

NBSE Class 10 Maths Syllabus

Objectives:

The broad objectives of teaching of Mathematics at secondary stage are to help the learners to:

- consolidate the Mathematical knowledge and skills acquired at the upper primary stage.
- acquire knowledge and understanding particularly by way of motivation and visualization, of basic concepts, terms, principles and symbols and underlying processes and skills.
- develop mastery of basic algebraic skills.
- develop drawing skills.
- feel the flow of reasons while proving a result or solving a problem.
- apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.
- to develop positive ability to think, analyze and articulate logically.
- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of sex biases;
- to develop necessary skills to work with modern technological devices such as calculators, computers, etc;
- to develop interest in Mathematics as a problem-solving tool in various fields for its beautiful structures and patterns, etc;
- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics;
- to develop interest in the subject by participating in related competitions;
- to acquaint students with different aspects of Mathematics used in daily life;
- to develop an interest in students to study Mathematics as a discipline.

DESIGN OF QUESTION PAPER MATHEMATICS

Weightage to different forms of questions:

Section	Forms of questions	Marks for each question	No. of questions	Total marks
A	MCQ	1	10	10
B	SA - I	2	5	10
C	SA - II	3	10	30
D	LA	5	6	30
	Total		31	80

Weightage level of questions:

Sl. no.	Level	Percentage	Marks
1.	Easy	20	16
2.	Average	60	48
3.	Difficult	20	16
	Total	100	80

The expected time to be taken under different section shall be as follows:

Sl. no.	Section	Expected time for each question	Total expected time
1.	Reading the question paper	-	10 minutes
2.	A	2 minutes	20 minutes
3.	B	4 minutes	20 minutes
4.	C	6 minutes	60 minutes
5.	D	10 minutes	60 minutes
6.	Revision	-	10 minutes
		Total time	180 minutes

Scheme of options:

1. Internal choice shall be provided in:
 - i. any 5(five) questions of 3 marks in Section C
 - ii. all 6 (six) questions of 5 marks in Section D
2. The internal choice questions shall be set from the same unit with the same difficulty level.
3. The question setter has the liberty to modify textual questions but has to set questions within the purview of the syllabus.

Unit-Wise weightage**Part 'A' External****Time : 3 hours****Marks : 80**

Unit	Marks
I. Number System	2
II. Algebra	20
III. Trigonometry	12
IV. Coordinate Geometry	6
V. Geometry	16
VI. Mensuration	12
VII. Statistics & Probability	12
Total:	80
Part 'B' Internal - Practical	20
Grand Total	100

PART – A: EXTERNAL**80 Marks/180 Periods****Unit I : NUMBER SYSTEMS****2 marks/6periods****1. Real Numbers**

Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples. Proofs of results - irrationality of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, decimal expansions of rational numbers in terms of terminating/non-terminating recurring decimals.

Unit II : ALGEBRA**20 marks****1. Polynomials****8 Periods**

Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.

2. Pair of Linear Equations in Two Variables**15 Periods**

Pair of linear equations in two variables and their graphical solution. Geometric representation of different possibilities of solutions/inconsistency.

Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution, by elimination and by cross multiplication method. Simple situational problems must be included. Simple problems on equations reducible to linear equations may be included.

3. Quadratic Equations**15 Periods**

Standard form of a quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$. Solution of the quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship between discriminant and nature of roots.

Problems related to day-to-day activities to be incorporated.

4. Arithmetic Progression**8 Periods**

Motivation for studying A.P. Derivation of standard results of finding the n^{th} term and sum of first n terms and their application in solving daily life problems.

Unit III : TRIGONOMETRY**12 marks****1. Introduction to Trigonometry****12 Periods**

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° & 90° . Values (with proofs) of the trigonometric ratios of 30° , 45° & 60° . Relationships between the ratios.

2. Trigonometric Identities

8 Periods

Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given. Trigonometric ratios of complementary angles.

3. Heights and Distances

8 Periods

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

Unit IV : COORDINATE GEOMETRY

6 marks

1. Lines (in two-dimensions)

14 Periods

Review the concepts of coordinate geometry done earlier including graphs of linear equations. Awareness of geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). Area of a triangle.

Unit V : GEOMETRY

16 marks

1. Triangles

22 Periods

Definitions, examples, counter examples of similar triangles.

1. (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.
2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.
4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
5. (Motivate) 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.
6. (Motivate) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other.
7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.
8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.
9. (Prove) In a triangle, if the square on one side is equal to the sum of the squares on the other two sides, the angles opposite to the first side is a right triangle.

2. Circles

8 Periods

Tangents to a circle motivated by chords drawn from points coming closer and closer to the point.

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

3. Constructions

8 Periods

1. Division of a line segment in a given ratio (internally).

2. Tangent to a circle from a point outside it.
3. Construction of a triangle similar to a given triangle.

Unit VI : MENSURATION

12 marks

1. Areas related to Circles

15 Periods

Motivate the area of a circle; 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° & 120° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

2. Surface Areas and Volumes

15 Periods

- i. Problems on finding surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Frustrum of a cone.
- ii. Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken.)

Unit VII : STATISTICS & PROBABILITY

12 marks

1. Statistics

9 Periods

Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph. Drawing of pie-charts (fractional angles to be avoided).

2. Probability

9 Periods

Classical definition of probability. Connection with probability as given in Class 9. Simple problems on single events, not using set notation.

PART – B: INTERNAL

Practical

Sl. No.	Areas of assessment	Marks
1.	Practical	10
2.	Project work	5
3.	Formal testing	5
	Total :	20

Prescribed textbook:

Mathematics Class X
K.C. Kakoty

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