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FOR PUNJAB CLASS 11 PREPARATION

PSEB 11th Class Syllabus 2027 Mathematics

EXAM	YEAR	TYPE	SUBJECT
Punjab Class 11	2027	Syllabus	Maths

CLASS - XI

MATHEMATICS

Time: 3:00 hrs

Theory : 80 Marks
INA : 20 Marks
Total : 100 Marks

Syllabus(2026-27)

Unit-1:Sets and Functions

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

2. Relations & Functions: Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto R × R ×R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued function, 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 : Positive and negative angles. Measuring angles in radians and 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 trigonometric function and their graphs. Expressing sin(x ± y) and cos(x ± y) in terms of sinx, siny, cosx & cosy and their simple applications. Deducing identities like the following:

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

$$\sin\alpha \pm sin\beta = 2\sin\tfrac{1}{2}(\alpha \pm \beta)\cos\tfrac{1}{2}(\alpha \mp \beta)$$

$$\cos\alpha + \cos\beta = 2\cos\tfrac{1}{2}(\alpha + \beta)\cos\tfrac{1}{2}(\alpha - \beta)$$

$$\cos\alpha - \cos\beta = -2\sin\frac{1}{2}(\alpha + \beta)\sin\frac{1}{2}(\alpha - \beta)$$

Identities related to sin2x, cos2x, tan2x, sin3x, cos3x and tan3x.

Unit-II Algebra

4. Complex Numbers and Quadratic Equations: Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equation. Algebraic properties of complex number. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system. Square root of a complex number.

5. Linear Inequalities: Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.

6. Permutations & Combinations : Fundamental principle of counting, Factorial n(n!) Permutations and combinations, derivation of formulae for n_{p_r} and n_{c_r} and their connections, simple applications.

7. Binomial Theorem : History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle. Simple applications.

8. Sequence and Series: Sequence and Series. Arithmetic Mean (A.M.) , Geometric Progression (G.P.), general term of a G.P, sum of n terms of a G.P. Infinite G.P. and its sum, geometric mean (G.M), relation between A.M. and G.M.

Unit-III: Coordinate Geometry

9. Straight Lines : Brief recall of two dimensional geometry from earlier classes. Slope of a line and angle between two lines .Various forms of equations of a line: parallel to axis, point–slope form, slop–intercept form, two–point form, intercept form. Distance of a point from a line.

10. Conic Sections: Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equations of a circle.

11. Introduction to Three-dimensional Geometry : Coordinate axes and coordinate planes in three dimensions .Coordinates of a point. Distance between two points.

Unit-IV: Calculus

12. Limits and Derivatives: Derivative introduced as rate of change both as that of distance function and geometrically. intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. 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: Statistics and Probability

13. Statistics: Measure of Dispersion: Range, mean deviation, variance and standard deviation of ungrouped/grouped data.

14. Probability : Events: Occurrence of events, 'not', 'and' & 'or' events, exhaustive events, mutually exclusive events. Axiomatic (set theoretic) probability, connections with others theories of earlier classes. Probability of an event , probability of 'not', 'and' & 'or' events.

INTERNAL ASSESSMENT	**20 Marks**
Mathematics Activities	10 Marks
Distribution of marks under CCE(Besides Mathematics Activities)	10 Marks

Note: For activities NCERT Lab Manual may be referred.

Conduct of Periodic Tests

1. Periodic Test is a Pen and Paper assessment which is to be conducted by the subject teacher.
2. In the entire Academic year, three periodic Tests in each subject may be conducted.
3. Once schools complete the conduct of all three periodic tests, they will convert the weightage of each of the three tests into ten marks each for identifying best two

tests. The best two will be taken into consideration and the average of the two shall be taken as the final marks for PT.

4. The school will ensure simple documentation to keep a record of performance.

Assessment of Activity work

Time : 2hrs **10 Marks**

Throughout the year any 10 activities shall be performed be the student from the activities given in the NCERT Laboratory Manual for the respective class (XI or XII) which is available on the link: http//www.ncert.nic.in/exemplar/labmanuals.html. A record of the same may be kept by the student. An year end test on the activity may be conducted at the School Level. The weightage are as under:

- The activities and one of the projects performed by the student throughout the year and recordkeeping : 5marks
- Assessment of the activity performed during the year end test : 3 marks
- Viva-voce : 2 marks

ACTIVITIES

1. To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n.
2. To verify that for two sets A and B, $n(A \times B) = pq$ and the total number of relations from A to B is 2^{pq} , where $n(A) = p$ and $n(B) = q$.
3. To represent set theoretic operations using Venn diagrams.
4. To verify distributive law for three given non-empty sets A,B and C, that is, $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
5. To identify a relation and a function.
6. To distinguish between a Relation and a Function.
7. To verify the relation between the degree measure and the radian measure of an angle.
8. To find the values of sine and cosine functions in second, third and fourth quadrants using their given values in first quadrant.
9. To prepare a model to illustrate the values of sine functions and cosine functions for different angles which are multiples of $\frac{n}{2}$ and π
10. To plot the graphs of $\sin x, \sin 2x, 2sinx$ *and* $\sin\frac{x}{2}$, using same coordinate axes.
11. To interpret geometrically the meaning of $i = \sqrt{-1}$ and its integral powers.
12. To find the number of ways in which three cards can be selected from given five cards.
13. To construct a Pascal's Triangle and to write binomial expansion for a given positive integral exponent.
14. To demonstrate that the Arithmetic mean of two different positive numbers is always greater than the Geometric mean.
15. To construct different types of conic section.
16. To construct a parabola.
17. An alternative method of constructing a parabola.
18. To construct an ellipse using a rectangle.
19. To construct an ellipse with given major and minor axes.
20. To construct an ellipse when two fixed points are given.
21. To explain the concept of octants by three mutually perpendicular planes in space.
22. To find analytically $lim_{x-c} f(x) = \frac{x^2 - c^2}{x - c}$
23. Verification of the geometrical significance of derivative.