CBSE CLASS X

Mathematics

COURSE STRUCTURE

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

UNIT I: NUMBER SYSTEMS

1. REAL NUMBERS (15) Periods

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

UNIT II: ALGEBRA

1. POLYNOMIALS (7) 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 graphical method of their solution, consistency / 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. Simple problems on equations reducible to linear equations.

3. QUADRATIC EQUATIONS (15) Periods

Standard form of a quadratic equation $ax^2 + bx + c = 0, (a \neq 0)$. Solutions of quadratic equations(only real roots) by factorization, by completing the square 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.

4. ARITHMETIC PROGRESSIONS (8) Periods

Motivation for studying Arithmetic Progression Derivation of the *n*th term and sum of the first n terms of A.P. and their application in solving daily life problems.

UNIT III: COORDINATE GEOMETRY

1. LINES (In two-dimensions) (14) Periods

Review: Concepts of coordinate geometry, graphs of linear equations. Distance between two points. Section formula (internal division). Area of a triangle.

UNIT IV: GEOMETRY

1. TRIANGLES (15) 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 indistinct 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 sum of the squares on the other two sides, the angles opposite to the first side is a right angle.

2. CIRCLES (8) Periods

Tangent to a circle at a 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 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 V: TRIGONOMETRY

1. INTRODUCTION TO TRIGONOMETRY (10) 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° and 90°. Values (with proofs)

of the trigonometric ratios of 30°, 45° and 60°. Relationships between the ratios.

2. TRIGONOMETRIC IDENTITIES (15) Periods

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

3. HEIGHTS AND DISTANCES: Angle of elevation, Angle of Depression. (8) Periods

Simple 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 VI: MENSURATION

1. AREAS RELATED TO CIRCLES (12) 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° and 120° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

2. SURFACE AREAS AND VOLUMES (12) Periods

(i) Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres,hemispheres and right circular cylinders/cones. Frustum 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 AND PROBABILITY

1. STATISTICS (18) Periods

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

2. PROBABILITY (10) Periods

Classical definition of probability. Simple problems on single events (not using set notation).

QUESTIONS PAPER DESIGNS 2017-2018

Mathematic (Code No. 041)

CLASS–X

1) Remembering - (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)

VSA Question (1 mark) =2

SA Question I (2 mark) = 2

SA Question II (3 mark) = 2

LA Question (4 mark) = 2

Total Marks = 20

Weightage = 25%

2) Understanding - (Comprehension -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)

VSA Question (1 mark) =2

SA Question I (2 mark) = 1

SA Question II (3mark) = 1

LA Question (4 mark) = 4

Total Marks = 23

Weightage = 29%

3) Application (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)

VSA Question (1 mark) =2

SA Question I (2 mark) = 2

SA Question II (3 mark) = 3

LA Question (4 mark) = 1

Total Marks = 19

Weightage = 24%

4) Higher Order Thinking Skills (Analysis & Synthesis - Classify, compare, contrast, or differentiate between different pieces of information; Organize and/or integrate unique

pieces of information from a variety of sources)
SA Question I (2 mark) = 1
SA Question II (3 mark) = 4
Total Marks = 14
Weightage = 17%

5) Evaluation - (judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)
LA Question (4 mark) = 1
Total = 4
Weightage = 5%
Total marks = 80 marks

(VSAQ =Very Short Answer Question, SA = short answer, LA = Long answer, VLA = very long answer)
NOTE : One of the LA (4 marks) will be to assess the values inherent in the texts.

INTERNAL ASSESSMENT : 20 Marks
1) Periodical TEST : 10 Marks
2) Note Book Submission : 05 Marks
3) Lab Practical(Lab activities to be done from the prescribed books): 05 Marks