

JAMB Mathematics Syllabus

Last Updated: 2025

General Objectives

1. Acquire computational and manipulative skills
2. Develop precise, logical and formal reasoning skills
3. Develop deductive skills in interpretation of graphs, diagrams and data
4. Apply mathematical concepts to resolve issues in daily living

1. Number and Numeration

Number bases

Content:

- Operations in different number bases from 2 to 10
- Conversion from one base to another including fractional parts

Learning Objectives:

1. Perform four basic operations (+, -, $\times$, $\div$)
2. Convert one base to another

Fractions, Decimals, Approximations and Percentages

Content:

- Fractions and decimals
- Significant figures
- Decimal places
- Percentage errors
- Simple interest
- Profit and loss percent
- Ratio, proportion and rate
- Shares and valued added tax (VAT)

Learning Objectives:

1. Perform basic operations (+, -, $\times$, $\div$) on fractions and decimals
2. Express to specified number of significant figures and decimal places
3. Calculate simple interest, profit and loss percent; ratio, proportion and rate
4. Solve problems involving share and VAT

Indices, Logarithms and Surds

Content:

- Laws of indices
- Standard form
- Laws of logarithm
- Logarithm of any positive number to a given base
- Change of bases in logarithm and application
- Relationship between indices and logarithm
- Surds

Learning Objectives:

1. Apply the laws of indices in calculation
2. Establish the relationship between indices and logarithms in solving problems
3. Solve problems in different bases in logarithms
4. Simplify and rationalize surds
5. Perform basic operations on surds

Sets

Content:

- Types of sets
- Algebra of sets
- Venn diagrams and their applications

Learning Objectives:

1. Identify types of sets, i.e. empty, universal, complements, subsets, finite, infinite and disjoint sets
2. Solve problems involving cardinality of sets
3. Solve set problems using symbols
4. Use Venn diagrams to solve problems involving not more than 3 sets

2. Algebra

Polynomials

Content:

- Change of subject of formula
- Factor and remainder theorems
- Factorization of polynomials of degree not exceeding 3
- Multiplication and division of polynomials
- Roots of polynomials not exceeding degree 3

- Simultaneous equations including one linear one quadratic
- Graphs of polynomials of degree not greater than 3

Learning Objectives:

1. Find the subject of the formula of a given equation
2. Apply factor and remainder theorem to factorize a given expression
3. Multiply and divide polynomials of degree not more than 3
4. Factorize by regrouping, difference of two squares, perfect squares and cubic expressions, etc.
5. Solve simultaneous equations – one linear, one quadratic
6. Interpret graphs of polynomials including applications to maximum and minimum values

Variation

Content:

- Direct
- Inverse
- Joint
- Partial
- Percentage increase and decrease

Learning Objectives:

1. Solve problems involving direct, inverse, joint and partial variations
2. Solve problems on percentage increase and decrease in variation

Inequalities

Content:

- Analytical and graphical solutions of linear inequalities
- Quadratic inequalities with integral roots only

Learning Objectives:

1. Solve problems on linear and quadratic inequalities
2. Interpret graphs of inequalities

Progression

Content:

- nth term of a progression
- Sum of A.P. and G.P.
- Sum to infinity of a given G.P.

Learning Objectives:

1. Determine the nth term of a progression

2. Compute the sum of A.P. and G.P.
3. Sum to infinity of a given G.P.

Binary Operations

Content:

- Properties of closure, commutativity, associativity and distributivity
- Identity and inverse elements (simple cases only)

Learning Objectives:

1. Solve problems involving closure, commutativity, associativity and distributivity
2. Solve problems involving identity and inverse elements

Matrices and Determinants

Content:

- Algebra of matrices not exceeding 3×3
- Determinants of matrices not exceeding 3×3
- Inverses of 2×2 matrices [excluding quadratic and higher degree equations]

Learning Objectives:

1. Perform basic operations (+, -, $\times$, $\div$) on matrices
2. Calculate determinants
3. Compute inverses of 2×2 matrices

3. Geometry and Trigonometry

Euclidean Geometry

Content:

- Properties of angles and lines
- Polygons: triangles, quadrilaterals and general polygons
- Circles: angle properties, cyclic quadrilaterals and intersecting chords
- Construction

Learning Objectives:

1. Identify various types of lines and angles
2. Solve problems involving polygons
3. Calculate angles using circle theorems
4. Identify construction procedures of special angles, e.g. 30° , 45° , 60° , 75° , 90° , etc.

Mensuration

Content:

- Lengths and areas of plane geometrical figures
- Lengths of arcs and chords of a circle
- Perimeters and areas of sectors and segments of circles
- Surface areas and volumes of simple solids and composite figures
- The earth as a sphere: longitudes and latitudes

Learning Objectives:

1. Calculate the perimeters and areas of triangles, quadrilaterals, circles and composite figures
2. Find the length of an arc, a chord, perimeters and areas of sectors and segments of circles
3. Calculate total surface areas and volumes of cuboids, cylinders, cones, pyramids, prisms, spheres and composite figures
4. Determine the distance between two points on the earth's surface

Loci

Content:

- Locus in 2 dimensions based on geometric principles relating to lines and curves

Learning Objectives:

1. Identify and interpret loci relating to parallel lines, perpendicular bisectors, angle bisectors and circles

Coordinate Geometry

Content:

- Midpoint and gradient of a line segment
- Distance between two points
- Parallel and perpendicular lines
- Equations of straight lines

Learning Objectives:

1. Determine the midpoint and gradient of a line segment
2. Find the distance between two points
3. Identify conditions for parallelism and perpendicularity
4. Find the equation of a line in the two-point form, point-slope form, slope intercept form and the general form

Trigonometry

Content:

- Trigonometric ratios of angles
- Angles of elevation and depression
- Bearings
- Areas and solutions of triangle
- Graphs of sine and cosine
- Sine and cosine formulae

Learning Objectives:

1. Calculate the sine, cosine and tangent of angles between -360° and 360°
2. Apply special angles (e.g. 30° , 45° , 60° , 75° , 90° , 105° , 135°) to solve simple problems in trigonometry
3. Solve problems involving angles of elevation and depression
4. Solve problems involving bearings
5. Apply trigonometric formulae to find areas of triangles
6. Solve problems involving sine and cosine graphs

4. Calculus

Differentiation

Content:

- Limit of a function
- Differentiation of explicit algebraic and simple trigonometric functions—sine, cosine and tangent

Learning Objectives:

1. Find the limit of a function
2. Differentiate explicit algebraic and simple trigonometric functions

Application of differentiation

Content:

- Rate of change
- Maxima and minima

Learning Objectives:

1. Solve problems involving applications of rate of change, maxima and minima

Integration

Content:

- Integration of explicit algebraic and simple trigonometric functions
- Area under the curve

Learning Objectives:

1. Solve problems of integration involving algebraic and simple trigonometric functions
2. Calculate area under the curve (simple cases only)

5. Statistics

Representation of data

Content:

- Frequency distribution
- Histogram, bar chart and pie chart

Learning Objectives:

1. Identify and interpret frequency distribution tables
2. Interpret information on histogram, bar chart and pie chart

Measures of Location

Content:

- Mean, mode and median of ungrouped and grouped data (simple cases only)
- Cumulative frequency

Learning Objectives:

1. Calculate the mean, mode and median of ungrouped and grouped data (simple cases only)
2. Use ogive to find the median, quartiles and percentiles

Measures of Dispersion

Content:

- Range
- Mean deviation
- Variance
- Standard deviation

Learning Objectives:

1. Calculate the range, mean deviation, variance and standard deviation of ungrouped and grouped data

Permutation and Combination

Content:

- Linear and circular arrangements
- Arrangements involving repeated objects

Learning Objectives:

1. Solve simple problems involving permutation and combination

Probability

Content:

- Experimental probability (tossing of coin, throwing of a dice etc)
- Addition and multiplication of probabilities (mutual and independent cases)

Learning Objectives:

1. Solve simple problems in probability (including addition and multiplication)

Recommended Textbooks

1. Adelodun A. A (2000) Distinction in Mathematics: Comprehensive Revision Text, (3rd Edition) Ado -Ekiti: FNPL.
2. Anyebe, J. A. B (1998) Basic Mathematics for Senior Secondary Schools and Remedial Students in Higher/ institutions, Lagos: Kenny Moore.
3. Channon, J. B. Smith, A. M (2001) New General Mathematics for West Africa SSS 1 to 3, Lagos: Longman.
4. David -Osuagwu, M. et al (2000) New School Mathematics for Senior Secondary Schools, Onitsha: Africana – FIRST Publishers.
5. Egbe. E et al (2000) Further Mathematics, Onitsha: Africana – FIRST Publishers
6. Ibude, S. O. et al (2003) Algebra and Calculus for Schools and Colleges: LINCEL Publishers.
7. Tuttuh – Adegun M. R. et al (1997), Further Mathematics Project Books 1 to 3, Ibadan: NPS Educational