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FOR UTTARAKHAND CLASS 10 PREPARATION

Uttarakhand Board Class 10 Syllabus 2027 Mathematics

EXAM	YEAR	TYPE	SUBJECT
Uttarakhand Class 10	2027	Syllabus	Maths

2026-27

Class – X

TOTAL MARKS- 100 {80 (Theory) + 20 (Internal Assessment)}

THEORY: 80 Marks **Time: 3:00 Hrs.**

Units	Unit Name	Marks
I	NUMBER SYSTEMS	06
II	ALGEBRA	20
III	COORDINATE GEOMETRY	06
IV	GEOMETRY	15
V	TRIGONOMETRY	12
VI	MENSURATION	10
VII	STATISTICS & PROBABILTY	11
	Total	**80**

UNIT I: NUMBER SYSTEMS

REAL NUMBER

Fundamental Theorem of Arithmetic- statements after reviewing work done earlier and after illustrating and motivating through examples

Proofs of irrationality of $\sqrt{2}, \sqrt{3}\ \sqrt{5}$

Competencies	• *Develops understanding of numbers, including the set of real numbers and its properties.* • *Extends the understanding of powers (radical powers) and exponents.* • *Applies Fundamental Theorem of Arithmetic to solve problems related to real life contexts.*
Explanation	• *Describes Fundamental Theorem of Arithmetic with examples* • *Prove algebraically the Irrationality of numbers like √2, √3, √5, 3 + 2√5 etc.*

UNIT II: ALGEBRA

1. POLYNOMIALS

Zeros of a polynomial.

Relationship between zeros and coefficients of quadratic polynomials.

Competencies	*Develops a relationship between algebraic and graphical methods of finding the zeroes of a polynomial.*
Explanation	*Find the zeros of polynomial graphically and algebraically and verifying the relation between zeros and coefficients of quadratic polynomials.*

2. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency.

Algebraic conditions for number of solutions.

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Solution of a pair of linear equations in two variables algebraically- by substitution, by elimination. Simple situational problems.

Competencies	• *Describes plotting a pair of linear equations and graphically finding the solution.* • *Models and solves contextualized problems using equations (e.g., simultaneous linear equations in two variables).*
Explanation	*Find the solution of pair of linear equations in two variables graphically and algebraically (substitution and elimination method)*

3. QUADRATIC EQUATIONS

Standard form of a quadratic equation $ax^2 + bx + c = 0, (a \neq 0)$.

Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula.

Relationship between discriminant and nature of roots.

Situational problems based on quadratic equations related to day-to-day activities to be incorporated.

Competencies	*Demonstrates strategies of finding roots and determining the nature of roots of a quadratic equation.*
Explanation	• *Solves quadratic equations using factorization and quadratic formula* • *Determines the nature of roots using discriminant* • *Formulates and solves problems based on real life context*

4. ARITHMETIC PROGRESSIONS

Motivation for studying Arithmetic Progression

Derivation of the n^{th} term and sum of the first n terms of AP and their application in solving daily life problems.

Competencies	*Develops strategies to apply the concept of AP to daily life situations.*
Explanation	• *Applies concepts of AP to find the* n^{th} *term and sum of n terms.* • *Application of AP in real life problems*

UNIT III: COORDINATE GEOMETRY

Coordinate Geometry

Review: Concepts of coordinate geometry. Distance formula. Section formula (internal division).

Competencies	*Derives formulae to establish relations for geometrical shapes in the context of a coordinate plane, such as, finding the distance between two given points, to determine the coordinates of a point between any two given points.*
Explanation	*Solves problems using distance formula and section formula.*

UNIT IV: GEOMETRY

1. TRIANGLES

Definitions, examples, counter examples of similar triangles.

a. (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.
b. State (without proof) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
c. State (without proof) If in two triangles, the corresponding angles are equal, their correspondingsides are proportional and the triangles are similar.

d. State (without proof) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
e. State (without proof) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.

Competencies	• *Works out ways to differentiate between congruent and similar figures.* • *Establishes properties for similarity of two triangles logically using different geometric criteria established earlier such as, Basic Proportionality Theorem, etc.*
Explanation	• *Prove Basic Proportionality theorem and applying the theorem and its converse in solving questions.* • *Prove similarity of triangles using different similarity criteria.*

2. CIRCLES

Tangent to a circle at, point of contact

a. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.
b. (Prove) The lengths of tangents drawn from an external point to a circle are equal.

Competencies	*Derives proofs of theorems related to the tangents of circles.*
Explanation	• *Prove the theorems based on the tangent to a circle.* • *Applies the concept of tangents of circle to solve various problems*

UNIT V: TRIGONOMETRY

1. INTRODUCTION TO TRIGONOMETRY

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^o and 90^o. Values of the trigonometric ratios of 30^0, 45^0 and 60^0.

Relationships between the ratios.

Competencies	*Understands the definitions of the basic trigonometric functions (including the introduction of the sine and cosine functions).*
Explanation	• *Evaluates trigonometric ratios* • *Describes trigonometric ratios of standard angles and solving related expressions*

2. TRIGONOMETRIC IDENTITIES

Proof and applications of the identity $sin^2A + cos^2A = 1$.

Only simple identities to be given.

Competencies	*Uses Trigonometric identities to solve problems.*
Explanation	*Proves trigonometric identities using $sin^2A + cos^2A = 1$ and other identities*

3. HEIGHTS AND DISTANCES: Angle of Elevation, Angle of Depression.

Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only 30°, 45°, and 60°.

Competencies	*Applies Trigonometric ratios in solving problems in daily life contexts like finding heights of different structures or distance from them.*
Explanation	*Find heights and distances in real life word problems using trigonometric ratios*

UNIT VI: MENSURATION

1. AREAS RELATED TO CIRCLES

Area of sectors and segments of a circle.

Problems based on areas and perimeter/circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of 60°, 90° and 120° only.

Competencies	*Derives and uses formulae to calculate areas of plane figures.*
Explanation	*Visualises and evaluates areas of sector and segment of a circle.*

2. SURFACE AREAS AND VOLUMES

Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones.

Competencies	*Visualises and uses mathematical thinking to discover formulae to calculate surface areas and volumes of solid objects (cubes, cuboids, spheres, hemispheres, right circular cylinders/cones, and their combinations).*
Explanation	*Evaluates the surface areas and volumes of combinations of solids by visualization.*

UNIT VII: STATISTICS AND PROBABILITY

1. STATISTICS

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

Competencies	*Calculates mean, median and mode for different sets of data related with real life contexts.*
Explanation	• *Computes the mean, of a grouped frequency distribution using direct, assumed mean and step deviation method.* • *Computes the median and mode of grouped frequency distribution by algebraic method*

2. PROBABILITY

Classical definition of probability.

Simple problems on finding the probability of an event.

Competencies	*Applies concepts from probability to solve problems on the likelihood of everyday events.*
Explanation	*Determines the probabilities in simple real-life problems*

INTERNAL ASSESSMENT — Max. Marks: 20

(i) Activities (02)- 2X5 — **10 Marks**

(ii) Project Work (01) — **05 Marks**

(iii) Continuous Assessment (Unit Test) — **05 Marks**

(There will be total 3 Unit Tests (two Unit Tests before half yearly examination and one after half yearly examination) and a pre-board examination. At the time of half yearly result preparation best of two Unit Tests (I & II) marks will be taken and converted to the weightage of 05 marks. In annual board examination, marks of the best out of 3 Unit Tests will be taken and converted to the weightage of 05 marks for the board result preparation.)

PRESCRIBED BOOKS:

1. गणित (Mathematics) - Textbook for class IX - NCERT Publication

2. गणित (Mathematics) - Textbook for class X - NCERT Publication

3. Laboratory Manual - Mathematics, secondary stage - NCERT Publication

4. Mathematics exemplar problems for class IX, NCERT publication.

5. Mathematics exemplar problems for class X, NCERT publication.

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