SCERT Kerala · Class 11 · Mathematics

Mathematics

ORIGINAL STUDY COMPANION
PADIKAM
CLASS 11 | SCIENCE / COMMERCE OPTION
Mathematics
Kerala SCERT / prescribed NCERT core lessons
15 chapter lessons
Quick explanations, core points, exam practice and chapter-specific notation in one consistent format.
Padikam explanations are independently written. Official textbooks are used as the coverage map, chapter sequence and terminology reference.

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Study rhythm
Read the quick explanation, recall the core points aloud, then answer the prompts without looking back. Use the official textbook links for full prescribed readings, activities and diagrams.
Textbook and verification links
1. https://samagra.kite.kerala.gov.in/files/samagra-resource/uploads/tbookscmq/Class_XI/Mathematics/Mathematics.pdf
2. https://ncert.nic.in/textbook.php

CHAPTER 01
Sets
Quick understanding
Represent collections precisely and use operations, intervals and Venn diagrams.
Core points Check your learning
Distinguish subset, proper subset and element. Prove a set identity.
De Morgan’s laws connect union, intersection and complement. Solve a three-set counting problem.
For finite sets, inclusion-exclusion avoids double counting.
Equation and notation
$n(A \cup B) = n(A) + n(B) - n(A \cap B)$
SYMBOLS AND UNITS
A, B: sets n(X): number of elements in finite set X
Union and intersection are count operations, so no SI unit applies
One-line recall Distinguish subset, proper subset and element.

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CHAPTER 02
Relations and Functions
Quick understanding
View a relation as ordered pairs and a function as a relation with exactly one output for each input.
Core points Check your learning
Domain, codomain and range are not interchangeable.
Test whether a relation is a function.
Find domain, range and composition.
One-one and onto describe different mapping properties.
Composition order matters.
Equation and notation
$(f \circ g)(x) = f(g(x))$
SYMBOLS AND UNITS
f, g: functions x: input value
f o g: composition, with g applied first
One-line recall Domain, codomain and range are not interchangeable.
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CHAPTER 03
Trigonometric Functions
Quick understanding
Extend trigonometry to real angles using the unit circle, identities and graphs.
Core points Check your learning
Use radians in calculus and arc-length problems.
Prove an identity using one side only.
Signs depend on quadrant.
Solve a trigonometric equation over a stated interval.
General solutions include all coterminal angles.
Equation and notation
$\sin^2 x + \cos^2 x = 1$
$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$s = r\theta$
SYMBOLS AND UNITS
θ: angle in radians s: arc length
One-line recall Use radians in calculus and arc-length problems.
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CHAPTER 04
Complex Numbers and Quadratic Equations
Quick understanding
Use $i^2 = -1$ to represent non-real roots and locate complex numbers in a plane.
Core points Check your learning
Add and multiply using algebraic rules.
Express a quotient in a + ib form.
Conjugates help simplify division and modulus.
Find roots of a quadratic with negative discriminant.
The discriminant classifies quadratic roots.
Equation and notation
$z = a + ib$
$|z| = \sqrt{(a^2+b^2)}$
$x = (-b \pm \sqrt{(b^2-4ac)})/2a$
SYMBOLS AND UNITS
z: complex number a, b, c: real numbers; in the quadratic formula a is not zero

i: imaginary unit, $i^2 = -1$ x: root of the quadratic equation
One-line recall Add and multiply using algebraic rules.
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CHAPTER 05
Linear Inequalities
Quick understanding
Solve inequalities while preserving order and represent solution sets on number lines or planes.
Core points Check your learning
Reverse the inequality when multiplying or dividing by a negative number.
Solve a rational inequality.
Graph a system of two linear inequalities.
A system requires the common region.
Boundary inclusion depends on ≤ or ≥.
One-line recall Reverse the inequality when multiplying or dividing by a negative number.
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CHAPTER 06
Permutations and Combinations
Quick understanding
Count arrangements and selections without listing every possibility.
Core points Check your learning
Permutation cares about order; combination does not.
Count arrangements with repeated letters.
Break a problem into disjoint cases before adding.
Choose a committee with stated restrictions.
Use complementary counting when direct restrictions are awkward.
Equation and notation
$^nP_r = n!/(n-r)!$
$^nC_r = n!/[r!(n-r)!]$
SYMBOLS AND UNITS
n: total available objects r: objects selected or arranged
!: factorial; counts are dimensionless
One-line recall Permutation cares about order; combination does not.
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CHAPTER 07
Binomial Theorem
Quick understanding
Expand powers and locate any term through binomial coefficients.
Core points Check your learning
The expansion has n + 1 terms.
Powers of the first term decrease while powers of the second increase.
Find a specified coefficient.
Determine the term independent of x.
Middle term depends on whether n is even or odd.
Equation and notation
$(a+b)^n = \Sigma\ ^nC_r\ a^{n-r}b^r$
$T_{r+1} = {}^nC_r\ a^{n-r}b^r$
SYMBOLS AND UNITS
a, b: terms of the binomial n: non-negative integer power
r: term index from 0 to n T(r+1): general term
One-line recall The expansion has n + 1 terms.
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CHAPTER 08
Sequences and Series
Quick understanding
Describe ordered patterns and sum arithmetic or geometric progressions.
Core points Check your learning
An AP has constant difference; a GP has constant Find unknown terms from AP conditions.
ratio.
Sum a finite or convergent infinite GP.
The nth term and sum answer different questions.
An infinite GP converges only when $|r| < 1$.
Equation and notation
AP: $a_n = a+(n-1)d$
$S_n(AP)=n[2a+(n-1)d]/2$
$S_n(GP)=a(1-r^n)/(1-r)$
$S_\infty=a/(1-r)$
SYMBOLS AND UNITS
a: first term d: common difference of an AP
r: common ratio of a GP n: number of terms
S(n): sum of n terms
One-line recall An AP has constant difference; a GP has constant ratio.
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CHAPTER 09
Straight Lines
Quick understanding
Translate line geometry into slope, angle, distance and equation forms.
Core points Check your learning
Slope measures change in y per change in x. Find a line through a point parallel to a
given line.
Parallel lines have equal slopes; perpendicular
slopes multiply to −1 when defined. Find distance from a point to a line.
Choose the equation form that uses the given data
directly.
Equation and notation
$m = (y_2-y_1)/(x_2-x_1)$
$y-y_1 = m(x-x_1)$
$\text{Distance} = |Ax_1+By_1+C|/\sqrt{(A^2+B^2)}$
SYMBOLS AND UNITS
m: slope, dimensionless when both axes use the (x1, y1), (x2, y2): points on the coordinate plane
same unit
A, B, C: coefficients in Ax + By + C = 0 Distance uses the unit chosen on the axes
One-line recall Slope measures change in y per change in x.
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CHAPTER 10
Conic Sections
Quick understanding
Understand circle, parabola, ellipse and hyperbola as loci and recognise standard equations.
Core points Check your learning
Focus-directrix definitions explain the shapes. Identify a conic and its key parameters.
Standard form reveals centre, vertices, foci and Form an equation from geometric data.
axes.
Eccentricity distinguishes conics.
Equation and notation
Parabola: $y^2 = 4ax$

Ellipse: $x^2/a^2 + y^2/b^2 = 1$
Hyperbola: $x^2/a^2 - y^2/b^2 = 1$
SYMBOLS AND UNITS
x, y: coordinates a, b: positive conic parameters in the same unit as x and y
Equations shown are standard forms centred at the origin
One-line recall Focus-directrix definitions explain the shapes.
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CHAPTER 11
Introduction to Three-dimensional Geometry
Quick understanding
Locate points in space and calculate distance or section coordinates.
Core points Check your learning
Coordinates are ordered (x,y,z). Find distance between two 3D points.
Distance extends the planar Pythagorean formula. Find a point dividing a segment in ratio m:n.
Internal division uses weighted averages.
Equation and notation
$d = \sqrt{[(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2]}$
SYMBOLS AND UNITS
(x1, y1, z1), (x2, y2, z2): points in space d: distance, in the coordinate unit
One-line recall Coordinates are ordered (x,y,z).
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CHAPTER 12
Limits and Derivatives
Quick understanding
Use limits to describe approaching behaviour and derivatives to measure instantaneous change.
Core points Check your learning
A limit concerns nearby values, not necessarily the value at the point.
Evaluate a limit by factorisation.
Differentiate a polynomial or trigonometric function from rules.
Derivative is the limit of an average rate of change.
Geometrically, the derivative is tangent slope.
Equation and notation
$f'(x)=\lim(h\to 0)[f(x+h)-f(x)]/h$
$d(x^n)/dx = nx^{n-1}$
SYMBOLS AND UNITS
f(x): function value h: small change in x
f'(x): derivative or instantaneous rate of change n: constant exponent
One-line recall A limit concerns nearby values, not necessarily the value at the point.
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CHAPTER 13
Statistics
Quick understanding
Measure spread around a central value using range, mean deviation, variance and standard deviation.
Core points Check your learning
Dispersion complements an average. Calculate standard deviation from a frequency table.
Variance uses squared deviations; standard deviation returns to original units. Compare two data sets using coefficient

of variation.
Grouped-data calculations use class marks.
Equation and notation
$\sigma^2 = \Sigma f_i(x_i-\bar{x})^2/\Sigma f_i$
$CV = (\sigma/\bar{x})\times 100$
SYMBOLS AND UNITS
fi: frequency of the ith value or class xi: observation or class mark
x-bar: arithmetic mean sigma: standard deviation, in the data unit
CV: coefficient of variation (%)
One-line recall Dispersion complements an average.
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CHAPTER 14
Probability
Quick understanding
Assign probability through a sample space and combine events with set operations.
Core points Check your learning
Events are subsets of the sample space. Use cards or dice to calculate a compound event.
Mutually exclusive and exhaustive describe different relationships. Apply the addition rule to overlapping events.
Complementary probability often simplifies counting.
Equation and notation
$P(A')=1-P(A)$
$P(A\cup B)=P(A)+P(B)-P(A\cap B)$
SYMBOLS AND UNITS
A, B: events A': complement of event A
P(A): probability of A; probabilities are dimensionless
One-line recall Events are subsets of the sample space.
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CHAPTER 15
Formative Reading: Principle of Mathematical Induction and Enrichment
Quick understanding
Use a base case and an inductive step to establish statements for all natural numbers, then connect the method with selected enrichment ideas.
Core points Check your learning
Verify the first permitted value before assuming the statement at n = k.
Prove a simple sum formula by induction.
Identify the missing step in an incorrect + 1.
Use the assumption only to prove the next case n = k induction proof.
Enrichment practice may revisit composition of functions, general solutions and geometric constructions without changing the core examination map.
Equation and notation
$P(1)$ true; $P(k) \Rightarrow P(k+1)$
SYMBOLS AND UNITS
P(n): proposition indexed by natural number n k: arbitrary natural-number step; no SI unit
One-line recall Verify the first permitted value before assuming the statement at n = k.
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