Rajasthan Board Class 11 Maths Syllabus

गणित (MATHEMATICS)

इस विषय का एक प्रश्न पत्र 3.15 घण्टे की अवधि का होगा जिसके पूर्णांक 100 होगें।

नोट – गणित विषय का पाठ्यक्रम कला, वाणिज्य, विज्ञान एवं कृषि के विद्यार्थियों के लिये समान है।

समय 3.15 घण्टे   पूर्णांक–100

इकाई का नाम	अंक
समुच्चय एवं फलन (Sets and Functions)	**27**
1. समुच्चय (Sets)	07
2. संबंध एवं फलन (Relations & functions)	10
3. त्रिकोण मितीय फलन (Trigonometric Functions)	10
बीज गणित (Algebra)	**35**
4. गणितीय आगमन का सिद्धान्त (Principal of Mathematical Inductions)	04
5. सम्मिश्र संख्याएं और द्विघातीय समीकरण (Complex Numbers & Quardriatic Equations)	07
6. रैखिक असमिकाएं (Linear Inequalities)	05
7. क्रमचय और संचय (Permutations & Combinatins)	07
8. द्विपद प्रमेय (Binomial Theiorem)	05
9. अनुक्रम तथा श्रेणी (Sequence and Series)	07
निर्देशांक ज्यामिति (Coordinate geometry)	**16**
10. सरल रेखाएं (Straight Lines)	05
11. शंकु परिच्छेद (Conic Sections)	07
12. त्रिविमीय ज्यामिति का परिचय (Introduction to Three-dimensinal Geometry)	04
कलन (Calculus)	**08**
13. सीमा और अवकलज (Limits and Derivatives)	08
गणितीय विवेचन (Mathematical Reasoning)	**03**
14. गणितीय विवेचन (Mathematical Reasoning)	03
सांख्यिकी एवं प्रायिकता (Statistics and probability)	**11**
15. सांख्यिकी (Statistics and probability)	06
16. प्रायिकता (Probalitiy)	05

निर्धारित पुस्तकें

गणित – एन.सी.ई.आर.टी. से प्रतिलिप्याधिकार अन्तर्गत प्रकाशित

Details of the Syllabus

UNIT-I: SET AND FUNCTIONS समुच्चय तथा फलन

1. Sets : समुच्चय

Sets and their representations. Empty set. Finite & Infinite sets. Equal sets. Subsets. Subsets of the set of real numbers, especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of complement sets.

2. Relations & Functions : फलन तथा संबंध

Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the sets of reals with itself (up to, R x R). Definition of relation, pictorial diagrams, domain, codomain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain & range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

3. Trigonometric Functions : त्रिकोणमितिय फलन

Positive and negative angles. Measuring angles in radians & in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Signs of trigonometric functions domain and range of tigonmetric functions and their graphs. Expressing $\sin(x \pm y)$ and $\cos(x \quad y)$ in terms of sinx, siny, cosx & cosy. Deducing the identities like the following.

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}, \quad \cot(x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x},$$

$$\sin x + \sin y = 2 \sin\frac{x+y}{2} \cos\frac{x-y}{2}, \quad \cos x + \cos y = 2 \cos\frac{x+y}{2} \cos\frac{x-y}{2},$$

$$\sin x - \sin y = 2 \cos\frac{x+y}{2} \sin\frac{x-y}{2}, \quad \cos x - \cos y = -2 \sin\frac{x+y}{2} \sin\frac{x-y}{2},$$

Identities related to sin 2x, cos2x, tan 2x, cos3x and tan 3x. General solution of trigonometric equations of the type $\sin\theta = \sin\alpha$, $\cos\theta = \cos\alpha$ and $\tan\theta = \tan\alpha$. Pwof and simple applications of sine and cosine formulae.

UNIT-II: ALGEBRA   बीजगणित

1. **Principle of Mathematical Induction: गणितिय आगमन का सिद्धांत**

   Processes of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

2. **Complex Numbers and Quadratic Equations : सम्मिश्र संख्याएँ तथा द्विघात समीकरण**

   Need for complex numbers, especially   to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system. Square of a complex number.

3. **Liner Inequalities : रैखिक असमिकाएं**

   Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables Graphical. Solution of system of linear inequalities in two variables.

4. **Permutations & Combinations : क्रमचय तथा संचय**

   Fundamental principle of counting. Factorial $n.(n!)$ Permutations and combinations, derivation of formulae and their connections, simple applications.

5. **Binomial Theorem : द्विपद प्रमेय**

   History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle terms in binomial expansion, simple applications.

6. **Sequence and Series : अनुक्रम तथा श्रेणी**

   Sequence and Series. Arithmetic progression (A.P.) arithmetic mean (A.M.) Geometic progression (G.P.), general terms of a G.P., sum of n terms of a G.P., Arithmetic and geometric series, infinite G.P. and its sum, geometric means (G.M.), relation between

   A.M. and G.M. Sum to n terms of the special series $\sum_{k=1}^{n} k$, $\sum_{k=1}^{n} k^2$ and $\sum_{k=1}^{n} k^3$

UNIT- III: COORDINATE GEOMETRY   निर्देशांक ज्यमिति

1. **Straight Lines : सरल रेखा**

   Brief recall of two dimensional geometry from earlier classes. Shifting of origin,

Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point – slope from, slope – intercept form, two point form, intercepts form and normal form. General equation of a line equation of families of lines passing through the point of intersection of two lines. Distance of point from a line.

2. **Conic Sections : शंकु परिच्छेद**

Sections of a cone: Circle, ellipse, parabola, hyperbola, a point, a straight line and pair of intersecting line as a degenerated case of a conic section. Standard equation and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

3. **Introduction of Three – dimensional Geometry त्रिविमीय ज्योमिति का परिचय**

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

UNIT – IV : CALCULUS कलन

1. **Limits and Derivatives : सीमा तथा अवकलन**

Limit of function introduced as rate of change of distance function and geometric

meaning $\lim_{x \to 0} \dfrac{\log_e (1 + x)}{x}$, $\lim_{x \to 0} \dfrac{e^x - 1}{x}$. Definition of derivative, relate it to slope

of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

UNIT- V : MATHEMATICAL REASIONNING गणितीय विवेचना

Mathematically acceptable statements. Connecting words/ phrases – consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting wards difference between contradiction, converse and contra positive.

UNIT – VI: STATISTICS & PROBABILITY   सांख्यिकी तथा प्रायिकता

1. **Statistics : सांख्यिकी**

Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. **Probability : प्रायिकता**

Random experiments: outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events. Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not' & 'or' events.

Prescribed Books :

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