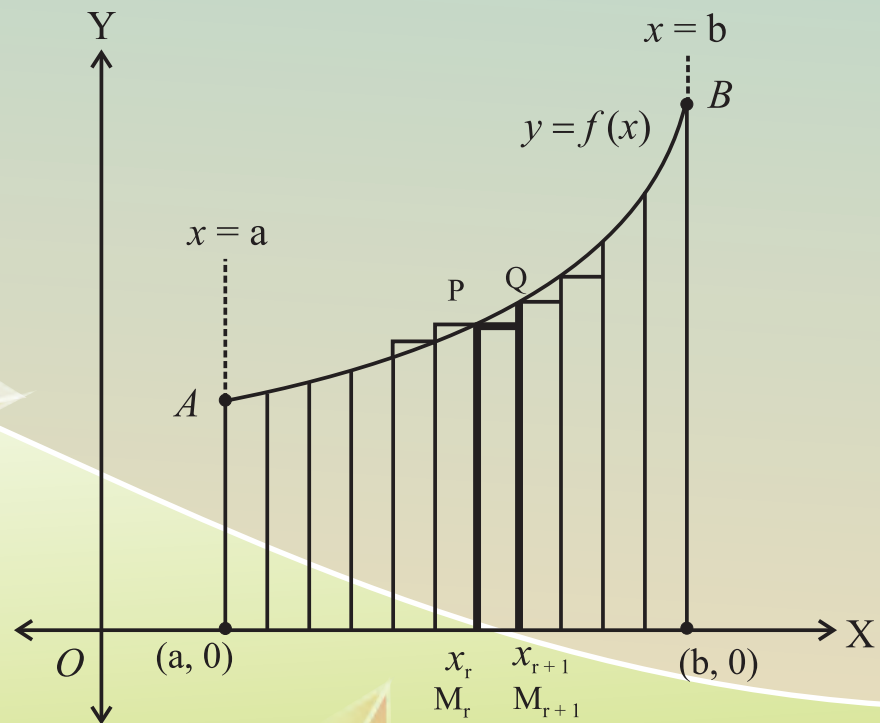
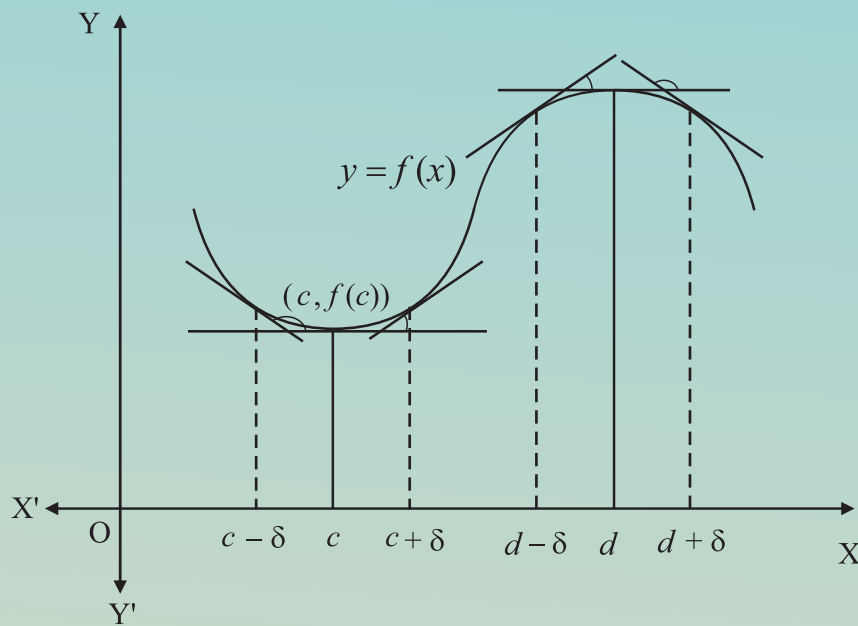




Mathematics & Statistics

Arts & Science Part 2

STANDARD XII



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.

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Dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on
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Mathematics and Statistics

(Arts and Science)

Part - II

STANDARD - XII



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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 focused 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).

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 Phalguna 1941

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

Mathematics and Statistics XII (Part II)
Arts and Science

Sr. No	Area / Topic	Sub Unit	Competency Statement
1.	Differentiation	Differentiation	<p>The students will be able to</p> <ul style="list-style-type: none"> • state and use standard formulas of derivative of standard functions • use chain rule of derivatives • find derivatives of the logarithm, implicit, inverse and parametric functions • find second and higher order derivatives.
2.	Applications of Derivatives	Applications of Derivatives	<ul style="list-style-type: none"> • find equations of tangents and normal to a curve • determine nature of the function-increasing or decreasing • find approximate values of the function • examine function for maximum and minimum values • verify mean value theorems
3.	Indefinite Integration	Indefinite Integration	<ul style="list-style-type: none"> • understand the relation between derivative and integral • use the method of substitution • solve integrals with the help of integration by parts • solve the integrals by the method of partial fractions
4.	Definite Integration	Definite Integration	<ul style="list-style-type: none"> • understand integral as a limit of sum • the properties of definite integral • state the properties of definite integral and use them to solve problems

5.	Application of Definite Integration	Application of Definite Integration	<ul style="list-style-type: none"> find the area under the curve, bounded by the curves using definite integrals.
6.	Differential Equation	Differential Equation	<ul style="list-style-type: none"> form a differential equation and find its order and degree solve the first order and first degree differential equation by various methods apply the differential equations to study the population, growth and decay in amount of substance and physics.
7.	Probability Distribution	Probability Distribution	<ul style="list-style-type: none"> understand the random variable and its types. find probability mass function and its probability distribution. find the expected value, variance and the standard deviation find the probability density function of continuous random variable find distribution function of c.r.v.
8	Binomial Distribution	Binomial Distribution	<ul style="list-style-type: none"> understand random experiment with two or more outcomes. determine probability distribution of random experiment with parameters n and p. find mean, variance, expected value and standard deviation for the binomial distribution.

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