

Design of Question Paper
Class X Mathematics (041)
Summative Assessment-I &II

S. No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer- 1 (2 marks)	Short Answer –II (3 marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1	Remembering - (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	23	26%
2	Understanding- (Comprehension -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	1	1	2	14	16%
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)	1	2	3	2	22	24%
4	High Order Thinking Skills (Analysis & Synthesis - Classify, compare, contrast, or differentiate between different pieces of information; Organise and/or integrate unique pieces of information from a variety of sources)	1	1	4	1	19	21%
5	Creating, Evaluation and Multi-Disciplinary- - - (Generating new ideas, product or ways of viewing things Appraise, judge, And/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)				3*	12	13%
	TOTAL	4x1=4	6x2=12	10x3=30	11x4=44	90	100%

The question paper will include a section on Open Text based assessment (questions of 5 marks each from the syllabus-a total of 10 marks). The case studies will be supplied to students in advance. These case studies are designed to test the analytical and higher order thinking skills of students. *One of the LA (4 marks) will assess the values inherent in the texts

Mathematics
Summative Assessment -1
CLASS X **FIRST TERM**

S.No	Units	Topic	MARKS
1.	I	NUMBER SYSTEMS	11
2.	II	ALGEBRA	23
3.	III	GEOMETRY	17
4.	IV	TRIGONOMETRY	22
5.	V	STATISTICS	17
		TOTAL	90

PRESCRIBED BOOKS:

1. Mathematics - Textbook for class IX - NCERT Publication
2. Mathematics - Textbook for class X - NCERT Publication
3. Guidelines for Mathematics Laboratory in Schools, class IX - CBSE Publication
4. Guidelines for Mathematics Laboratory in Schools, class X - CBSE Publication
5. A Handbook for Designing Mathematics Laboratory in Schools - NCERT Publication
6. Laboratory Manual - Mathematics, secondary stage - NCERT Publication

S.NO	Month	Units / Chapters	Detailed Split-up Syllabus	Total No. of Periods
1	APRIL & MAY	1.Real Numbers	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	15
		2. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES	PAIR OF LINEAR EQUATIONS IN TWO VARIABLES 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 Two skill based Math's Lab activities / Project	15
2	JUNE & JULY	1. Polynomials	Polynomials Zeroes of a polynomial. Relationship between zeroes and coefficients of quadratic polynomials. Statement and simple Problems on division algorithm for polynomials with real coefficients.	7
		2. TRIANGLES	TRIANGLES 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.	15
	Month	Units / Chapters	Detailed Split-up Syllabus	Total No. of Periods

	JUNE & JULY	3. TRIGONOMETRY Formative assessment-1	<p>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.</p> <p>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.</p> <p>7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.</p> <p>8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.</p> <p>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 triangle.</p> <p>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° and 90°. Values (with proofs) of the trigonometric ratios of 30°, 45° and 60°. Relationships between the ratios</p> <p>Two skill based Math's lab activities /Project. Formative assessment-1</p> <p style="text-align: center;">$4 \times 1 \text{ mark} = 4$ $4 \times 2 \text{ marks} = 8$ $4 \times 3 \text{ marks} = 12$ $4 \times 4 \text{ marks} = 16$ <i>Total 16 questions = 40 marks</i></p>	10
3	AUGUST	1. TRIGONOMETRY (Contd.) 2. STATISTICS	<p>1. TRIGONOMETRIC IDENTITIES Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given. Trigonometric ratios of Complementary angles.</p> <p>2. STATISTICS Mean, median and mode of grouped data (bimodal situation to be avoided) cumulative frequency graph. Two skill based Math's Lab Activities/Projects</p>	15 13
4	SEPTEMBER	1. STATISTICS 2. Revision FOR SA1	<p>1. STATISTICS ---- Cumulative frequency graph.</p> <p>2. Revision for SA– I</p>	5

Mathematics (041)
Summative Assessment-II
Class X Second TERM

S.No	Unit No.	Topic	MARKS
1	II	Algebra	23
2	III	Geometry	17
3	IV	Trigonometry	08
4	V	Probability	08
5	VI	Coordinate Geometry	11
6	VII	Mensuration	23
		Total	90

**SYLLABUS/CURRICULUM
MATHEMATICS (041) CLASS-X TERM II**

S.NO	Month	Units / Chapters	Detailed Split-up Syllabus	Total No. of Periods
1	October	1.ARITHMETIC PROGRESSIONS	1)Motivation for studying AP. Derivation of standard results of finding the nth term and sum of first n terms and their application in solving daily life problems	8
		2.QUADRATIC EQUATIONS	2) 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. Two skill based Math's Lab activities/Projects	15
2	November	1. CIRCLES	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 circle are equal.	8
		2. CONSTRUCTIONS	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	8
		3.AREAS RELATED TO CIRCLES	1.) 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 $60^\circ, 90^\circ$ & 120° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken Two skill based Math's Lab Activities/Projects	12
		Units /	Detailed Split-up Syllabus	Total No. of

S.NO	Month	Chapters		Periods
	December	1. SURFACE AREAS AND VOLUMES	1. (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. Frustum of a cone.	12
		2. HEIGHTS AND DISTANCES	(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.) 1. 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° Two skill based Math's Lab Activities/Projects	8
3	January	1 PROBABILITY	1. Classical definition of probability. Connection with probability as given in Class IX. Simple problems on single events, not using set notation. Formative assessment-3 $4 \times 1 \text{ mark} = 4$ $4 \times 2 \text{ marks} = 8$ $4 \times 3 \text{ marks} = 12$ $4 \times 4 \text{ marks} = 16$ <i>Total 16 questions = 40 marks</i>	10
		2.COORDINATE GEOMETRY	2. LINES (In two-dimensions) 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. Two skill based Math's Lab Activities/Projects	14
	February	REVISION FOR SA 2	Revision for SA2	
	March		SA2	

Three activities i.e. written assignments, Group projects and Math's Lab. Activities will be common under the scheme of FA 2 and FA 4 in addition a teacher is free to conduct one meaningful activity.

CRITERIA FOR ASSESSING VARIOUS ACTIVITIES for fa2 and fa4

NAME OF THE ACTIVITY	CRITERIA FOR ASSESSMENT (OUT OF 10)
PROBLEM SOLVING, MCQ	Based on the correct answers
DATA HANDLING AND ANALYSIS	<ul style="list-style-type: none">✓ Collection of data – 03 marks✓ Representation of data – 03 marks✓ Interpretation of data – 03 marks✓ Timely submission – 01 mark
INVESTIGATIVE PROJECTS	<ul style="list-style-type: none">✓ Neatness in presentation – 02 marks✓ Understanding the concept – 03 marks✓ Clarity of the concept – 03 marks✓ Timely submission – 02 marks
MATHS LAB ACTIVITIES	<ul style="list-style-type: none">✓ Active participation – 03 marks✓ Presentation – 02 marks✓ Accuracy and inference – 02 marks✓ Viva – 02 marks✓ Completion of activity in time – 01 mark
MODELS	<ul style="list-style-type: none">✓ Finishing – 03 marks✓ Description of the model – 03 marks✓ Viva – 02 marks✓ Timely submission – 02 marks
GROUP PROJECTS	<ul style="list-style-type: none">✓ Active participation – 03 marks✓ Individual contribution – 03 marks✓ Viva – 02 marks✓ Team work – 01 mark✓ Timely submission – 01 mark
PEER ASSIGNMENT	<ul style="list-style-type: none">✓ Active participation – 03 marks✓ Individual contribution – 03 marks✓ Viva – 02 marks✓ Team work – 01 mark✓ Timely submission – 01 mark
PRESENTATION USING IT	<ul style="list-style-type: none">✓ Selection of presentation set up – 02 marks✓ Content relevance – 04 marks✓ Clarity in presentation – 02 marks✓ Timely submission – 02 marks

Note:i) The above is only suggestive for a normal class

ii) Teacher can change the above criteria to suite their student's level

iii) Teacher has to provide the objectives, method and evaluation criteria of evaluation of the Activity, to the students before conducting the activity.